



Simmons' Farm

TRAFFIC IMPACT STUDY – REVISION 1

ROBERTS ROAD
KNOX COUNTY, TN

CCI PROJECT NO. 01203-0003.000



11-SA-24-C / 11-A-24-DP
TIS Version 2
10/28/2024

REVISION 1 (10/28/24)

This report replaces the previous version of the traffic impact study dated 09/13/24 prepared for this project in its entirety.

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1.0 EXECUTIVE SUMMARY

This report provides a summary of a traffic impact study that was performed for a proposed residential development to be located along Roberts Road in Knox County. The project site is located on the west side of Roberts Road between E. Emory Road (SR 331) and Washington Pike. The conceptual development plan for this project, Simmons' Farm, proposes a single-family residential development with up to 142 dwelling units. The project is proposed to have two primary access locations onto Roberts Road. Site Access #1 is proposed roughly 300-feet north of Mari Ben Lane and Site Access #2 is proposed roughly 900 feet north of Site Access #1.

The purpose of this study was the evaluation of the traffic operational and safety impacts of the proposed residential development upon roadways in the vicinity of the site. Of particular interest were the two access intersections mentioned above. Additionally, the intersections Roberts Road at E. Emory Road (SR 331), Roberts Road at Washington Pike (eastern intersection), and Roberts Road at Washington Pike (western intersection) were also analyzed. Appropriate intersection evaluations were conducted at these locations for existing and future conditions, both with and without traffic volumes generated from the proposed residential development, to determine the anticipated impacts and to establish recommended measures to mitigate these impacts. These evaluations included intersection capacity analyses, turn lane analyses and others as appropriate.

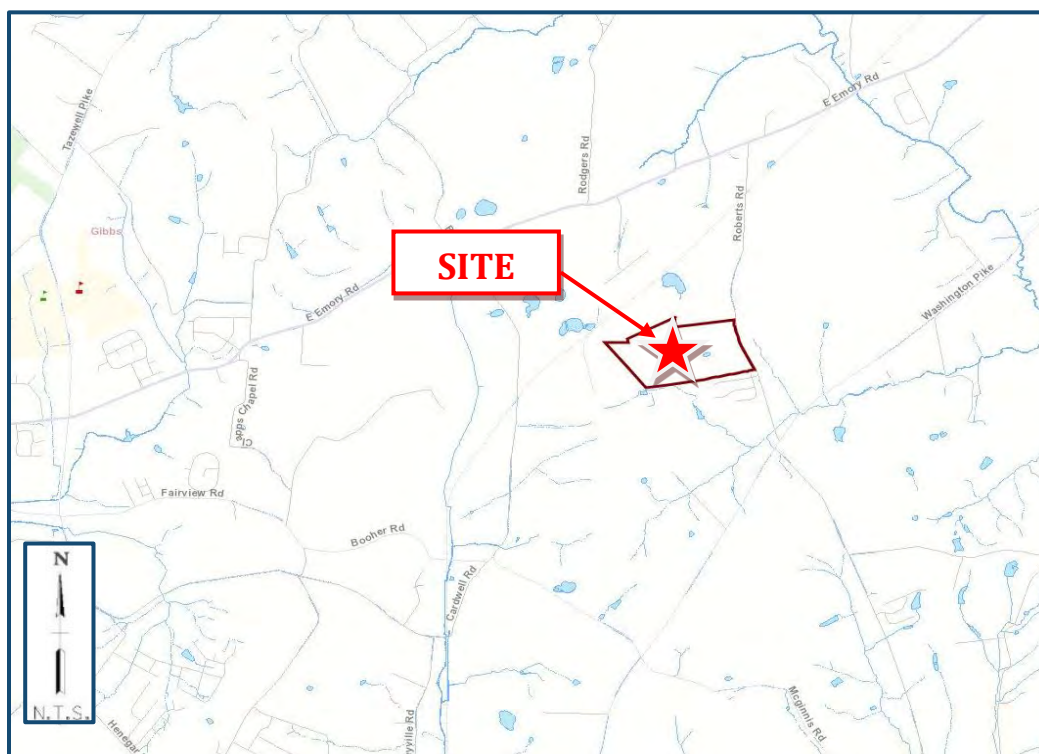
The primary conclusion of this study is that traffic generated from the proposed development will not have major negative impacts on the study intersections. The following listing is a summary of the improvements that are recommended to be implemented with the construction of this project:

1. Install left turn lane (50 feet storage) on E. Emory Road (SR 331) at Roberts Road intersection.
2. At the intersections of Roberts Road at Washington Pike, a left turn lane is warranted during the PM peak at the eastern intersection and during the AM peak hour at the western intersection. Due to the proximity of the eastern and western intersections of Roberts Road at Washington Pike (around 200 feet), installing left turn lanes for opposing movements would not be easily accommodated. It is recommended to realign Roberts Road to create a more traditional four-way intersection to accommodate the additional traffic associated with this development.
3. Maintain intersection corner sight distances on the site driveways by ensuring that new site signage and landscaping is appropriately located.



2.0 INTRODUCTION & PURPOSE OF STUDY

This report provides a summary of a traffic impact study that was performed for a proposed residential development to be located along Roberts Road in Knox County. The project site is located on the west side of Roberts Road between E. Emory Road (SR 331) and Washington Pike. FIGURE 1 is a location map identifying the major roadways in the vicinity of the site.



**FIGURE 1
LOCATION MAP**

The conceptual development plan for this project, Simmons' Farm, proposes a single-family residential development with up to 142 dwelling units. The project is proposed to have two primary access locations onto Roberts Road. Site Access #1 is proposed roughly 300-feet north of Mari Ben Lane and Site Access #2 is proposed roughly 900 feet north of Site Access #1. FIGURE 2 is a Conceptual Site Plan which details the proposed site configuration.

The purpose of this study was the evaluation of the traffic operational and safety impacts of the proposed residential development upon roadways in the vicinity of the site. Of particular interest were the two access intersections mentioned above. Additionally, the intersections Roberts Road at E. Emory Road (SR 331), Roberts Road at Washington Pike (eastern intersection), and Roberts Road at Washington Pike (western intersection) were also analyzed. Appropriate intersection evaluations were conducted at these locations for existing and future conditions, both with and without traffic volumes generated from the proposed residential development, to determine the anticipated impacts and to establish recommended measures to mitigate these impacts. These evaluations included intersection capacity analyses, turn lane analyses and others as appropriate.



FIGURE 2
 CONCEPTUAL SITE PLAN
 (SOUTHLAND ENGINEERING CONSULTANTS, LLC)



3.0 EXISTING CONDITIONS

EXISTING ROADWAY CONDITIONS

According to the Knox County Major Road Plan, Roberts Road is a Major Collector roadway that provides north-south access from E. Emory Road (SR 331) to Washington Pike within the vicinity of the proposed development. The roadway consists of two 10-foot travel lanes and a posted speed limit of 40 mph south of Washington Pike.

According to the Tennessee Department of Transportation (TDOT) and the Knox County Major Road Plan, E. Emory Road (SR 331) is a Major Arterial roadway that provides east-west access across the northern portion of Knox County. In the vicinity of the proposed development, the roadway consists of two 10-foot wide through travel lanes in each direction. The speed limit on E. Emory Road (SR 331) is posted as 45 mph.

Washington Pike is classified as a Major Collector within the vicinity of the proposed development according to the Knox County Major Road Plan. The roadway consists of two 10-foot travel lanes and a posted speed limit of 45 mph.

EXISTING SITE CONDITIONS

The acreage for this project consists of approximately 75 acres located east of Roberts Road. The existing parcel is open, rolling land with no visible structures currently present.

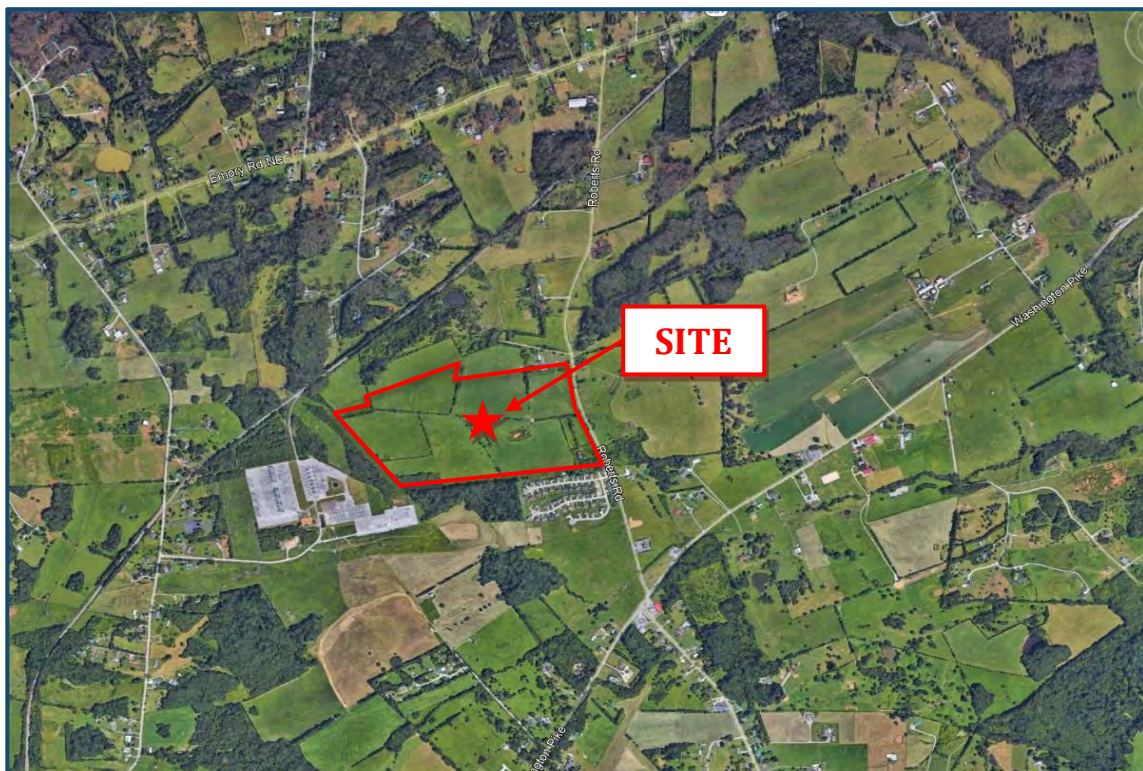


FIGURE 3
EXISTING SITE CONDITIONS

EXISTING TRAFFIC DATA

Existing traffic data was gathered for this study. TDOT collects annual average daily traffic data (AADT) on roadways in the study area, and three count stations located within the project study area were felt to have relevance for this study. The most currently available data from this count station is contained in TABLE 1.

In addition to the available AADT data, intersection turning movement traffic counts were performed to determine the current AM and PM peak hour operating volumes for the studied intersections. The 2024 existing traffic data is summarized in FIGURE 4, and the raw data traffic count summary sheets are contained in APPENDIX A.

TABLE 1
ANNUAL AVERAGE DAILY TRAFFIC COUNT SUMMARY

COUNT YEAR	TDOT COUNT STATION 47000566 ROBERTS ROAD NORTH OF SITE	TDOT COUNT STATION 47000011 SR331 – EMORY ROAD NORTH OF SITE	TDOT COUNT STATION 47000018 WASHINGTON PIKE SOUTH OF SITE
2023	2,681	2,740	3,508
2022	2,573	2,239	3,484
2021	2,391	1,972	3,456
2020	2,129	2,724	3,637
2019	2,397	2,520	3,812

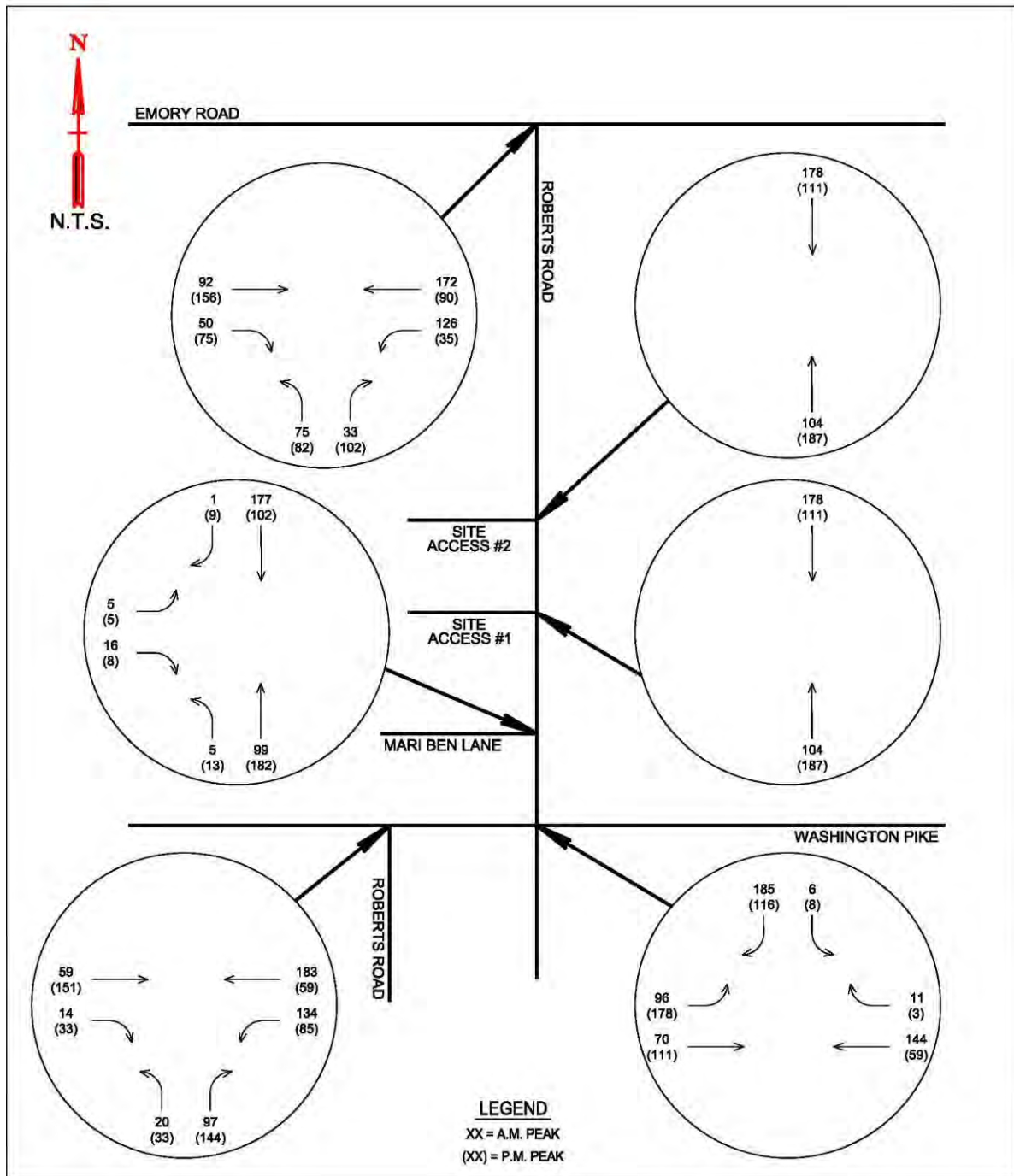


FIGURE 4
EXISTING TRAFFIC VOLUMES



EXISTING CAPACITY ANALYSES / LEVELS-OF-SERVICE

Capacity analyses employing the methods of the Highway Capacity Manual (7th Edition) were conducted for the existing study intersections. The analyses were performed with the 2024 existing traffic volumes and existing intersection traffic control and lane configurations. The intersection of Roberts Road at E. Emory Road (SR 331) was found to operate at a Level-of-Service (LOS) “B” during the AM peak hour with an approach delay of approximately 14.3 seconds and a LOS “B” during the PM peak hour with an approach delay of 12.1 seconds. The intersection of Roberts Road at Washington Pike (eastern intersection) was found to operate at a LOS “B” during the AM peak hour with an approach delay of approximately 10.5 seconds and a LOS “A” during the PM peak hour with an approach delay of 9.6 seconds. The intersection of Roberts Road at Washington Pike (western intersection) was found to operate at a LOS “B” during the AM peak hour with an approach delay of approximately 10.3 seconds and a LOS “B” during the PM peak hour with an approach delay of 11.2 seconds.

The EVALUATIONS section of this report may be referenced for tabular summaries and discussion of these analyses, while more detailed summaries are presented on the computer printouts contained in APPENDIX C. Also contained in APPENDIX C is a section entitled “Capacity and Level of Service Concepts,” which provides a description of the utilized procedures.



4.0 BACKGROUND CONDITIONS

BACKGROUND TRAFFIC GROWTH

The proposed development is anticipated to be constructed by 2028. To determine traffic volumes resulting solely from background traffic growth to years 2024 and 2028, it was necessary to establish an annual growth rate for existing traffic. The AADT values previously discussed, as well as knowledge of the area, were used to determine an approximate annual growth rate. Based on the available data, an annual growth rate of 1.77% was calculated when averaging the AADT traffic data in TABLE 1. For the purposes of this report, a 2% annual growth rate was assumed. FIGURE 5 contains the background traffic volumes that would result from a 2% annual growth rate from year 2024, when the counts were conducted, to year 2028. The background traffic volumes shown in FIGURE 5 represent Year 2028 background growth conditions without traffic related to the proposed development.

BACKGROUND CAPACITY ANALYSES / LEVELS-OF-SERVICE

Appropriate capacity analyses as described in the Existing Conditions section of this report were conducted utilizing the Year 2028 background volumes shown in FIGURES 5. Under Year 2028 background conditions without traffic related to the development, the intersection of Roberts Road at E. Emory Road (SR 331) was found to operate at a LOS “C” during the AM peak hour with an approach delay of approximately 15.4 seconds and a LOS “B” during the PM peak hour with an approach delay of 12.7 seconds. The intersection of Roberts Road at Washington Pike (eastern intersection) was found to operate at a LOS “B” during the AM peak hour with an approach delay of approximately 10.5 seconds and a LOS “A” during the PM peak hour with an approach delay of 9.8 seconds. The intersection of Roberts Road at Washington Pike (western intersection) was found to operate at a LOS “B” during the AM peak hour with an approach delay of approximately 11.5 seconds and a LOS “B” during the PM peak hour with an approach delay of 11.2 seconds.

The EVALUATIONS section of this report may be referenced for tabular summaries and discussion of these analyses, while more detailed summaries are presented on the computer printouts contained in APPENDIX C.

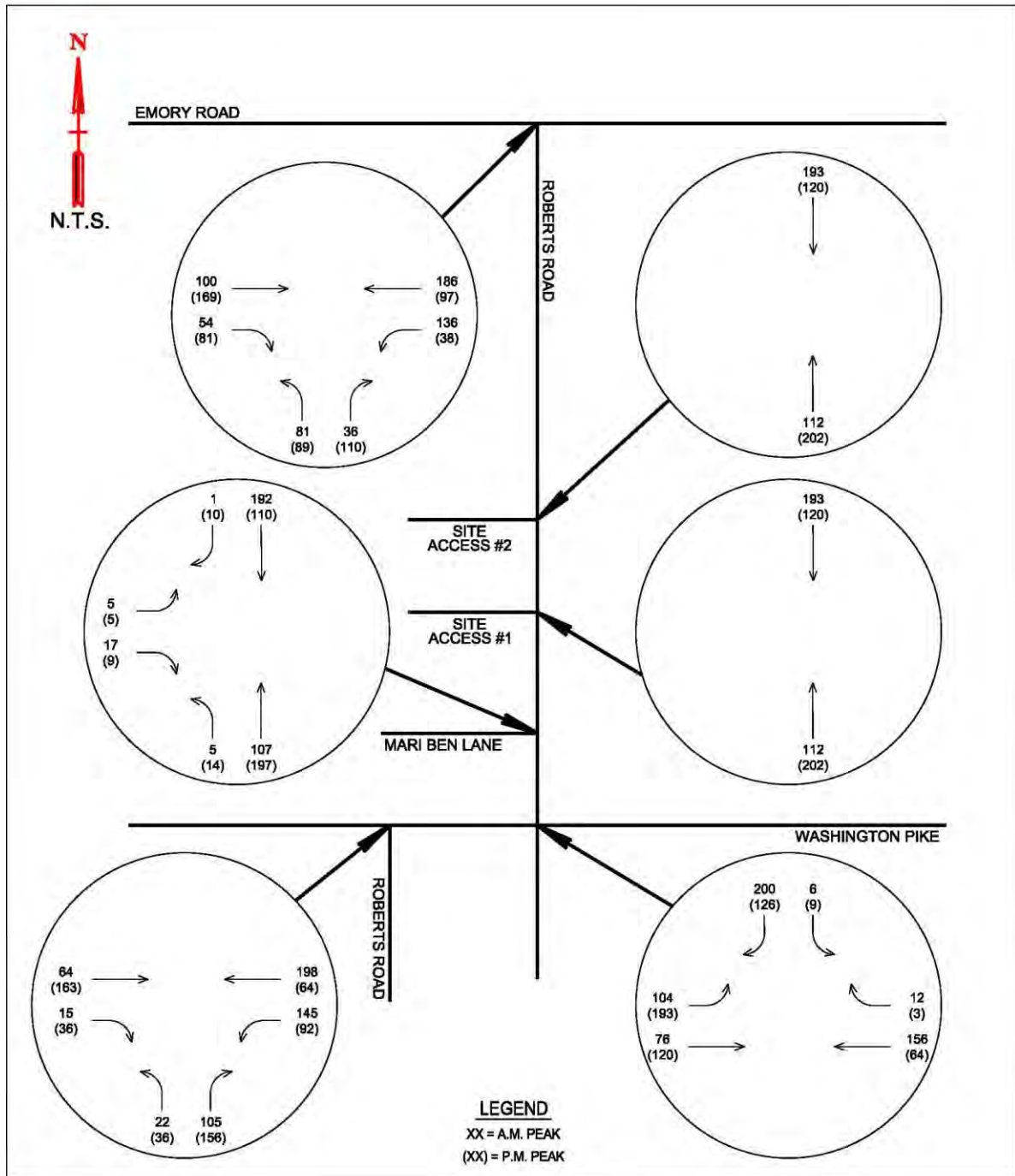


FIGURE 5
BACKGROUND TRAFFIC VOLUMES (2028)



5.0 FUTURE CONDITIONS

TRIP GENERATION

In order to estimate the expected traffic volumes to be generated by the proposed development, the procedures recommended by the Institute of Transportation Engineers were utilized. Trip generation rates developed by the Institute of Transportation Engineers (Trip Generation, 11th Edition) were utilized to generate the estimated trips for the proposed development. The generated traffic volumes were determined based on the data for the weekday, AM peak hour and PM peak hour. TABLE 2 provides a summary of the expected newly generated traffic. More detailed information is contained in APPENDIX B.

TABLE 2 TRIP GENERATION SUMMARY					
LAND USE	ITE CODE	NO. OF DWELLING UNITS	WEEKDAY (TRIPS/DAY)	AM PEAK HOUR (TRIPS/HR)	PM PEAK HOUR (TRIPS/HR)
Single-Family Detached Housing	210	142	1,339	99	133
Entering Trips			669	25	84
Exiting Trips			670	74	49

TRIP DISTRIBUTION AND ASSIGNMENT

FIGURE 6 provides a summary of the trip distribution patterns assumed for this study. These patterns were based on the existing traffic patterns derived from the traffic counts and knowledge of the area. FIGURE 7 provides a summary of the anticipated trips associated with the final buildout of the development as assigned to the study intersections utilizing the trip generation data from TABLE 2 and the distribution patterns shown in FIGURE 6.

Future projected traffic volumes were developed by adding the generated trips shown in FIGURE 7 to the 2028 background traffic volumes developed in the previous section. These combined year volumes reflect the existing traffic, the background traffic growth, and the newly generated traffic from the proposed development. FIGURE 8 represents the 2028 combined traffic data with anticipated trips from the proposed development. The volumes shown in FIGURE 8 are the combined volumes used in the analysis of the future conditions.



FUTURE CAPACITY ANALYSES / LEVELS-OF-SERVICE

Capacity analyses as described in the Existing Conditions section of this report were conducted for 2026, full build-out conditions, and 2031, TDOT target year, utilizing the Year 2026 and 2031 combined volumes shown in FIGURES 10 and 11. Under Year 2026 combined conditions including traffic related to the development, the intersection of Roberts Road at E. Emory Road (SR 331) was found to operate at a LOS “C” during the AM peak hour with an approach delay of approximately 16.6 seconds and a LOS “B” during the PM peak hour with an approach delay of 13.4 seconds. The intersection of Roberts Road at Washington Pike (eastern intersection) was found to operate at a LOS “B” during the AM peak hour with an approach delay of approximately 11.5 seconds and a LOS “B” during the PM peak hour with an approach delay of 10.3 seconds. The intersection of Roberts Road at Washington Pike (western intersection) was found to operate at a LOS “B” during the AM peak hour with an approach delay of approximately 10.9 seconds and a LOS “B” during the PM peak hour with an approach delay of 12.5 seconds.

Proposed Site Access #1 is anticipated to operate at a LOS “A” during the AM and PM peak hours, 9.8 seconds delay and 9.4 seconds delay, respectively. Proposed Site Access #2 is anticipated to operate at a LOS “B” during the AM and PM peak hours, 10.4 seconds delay each peak hour.

The EVALUATIONS section of this report may be referenced for tabular summaries and discussion of these analyses, while more detailed summaries are presented on the computer printouts contained in APPENDIX C.

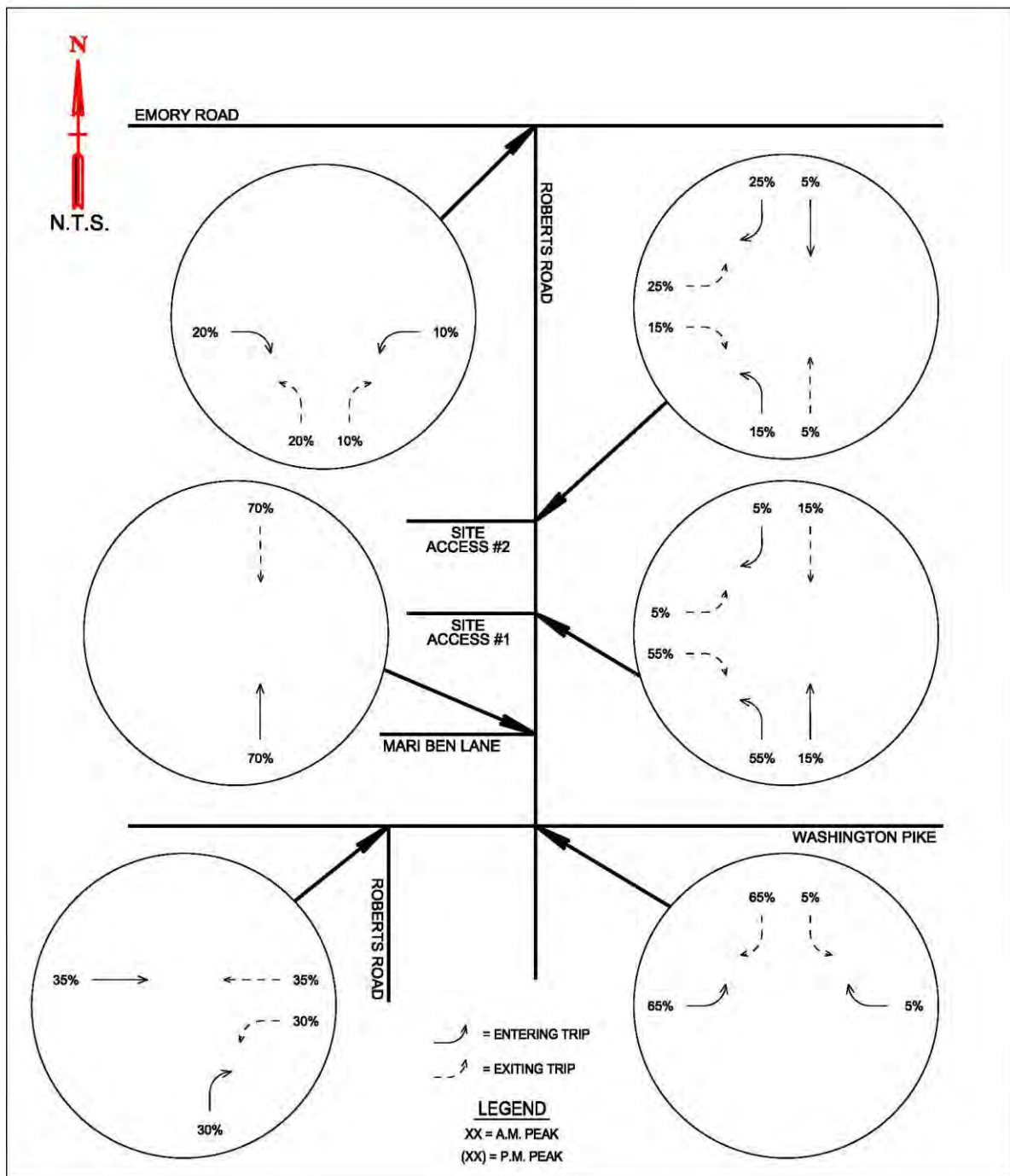
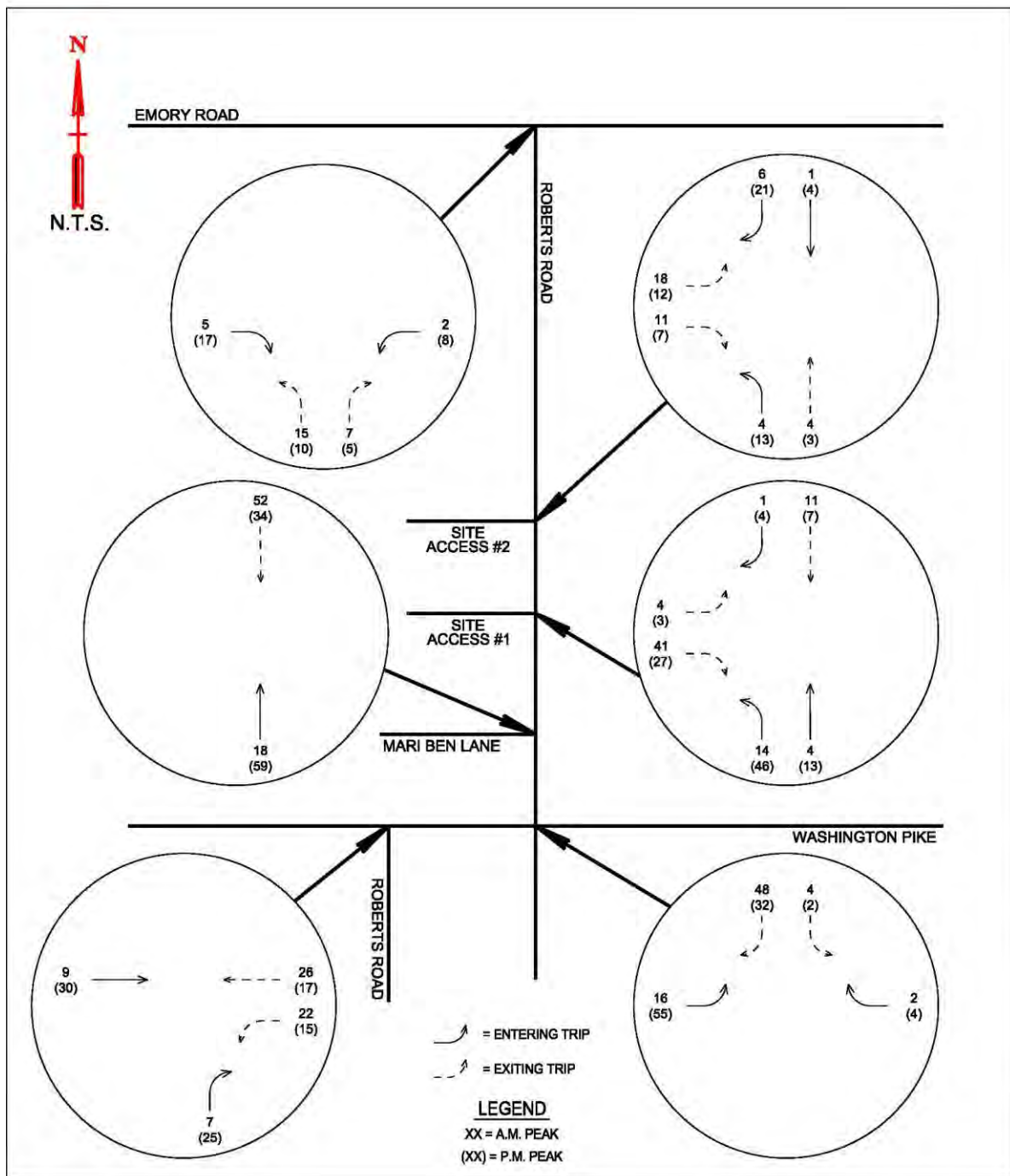


FIGURE 6
TRIP DISTRIBUTION



**FIGURE 7
TRIP ASSIGNMENT**

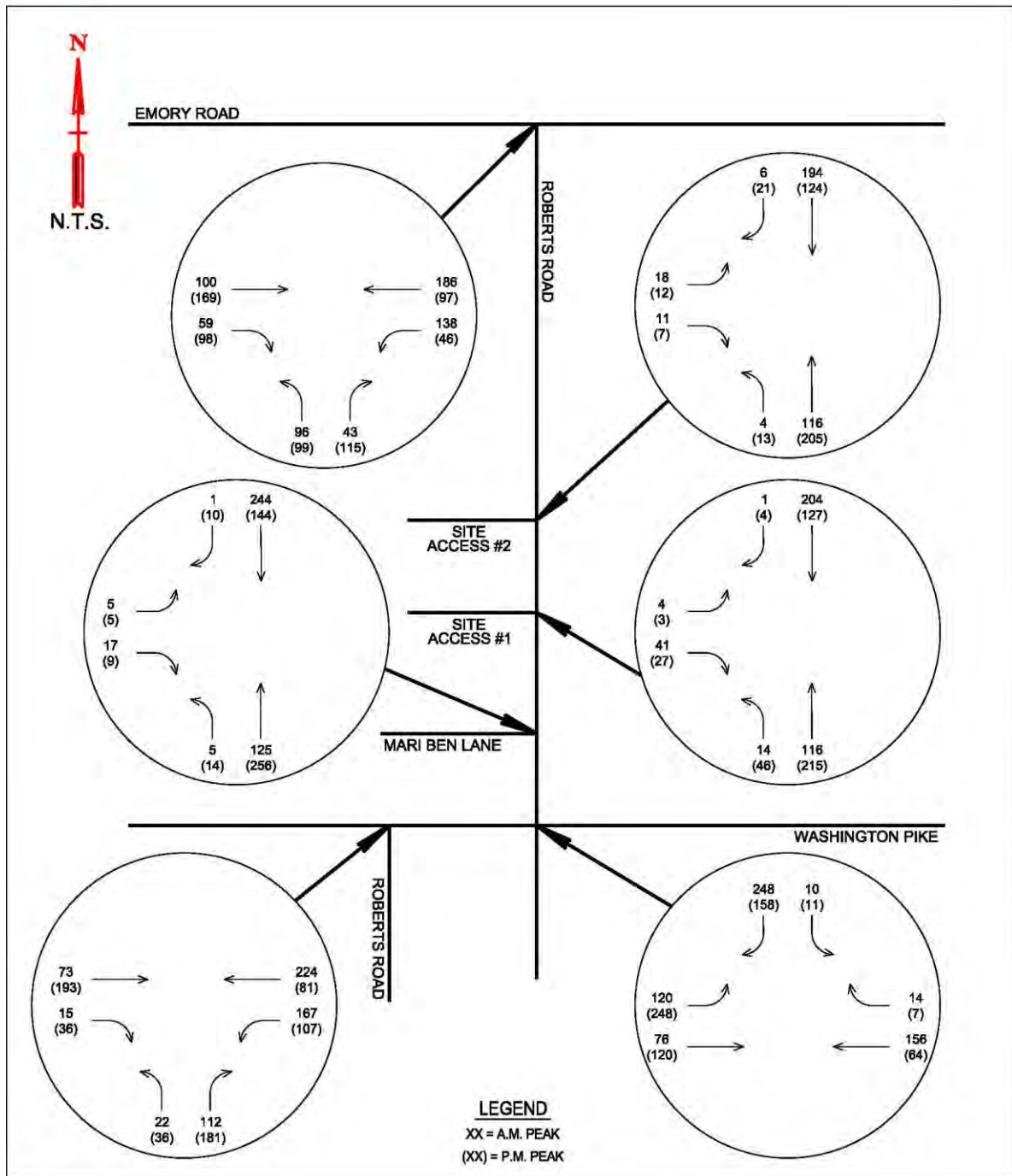


FIGURE 8
COMBINED TRAFFIC VOLUMES (2028)

6.0 EVALUATIONS

INTERSECTION CAPACITY ANALYSES

**TABLE 3
CAPACITY ANALYSIS SUMMARY**

INTERSECTION	TIME PERIOD	YEAR 2024 EXISTING (LOS/DELAY)	YEAR 2028 BACKGROUND (LOS/DELAY)	YEAR 2028 COMBINED (LOS/DELAY)
Roberts Road at E. Emory Road (SR 331) (SIDE STREET STOP) ¹	A.M.	B 14.3	C 15.4	C 16.6
	P.M.	B 12.1	B 12.7	B 13.4
Roberts Road at Washington Pike (East Intersection) (SIDE STREET STOP) ¹	A.M.	B 10.5	B 10.5	B 11.5
	P.M.	A 9.6	A 9.8	B 10.3
Roberts Road at Washington Pike (West Intersection) (SIDE STREET STOP) ¹	A.M.	B 10.3	B 10.6	B 10.9
	P.M.	B 11.2	B 11.6	B 12.5
Proposed Site Access #1 at Roberts Road (SIDE STREET STOP) ¹	A.M.	-	-	A 9.8
	P.M.	-	-	A 9.4
Proposed Site Access #2 at Roberts Road (SIDE STREET STOP) ¹	A.M.	-	-	B 10.4
	P.M.	-	-	B 10.4

¹SIDE STREET STOP CONTROL – Level-of-Service and Average Vehicular Delay (seconds) for side street approach utilizing HCM methodology.

The results summarized in TABLE 3 indicate that acceptable level-of-service “C” or better operation can be anticipated at all study intersections under the evaluated conditions, including combined conditions.



TURN LANE ASSESSMENT

The studied intersections were evaluated for left and right-turn lane warrants utilizing TDOT's Highway System Access Manual turn lane volume thresholds for the intersection of Roberts Road at E. Emory Road (SR 331) and Knox County's turn lane volume thresholds for each intersection of Roberts Road at Washington Pike. Existing, Background, and Combined conditions were evaluated as part of this assessment with the following results:

- Existing Traffic
 - Roberts Road at E. Emory Road (SR 331)
 - Left Turn Warrant – AM Peak: **Met** / PM Peak: **Met**
 - Right Turn Warrant – AM Peak: Not Met / PM Peak: Not Met
 - Roberts Road at Washington Pike (Eastern)
 - Left Turn Warrant – AM Peak: Not Met / PM Peak: Not Met
 - Right Turn Warrant – AM Peak: Not Met / PM Peak: Not Met
 - Roberts Road at Washington Pike (Western)
 - Left Turn Warrant – AM Peak: Not Met / PM Peak: Not Met
 - Right Turn Warrant – AM Peak: Not Met / PM Peak: Not Met
- Background Traffic
 - Roberts Road at E. Emory Road (SR 331)
 - Left Turn Warrant – AM Peak: **Met** / PM Peak: **Met**
 - Right Turn Warrant – AM Peak: Not Met / PM Peak: Not Met
 - Roberts Road at Washington Pike (Eastern)
 - Left Turn Warrant – AM Peak: Not Met / PM Peak: Not Met
 - Right Turn Warrant – AM Peak: Not Met / PM Peak: Not Met
 - Roberts Road at Washington Pike (Western)
 - Left Turn Warrant – AM Peak: Not Met / PM Peak: Not Met
 - Right Turn Warrant – AM Peak: Not Met / PM Peak: Not Met
- Build-out Traffic
 - Roberts Road at E. Emory Road (SR 331)
 - Left Turn Warrant – AM Peak: **Met** / PM Peak: **Met**
 - Right Turn Warrant – AM Peak: Not Met / PM Peak: Not Met
 - Roberts Road at Washington Pike (Eastern)
 - Left Turn Warrant – AM Peak: Not Met / PM Peak: **Met**
 - Right Turn Warrant – AM Peak: Not Met / PM Peak: Not Met
 - Roberts Road at Washington Pike (Western)
 - Left Turn Warrant – AM Peak: **Met** / PM Peak: Not Met
 - Right Turn Warrant – AM Peak: Not Met / PM Peak: Not Met

As indicated above, the intersection of Roberts Road at E. Emory Road (SR 331) meets left lane warrants under Existing, Background, and Combined conditions during both the AM and PM peak hours. At the intersections of Roberts Road at Washington Pike (eastern & western intersections), under Combined conditions, the left turn lane warrant is met for during the PM peak hour at the eastern intersection and during the AM peak hour at the western intersection. However, it is worth noting that the “Opposing Volume” threshold is listed at 100 vehicles while the actual volumes are 71 vehicles at the eastern intersection and 88 vehicles at the western intersection for this movement. Turn lane warrant analyses worksheets are in APPENDIX E.



SIGHT DISTANCE ASSESSMENT

Intersection sight distance was assessed looking both directions from the side street stop condition at each of the studied intersections. The intersection of Roberts Road at E. Emory Road (SR 331) utilized AASHTO sight distance requirements since E. Emory Rd (SR 331) is a TDOT maintained facility. The Roberts Road intersections with Washington Pike, as well as the proposed site access locations with Roberts Road, utilized the Knox County sight distance requirement methodology of 10 times the posted speed limit.

At the intersection of Roberts Road at E. Emory Road (SR 331), E. Emory Road is a 45-mph facility. Based on AASHTO sight distance requirements for 45 mph roadways, 500 feet of sight distance is required to make a left turn, and 430 feet of sight distance is required to make a right turn from a side street stop-controlled scenario. Field measurements indicate that roughly 280 feet of sight distance is available when looking right onto E. Emory Road and more than 1,000 feet when looking left. The required 500 feet of sight distance to make a left turn from stop is not currently met. Intersection warning signs with supplemental advisory speed limits of 20 mph and “Roberts Rd” are currently installed along E. Emory Road to warn drivers of the approaching intersection of Roberts Road. The vertical roadway geometry of E. Emory Road is the primary reason why the required 500 feet of sight distance is not met.

At the intersection of Roberts Road at Washington Pike, Washington Pike is a 45-mph facility. Based on Knox County sight distance requirements for 45 mph roadways, 450 feet of sight distance is required to make a left turn, and 450 feet of sight distance is required to make a right turn from a side street stop-controlled scenario. For the western intersection of Roberts Road at Washington Pike, field measurements indicate that roughly 620 feet of sight distance is available when looking left onto Washington Pike and 355’ feet when looking right. The required 450 feet of sight distance to make a left and right turn from stop is not currently met. An intersection configuration warning sign with a supplemental advisory speed limit of 35 mph is currently installed along eastbound Washington Pike to warn drivers of the approaching intersection of Roberts Road. The vertical roadway geometry of Washington Pike is the primary reason why the required 450 feet of sight distance is not met.

For the eastern intersection of Roberts Road at Washington Pike, field measurements indicate that roughly 740 feet of sight distance is available when looking left onto Washington Pike and 850 feet when looking right. The required 450 feet of sight distance to make a left and right turn from stop is currently met for this intersection.

At the intersection of Roberts Road at proposed Site Access #1 and proposed Access #2, Roberts Road is a 40-mph facility. Based on Knox County sight distance requirements for 40 mph roadways, 400 feet of sight distance is required to make a left turn, and 400 feet of sight distance is required to make a right turn from a side street stop-controlled scenario. For proposed Site Access #1, field measurements indicate that roughly 360 feet of sight distance is available when looking right onto Roberts Road and 720 feet when looking left. For proposed Site Access #2, field measurements indicate that 605 feet of sight distance is available when looking right onto Roberts Road and 380 feet when looking left. The primary reason for limited measured sight distances for the proposed access points is excessive vegetation. Due to the geometry of Roberts Road within the vicinity of each proposed access point, it is believed that with proper clearing and grubbing that the required sight distances of 400 feet will be met.



7.0 CONCLUSIONS & RECOMMENDATIONS

The primary conclusion of this study is that traffic generated from the proposed development will not have major negative impacts on the study intersections. The following listing is a summary of the improvements that are recommended to be implemented with the construction of this project:

1. Install left turn lane (50 feet storage) on E. Emory Road (SR 331) at Roberts Road intersection.
2. At the intersections of Roberts Road at Washington Pike, a left turn lane is warranted during the PM peak at the eastern intersection and during the AM peak hour at the western intersection. Due to the proximity of the eastern and western intersections of Roberts Road at Washington Pike (around 200 feet), installing left turn lanes for opposing movements would not be easily accommodated. It is recommended to realign Roberts Road to create a more traditional four-way intersection to accommodate the additional traffic associated with this development.
3. Maintain intersection corner sight distances on the site driveways by ensuring that new site signage and landscaping is appropriately located.

APPENDIX A | TRAFFIC DATA
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APPENDIX A | TRAFFIC DATA

Peak Hour Turning Movement Count

City: Corryton

Date: 11/29/2023



Project ID: 23-190064-001
Location: Roberts Rd & Mari Ben Ln
City: Corryton

Day: Wednesday
Date: 11/29/2023

Groups Printed - Cars, PU, Vans - Heavy Trucks

	Roberts Rd Northbound						Roberts Rd Southbound						Mari Ben Ln Eastbound						Mari Ben Ln Westbound							
Start Time	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Int. Total	
7:00 AM	0	21	0	0	0	21	0	40	1	0	0	41	2	0	1	0	0	3	0	0	0	0	0	0	65	
7:15 AM	0	18	0	0	1	18	0	43	0	0	0	43	2	0	9	0	2	11	0	0	0	0	0	0	72	
7:30 AM	2	26	0	0	0	28	0	51	0	0	0	51	1	0	4	0	0	5	0	0	0	0	0	0	84	
7:45 AM	3	34	0	0	0	37	0	43	0	0	0	43	0	0	2	0	0	2	0	0	0	0	0	0	82	
Total	5	99	0	0	1	104	0	177	1	0	0	178	5	0	16	0	2	21	0	0	0	0	0	0	303	
8:00 AM	1	17	0	0	0	18	0	33	1	0	0	34	3	0	4	0	0	7	0	0	0	0	0	0	59	
8:15 AM	0	23	0	0	0	23	0	27	0	0	0	27	0	0	1	0	0	1	0	0	0	0	0	0	51	
8:30 AM	1	16	0	0	0	17	0	24	1	0	0	25	2	0	0	0	0	2	0	0	0	0	0	0	44	
8:45 AM	1	24	0	0	0	25	0	17	1	0	0	18	0	0	2	0	0	2	0	0	0	0	0	0	45	
Total	3	80	0	0	0	83	0	101	3	0	0	104	5	0	7	0	0	12	0	0	0	0	0	0	199	
BREAK																										
4:00 PM	2	36	0	0	0	38	0	38	1	0	0	39	1	0	1	0	0	2	0	0	0	0	0	0	79	
4:15 PM	1	50	0	0	0	51	0	23	1	0	0	24	1	0	3	0	0	4	0	0	0	0	0	0	79	
4:30 PM	6	45	0	0	0	51	0	29	2	0	0	31	1	0	3	0	0	4	0	0	0	0	0	0	86	
4:45 PM	3	39	0	0	0	42	0	26	3	0	0	29	1	0	1	0	0	2	0	0	0	0	0	0	73	
Total	12	170	0	0	0	182	0	116	7	0	0	123	4	0	8	0	0	12	0	0	0	0	0	0	317	
5:00 PM	3	48	0	0	0	51	0	24	3	0	0	27	2	0	1	0	0	3	0	0	0	0	0	0	81	
5:15 PM	1	35	0	0	0	36	0	26	1	0	0	27	1	0	2	0	0	3	0	0	0	0	0	0	66	
5:30 PM	1	53	0	0	0	54	0	33	0	0	0	33	3	0	2	0	0	5	0	0	0	0	0	0	92	
5:45 PM	3	48	0	0	0	51	0	18	1	0	0	19	2	0	0	0	0	2	0	0	0	0	0	0	72	
Total	8	184	0	0	0	192	0	101	5	0	0	106	8	0	5	0	0	13	0	0	0	0	0	0	311	
Grand Total	28	533	0	0	1	561	0	495	16	0	0	511	22	0	36	0	2	58	0	0	0	0	0	0	1130	
Apprch %	5.0	95.0	0.0	0.0	0.2		0.0	96.9	3.1	0.0	0.0		37.9	0.0	62.1	0.0	3.4		0.0	0.0	0.0	0.0	0.0			
Total %	2.5	47.2	0.0	0.0	0.1	49.6	0.0	43.8	1.4	0.0	0.0	45.2	1.9	0.0	3.2	0.0	0.2	5.1	0.0	0.0	0.0	0.0	0.0	0.0		
Cars, PU, Vans	27	514	0	0		541	0	479	15	0		494	21	0	34	0		55	0	0	0	0			1090	
% Cars, PU, Vans	96.4	96.4	0.0	0.0		96.4	0.0	96.8	93.8	0.0		96.7	95.5	0.0	94.4	0.0		94.8	0.0	0.0	0.0	0.0		0.0	96.5	
Heavy trucks	1	19	0	0		20	0	16	1	0		17	1	0	2	0		3	0	0	0	0			40	
%Heavy trucks	3.6	3.6	0.0	0.0		3.6	0.0	3.2	6.3	0.0		3.3	4.5	0.0	5.6	0.0		5.2	0.0	0.0	0.0	0.0		0.0	3.5	

Project ID: 23-190064-001
Location: Roberts Rd & Mari Ben Ln
City: Corryton

PEAK HOURS

Day: Wednesday
Date: 11/29/2023

AM

	Roberts Rd Northbound					Roberts Rd Southbound					Mari Ben Ln Eastbound					Mari Ben Ln Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 07:00 AM - 09:00 AM																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
7:00 AM	0	21	0	0	21	0	40	1	0	41	2	0	1	0	3	0	0	0	0	0	65
7:15 AM	0	18	0	0	18	0	43	0	0	43	2	0	9	0	11	0	0	0	0	0	72
7:30 AM	2	26	0	0	28	0	51	0	0	51	1	0	4	0	5	0	0	0	0	0	84
7:45 AM	3	34	0	0	37	0	43	0	0	43	0	0	2	0	2	0	0	0	0	0	82
Total Volume	5	99	0	0	104	0	177	1	0	178	5	0	16	0	21	0	0	0	0	0	303
% App. Total	4.8	95.2	0.0	0.0	100	0.0	99.4	0.6	0.0	100	23.8	0.0	76.2	0.0	100	0.0	0.0	0.0	0.0	0	
PHF	0.703					0.873					0.477										0.902
Cars, PU, Vans	5	96	0	0	101	0	169	1	0	170	5	0	15	0	20	0	0	0	0	0	291
% Cars, PU, Vans	100.0	97.0	0.0	0.0	97.1	0.0	95.5	100.0	0.0	95.5	100.0	0.0	93.8	0.0	95.2	0.0	0.0	0.0	0.0	0.0	96.0
Heavy trucks	0	3	0	0	3	0	8	0	0	8	0	0	1	0	1	0	0	0	0	0	12
%Heavy trucks	0.0	3.0	0.0	0.0	2.9	0.0	4.5	0.0	0.0	4.5	0.0	0.0	6.3	0.0	4.8	0.0	0.0	0.0	0.0	0.0	4.0

PM

	Roberts Rd Northbound					Roberts Rd Southbound					Mari Ben Ln Eastbound					Mari Ben Ln Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 04:00 PM - 06:00 PM																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
4:15 PM	1	50	0	0	51	0	23	1	0	24	1	0	3	0	4	0	0	0	0	0	79
4:30 PM	6	45	0	0	51	0	29	2	0	31	1	0	3	0	4	0	0	0	0	0	86
4:45 PM	3	39	0	0	42	0	26	3	0	29	1	0	1	0	2	0	0	0	0	0	73
5:00 PM	3	48	0	0	51	0	24	3	0	27	2	0	1	0	3	0	0	0	0	0	81
Total Volume	13	182	0	0	195	0	102	9	0	111	5	0	8	0	13	0	0	0	0	0	319
% App. Total	6.7	93.3	0.0	0.0	100	0.0	91.9	8.1	0.0	100	38.5	0.0	61.5	0.0	100	0.0	0.0	0.0	0.0	0	
PHF	0.956					0.895					0.813										0.927
Cars, PU, Vans	13	171	0	0	184	0	98	9	0	107	5	0	7	0	12	0	0	0	0	0	303
% Cars, PU, Vans	100.0	94.0	0.0	0.0	94.4	0.0	96.1	100.0	0.0	96.4	100.0	0.0	87.5	0.0	92.3	0.0	0.0	0.0	0.0	0.0	95.0
Heavy trucks	0	11	0	0	11	0	4	0	0	4	0	0	1	0	1	0	0	0	0	0	16
%Heavy trucks	0.0	6.0	0.0	0.0	5.6	0.0	3.9	0.0	0.0	3.6	0.0	0.0	12.5	0.0	7.7	0.0	0.0	0.0	0.0	0.0	5.0

Peak Hour Turning Movement Count

City: Corryton

Date: 11/29/2023



Project ID: 23-190064-002
Location: Roberts Rd & Emory Rd NE
City: Corryton

Day: Wednesday
Date: 11/29/2023

Groups Printed - Cars, PU, Vans - Heavy Trucks

Start Time	Roberts Rd Northbound						Roberts Rd Southbound						Emory Rd NE Eastbound						Emory Rd NE Westbound						Int. Total
	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	
7:00 AM	15	0	7	0	0	22	0	0	0	0	0	0	0	15	5	0	0	20	35	41	0	0	0	76	118
7:15 AM	16	0	7	0	0	23	0	0	0	0	0	0	0	22	14	0	0	36	32	43	0	0	0	75	134
7:30 AM	17	0	7	0	0	24	0	0	0	0	0	0	0	28	20	0	0	48	31	43	0	0	0	74	146
7:45 AM	27	0	12	0	0	39	0	0	0	0	0	0	0	27	11	0	0	38	28	45	0	0	0	73	150
Total	75	0	33	0	0	108	0	0	0	0	0	0	0	92	50	0	0	142	126	172	0	0	0	298	548
8:00 AM	16	0	3	0	0	19	0	0	0	0	0	0	0	14	16	0	0	30	18	25	0	0	0	43	92
8:15 AM	13	0	8	0	0	21	0	0	0	0	0	0	0	17	13	0	0	30	15	24	0	0	0	39	90
8:30 AM	10	0	1	0	0	11	0	0	0	0	0	0	0	19	12	0	0	31	10	22	0	0	0	32	74
8:45 AM	13	0	16	0	0	29	0	0	0	0	0	0	0	14	6	0	0	20	9	18	0	0	0	27	76
Total	52	0	28	0	0	80	0	0	0	0	0	0	0	64	47	0	0	111	52	89	0	0	0	141	332
BREAK																									
4:00 PM	13	0	29	0	0	42	0	0	0	0	0	0	0	38	17	0	0	55	15	19	0	0	0	34	131
4:15 PM	23	0	28	0	0	51	0	0	0	0	0	0	0	37	20	0	0	57	6	20	0	0	0	26	134
4:30 PM	20	0	22	0	0	42	0	0	0	0	0	0	0	37	17	0	0	54	15	30	0	0	0	45	141
4:45 PM	19	0	22	0	0	41	0	0	0	0	0	0	0	40	21	0	0	61	6	22	0	0	0	28	130
Total	75	0	101	0	0	176	0	0	0	0	0	0	0	152	75	0	0	227	42	91	0	0	0	133	536
5:00 PM	20	0	30	0	0	50	0	0	0	0	0	0	0	42	17	0	0	59	8	18	0	0	0	26	135
5:15 PM	15	0	22	0	0	37	0	0	0	0	0	0	0	30	17	0	0	47	10	29	0	0	0	39	123
5:30 PM	21	0	29	0	0	50	0	0	0	0	0	0	0	34	21	0	0	55	10	27	0	0	0	37	142
5:45 PM	15	0	36	0	0	51	0	0	0	0	0	0	0	27	12	0	0	39	10	24	0	0	0	34	124
Total	71	0	117	0	0	188	0	0	0	0	0	0	0	133	67	0	0	200	38	98	0	0	0	136	524
Grand Total	273	0	279	0	0	552	0	0	0	0	0	0	0	441	239	0	0	680	258	450	0	0	0	708	1940
Apprch %	49.5	0.0	50.5	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	64.9	35.1	0.0	0.0		36.4	63.6	0.0	0.0	0.0		
Total %	14.1	0.0	14.4	0.0	0.0	28.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.7	12.3	0.0	0.0	35.1	13.3	23.2	0.0	0.0	0.0	36.5	
Cars, PU, Vans	258	0	272	0		530	0	0	0	0		0	0	422	227	0		649	252	425	0	0		677	1856
% Cars, PU, Vans	94.5	0.0	97.5	0.0		96.0	0.0	0.0	0.0	0.0		0.0	0.0	95.7	95.0	0.0		95.4	97.7	94.4	0.0	0.0		95.6	95.7
Heavy trucks	15	0	7	0		22	0	0	0	0		0	0	19	12	0		31	6	25	0	0		31	84
%Heavy trucks	5.5	0.0	2.5	0.0		4.0	0.0	0.0	0.0	0.0		0.0	0.0	4.3	5.0	0.0		4.6	2.3	5.6	0.0	0.0		4.4	4.3

Project ID: 23-190064-002
Location: Roberts Rd & Emory Rd NE
City: Corryton

PEAK HOURS

Day: Wednesday
Date: 11/29/2023

AM

	Roberts Rd Northbound					Roberts Rd Southbound					Emory Rd NE Eastbound					Emory Rd NE Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 07:00 AM - 09:00 AM																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
7:00 AM	15	0	7	0	22	0	0	0	0	0	0	15	5	0	20	35	41	0	0	76	118
7:15 AM	16	0	7	0	23	0	0	0	0	0	0	22	14	0	36	32	43	0	0	75	134
7:30 AM	17	0	7	0	24	0	0	0	0	0	0	28	20	0	48	31	43	0	0	74	146
7:45 AM	27	0	12	0	39	0	0	0	0	0	0	27	11	0	38	28	45	0	0	73	150
Total Volume	75	0	33	0	108	0	0	0	0	0	0	92	50	0	142	126	172	0	0	298	548
% App. Total	69.4	0.0	30.6	0.0	100	0.0	0.0	0.0	0.0	0	0.0	64.8	35.2	0.0	100	42.3	57.7	0.0	0.0	100	
PHF	0.692										0.740					0.980					0.913
Cars, PU, Vans	73	0	32	0	105	0	0	0	0	0	0	89	46	0	135	123	164	0	0	287	527
% Cars, PU, Vans	97.3	0.0	97.0	0.0	97.2	0.0	0.0	0.0	0.0	0.0	0.0	96.7	92.0	0.0	95.1	97.6	95.3	0.0	0.0	96.3	96.2
Heavy trucks	2	0	1	0	3	0	0	0	0	0	0	3	4	0	7	3	8	0	0	11	21
% Heavy trucks	2.7	0.0	3.0	0.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	3.3	8.0	0.0	4.9	2.4	4.7	0.0	0.0	3.7	3.8

PM

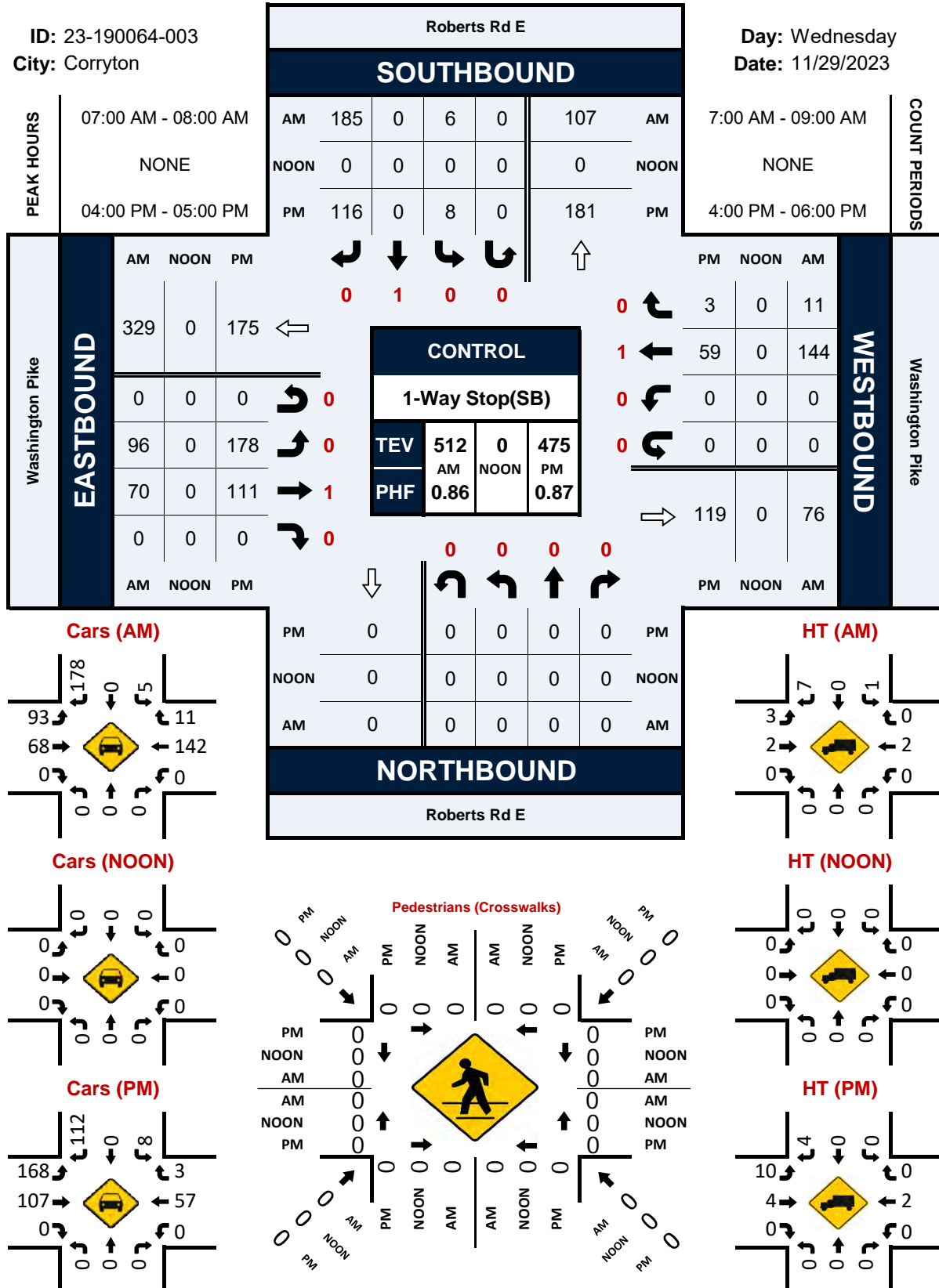
	Roberts Rd Northbound					Roberts Rd Southbound					Emory Rd NE Eastbound					Emory Rd NE Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 04:00 PM - 06:00 PM																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
4:15 PM	23	0	28	0	51	0	0	0	0	0	0	37	20	0	57	6	20	0	0	26	134
4:30 PM	20	0	22	0	42	0	0	0	0	0	0	37	17	0	54	15	30	0	0	45	141
4:45 PM	19	0	22	0	41	0	0	0	0	0	0	40	21	0	61	6	22	0	0	28	130
5:00 PM	20	0	30	0	50	0	0	0	0	0	0	42	17	0	59	8	18	0	0	26	135
Total Volume	82	0	102	0	184	0	0	0	0	0	0	156	75	0	231	35	90	0	0	125	540
% App. Total	44.6	0.0	55.4	0.0	100	0.0	0.0	0.0	0.0	0	0.0	67.5	32.5	0.0	100	28.0	72.0	0.0	0.0	100	
PHF	0.902										0.947					0.694					0.957
Cars, PU, Vans	74	0	99	0	173	0	0	0	0	0	0	150	71	0	221	34	85	0	0	119	513
% Cars, PU, Vans	90.2	0.0	97.1	0.0	94.0	0.0	0.0	0.0	0.0	0.0	0.0	96.2	94.7	0.0	95.7	97.1	94.4	0.0	0.0	95.2	95.0
Heavy trucks	8	0	3	0	11	0	0	0	0	0	0	6	4	0	10	1	5	0	0	6	27
% Heavy trucks	9.8	0.0	2.9	0.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	5.3	0.0	4.3	2.9	5.6	0.0	0.0	4.8	5.0

Roberts Rd E & Washington Pike

Peak Hour Turning Movement Count

ID: 23-190064-003
City: Corryton

Day: Wednesday
Date: 11/29/2023



Project ID: 23-190064-003

Location: Roberts Rd E & Washington Pike

City: Corryton

Day: Wednesday

Date: 11/29/2023

Groups Printed - Cars, PU, Vans - Heavy Trucks

Start Time	Roberts Rd E Northbound						Roberts Rd E Southbound						Washington Pike Eastbound						Washington Pike Westbound						Int. Total
	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	
7:00 AM	0	0	0	0	0	0	0	0	40	0	0	40	21	14	0	0	0	35	0	28	0	0	0	28	103
7:15 AM	0	0	0	0	0	0	2	0	50	0	0	52	19	22	0	0	0	41	0	43	2	0	0	45	138
7:30 AM	0	0	0	0	0	0	2	0	50	0	0	52	26	22	0	0	0	48	0	45	3	0	0	48	148
7:45 AM	0	0	0	0	0	0	2	0	45	0	0	47	30	12	0	0	0	42	0	28	6	0	0	34	123
Total	0	0	0	0	0	0	6	0	185	0	0	191	96	70	0	0	0	166	0	144	11	0	0	155	512
8:00 AM	0	0	0	0	0	0	2	0	34	0	0	36	17	5	0	0	0	22	0	26	1	0	0	27	85
8:15 AM	0	0	0	0	0	0	1	0	27	0	0	28	22	11	0	0	0	33	0	22	0	0	0	22	83
8:30 AM	0	0	0	0	0	0	1	0	22	0	0	23	17	9	0	0	0	26	0	11	1	0	0	12	61
8:45 AM	0	0	0	0	0	0	0	0	20	0	0	20	22	4	0	0	0	26	0	13	2	0	0	15	61
Total	0	0	0	0	0	0	4	0	103	0	0	107	78	29	0	0	0	107	0	72	4	0	0	76	290
BREAK																									
4:00 PM	0	0	0	0	0	0	1	0	37	0	0	38	38	24	0	0	0	62	0	18	0	0	0	18	118
4:15 PM	0	0	0	0	0	0	4	0	23	0	0	27	50	21	0	0	0	71	0	13	0	0	0	13	111
4:30 PM	0	0	0	0	0	0	0	0	32	0	0	32	50	37	0	0	0	87	0	16	2	0	0	18	137
4:45 PM	0	0	0	0	0	0	3	0	24	0	0	27	40	29	0	0	0	69	0	12	1	0	0	13	109
Total	0	0	0	0	0	0	8	0	116	0	0	124	178	111	0	0	0	289	0	59	3	0	0	62	475
5:00 PM	0	0	0	0	0	0	1	0	23	0	0	24	53	28	0	0	0	81	0	9	0	0	0	9	114
5:15 PM	0	0	0	0	0	0	1	0	28	0	0	29	37	28	0	0	0	65	0	14	0	0	0	14	108
5:30 PM	0	0	0	0	0	0	1	0	32	0	0	33	50	25	0	0	0	75	0	15	5	0	0	20	128
5:45 PM	0	0	0	0	0	0	0	0	19	0	0	19	51	31	0	0	0	82	0	9	0	0	0	9	110
Total	0	0	0	0	0	0	3	0	102	0	0	105	191	112	0	0	0	303	0	47	5	0	0	52	460
Grand Total	0	0	0	0	0	0	21	0	506	0	0	527	543	322	0	0	0	865	0	322	23	0	0	345	1737
Apprch %	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	96.0	0.0	0.0		62.8	37.2	0.0	0.0	0.0		0.0	93.3	6.7	0.0	0.0		
Total %	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	29.1	0.0	0.0	30.3	31.3	18.5	0.0	0.0	0.0	49.8	0.0	18.5	1.3	0.0	0.0	19.9	
Cars, PU, Vans	0	0	0	0	0	0	20	0	489	0	0	509	525	309	0	0	0	834	0	314	21	0	0	335	1678
% Cars, PU, Vans	0.0	0.0	0.0	0.0	0.0	0.0	95.2	0.0	96.6	0.0	0.0	96.6	96.7	96.0	0.0	0.0	0.0	96.4	0.0	97.5	91.3	0.0	0.0	97.1	96.6
Heavy trucks	0	0	0	0	0	0	1	0	17	0	0	18	18	13	0	0	0	31	0	8	2	0	0	10	59
%Heavy trucks	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0	3.4	0.0	0.0	3.4	3.3	4.0	0.0	0.0	0.0	3.6	0.0	2.5	8.7	0.0	0.0	2.9	3.4

Project ID: 23-190064-003

Location: Roberts Rd E & Washington Pike

City: Corryton

PEAK HOURS

Day: Wednesday

Date: 11/29/2023

AM

	Roberts Rd E Northbound					Roberts Rd E Southbound					Washington Pike Eastbound					Washington Pike Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 07:00 AM - 09:00 AM																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
7:00 AM	0	0	0	0	0	0	0	40	0	40	21	14	0	0	35	0	28	0	0	28	103
7:15 AM	0	0	0	0	0	2	0	50	0	52	19	22	0	0	41	0	43	2	0	45	138
7:30 AM	0	0	0	0	0	2	0	50	0	52	26	22	0	0	48	0	45	3	0	48	148
7:45 AM	0	0	0	0	0	2	0	45	0	47	30	12	0	0	42	0	28	6	0	34	123
Total Volume	0	0	0	0	0	6	0	185	0	191	96	70	0	0	166	0	144	11	0	155	512
% App. Total	0.0	0.0	0.0	0.0	0	3.1	0.0	96.9	0.0	100	57.8	42.2	0.0	0.0	100	0.0	92.9	7.1	0.0	100	
PHF						0.918					0.865					0.807					0.865
Cars, PU, Vans	0	0	0	0	0	5	0	178	0	183	93	68	0	0	161	0	142	11	0	153	497
% Cars, PU, Vans	0.0	0.0	0.0	0.0	0.0	83.3	0.0	96.2	0.0	95.8	96.9	97.1	0.0	0.0	97.0	0.0	98.6	100.0	0.0	98.7	97.1
Heavy trucks	0	0	0	0	0	1	0	7	0	8	3	2	0	0	5	0	2	0	0	2	15
%Heavy trucks	0.0	0.0	0.0	0.0	0.0	16.7	0.0	3.8	0.0	4.2	3.1	2.9	0.0	0.0	3.0	0.0	1.4	0.0	0.0	1.3	2.9

PM

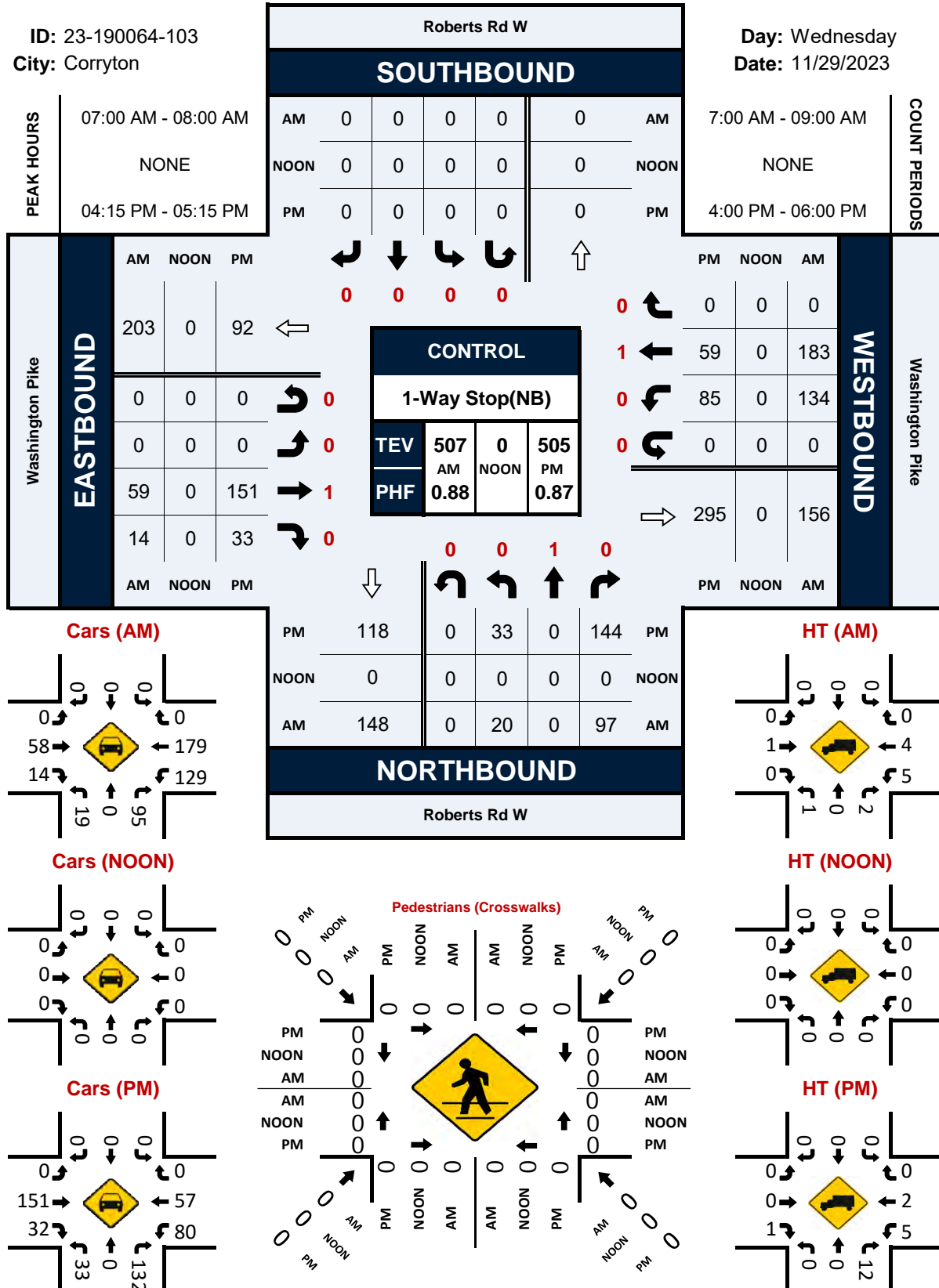
	Roberts Rd E Northbound					Roberts Rd E Southbound					Washington Pike Eastbound					Washington Pike Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 04:00 PM - 06:00 PM																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
4:00 PM	0	0	0	0	0	1	0	37	0	38	38	24	0	0	62	0	18	0	0	18	118
4:15 PM	0	0	0	0	0	4	0	23	0	27	50	21	0	0	71	0	13	0	0	13	111
4:30 PM	0	0	0	0	0	0	0	32	0	32	50	37	0	0	87	0	16	2	0	18	137
4:45 PM	0	0	0	0	0	3	0	24	0	27	40	29	0	0	69	0	12	1	0	13	109
Total Volume	0	0	0	0	0	8	0	116	0	124	178	111	0	0	289	0	59	3	0	62	475
% App. Total	0.0	0.0	0.0	0.0	0	6.5	0.0	93.5	0.0	100	61.6	38.4	0.0	0.0	100	0.0	95.2	4.8	0.0	100	
PHF						0.816					0.830					0.861					0.867
Cars, PU, Vans	0	0	0	0	0	8	0	112	0	120	168	107	0	0	275	0	57	3	0	60	455
% Cars, PU, Vans	0.0	0.0	0.0	0.0	0.0	100.0	0.0	96.6	0.0	96.8	94.4	96.4	0.0	0.0	95.2	0.0	96.6	100.0	0.0	96.8	95.8
Heavy trucks	0	0	0	0	0	0	0	4	0	4	10	4	0	0	14	0	2	0	0	2	20
%Heavy trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.0	3.2	5.6	3.6	0.0	0.0	4.8	0.0	3.4	0.0	0.0	3.2	4.2

Roberts Rd W & Washington Pike

Peak Hour Turning Movement Count

ID: 23-190064-103
City: Corryton

Day: Wednesday
Date: 11/29/2023



Project ID: 23-190064-103
Location: Roberts Rd W & Washington Pike
City: Corryton

Day: Wednesday
Date: 11/29/2023

Groups Printed - Cars, PU, Vans - Heavy Trucks

Start Time	Roberts Rd W Northbound						Roberts Rd W Southbound						Washington Pike Eastbound						Washington Pike Westbound						Int. Total
	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	
7:00 AM	4	0	20	0	0	24	0	0	0	0	0	0	0	10	4	0	0	14	21	47	0	0	0	68	106
7:15 AM	7	0	22	0	0	29	0	0	0	0	0	0	0	15	5	0	0	20	37	49	0	0	0	86	135
7:30 AM	6	0	31	0	0	37	0	0	0	0	0	0	0	17	2	0	0	19	45	49	0	0	0	94	150
7:45 AM	3	0	24	0	0	27	0	0	0	0	0	0	0	17	3	0	0	20	31	38	0	0	0	69	116
Total	20	0	97	0	0	117	0	0	0	0	0	0	0	59	14	0	0	73	134	183	0	0	0	317	507
8:00 AM	10	0	8	0	0	18	0	0	0	0	0	0	0	11	2	0	0	13	23	32	0	0	0	55	86
8:15 AM	8	0	17	0	0	25	0	0	0	0	0	0	0	15	3	0	0	18	18	30	0	0	0	48	91
8:30 AM	8	0	11	0	0	19	0	0	0	0	0	0	0	13	7	0	0	20	16	16	0	0	0	32	71
8:45 AM	4	0	15	0	0	19	0	0	0	0	0	0	0	9	7	0	0	16	9	22	0	0	0	31	66
Total	30	0	51	0	0	81	0	0	0	0	0	0	0	48	19	0	0	67	66	100	0	0	0	166	314
BREAK																									
4:00 PM	3	0	30	0	0	33	0	0	0	0	0	0	0	30	5	0	0	35	26	26	0	0	0	52	120
4:15 PM	11	0	37	0	0	48	0	0	0	0	0	0	0	30	7	0	0	37	21	12	0	0	0	33	118
4:30 PM	9	0	35	0	0	44	0	0	0	0	0	0	0	47	7	0	0	54	22	21	0	0	0	43	141
4:45 PM	7	0	31	0	0	38	0	0	0	0	0	0	0	36	11	0	0	47	23	13	0	0	0	36	121
Total	30	0	133	0	0	163	0	0	0	0	0	0	0	143	30	0	0	173	92	72	0	0	0	164	500
5:00 PM	6	0	41	0	0	47	0	0	0	0	0	0	0	38	8	0	0	46	19	13	0	0	0	32	125
5:15 PM	4	0	33	0	0	37	0	0	0	0	0	0	0	32	4	0	0	36	18	22	0	0	0	40	113
5:30 PM	5	0	30	0	0	35	0	0	0	0	0	0	0	38	4	0	0	42	23	20	0	0	0	43	120
5:45 PM	4	0	29	0	0	33	0	0	0	0	0	0	0	50	2	0	0	52	14	13	0	0	0	27	112
Total	19	0	133	0	0	152	0	0	0	0	0	0	0	158	18	0	0	176	74	68	0	0	0	142	470
Grand Total	99	0	414	0	0	513	0	0	0	0	0	0	0	408	81	0	0	489	366	423	0	0	0	789	1791
Apprch %	19.3	0.0	80.7	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	83.4	16.6	0.0	0.0		46.4	53.6	0.0	0.0	0.0		
Total %	5.5	0.0	23.1	0.0	0.0	28.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.8	4.5	0.0	0.0	27.3	20.4	23.6	0.0	0.0	0.0	44.1	
Cars, PU, Vans	98	0	395	0		493	0	0	0	0		0	0	401	80	0		481	351	413	0	0		764	1738
% Cars, PU, Vans	99.0	0.0	95.4	0.0		96.1	0.0	0.0	0.0	0.0		0.0	0.0	98.3	98.8	0.0		98.4	95.9	97.6	0.0	0.0		96.8	97.0
Heavy trucks	1	0	19	0		20	0	0	0	0		0	0	7	1	0		8	15	10	0	0		25	53
%Heavy trucks	1.0	0.0	4.6	0.0		3.9	0.0	0.0	0.0	0.0		0.0	0.0	1.7	1.2	0.0		1.6	4.1	2.4	0.0	0.0		3.2	3.0

Project ID: 23-190064-103

Location: Roberts Rd W & Washington Pike

City: Corryton

PEAK HOURS

Day: Wednesday

Date: 11/29/2023

AM

	Roberts Rd W Northbound					Roberts Rd W Southbound					Washington Pike Eastbound					Washington Pike Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 07:00 AM - 09:00 AM																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
7:00 AM	4	0	20	0	24	0	0	0	0	0	0	10	4	0	14	21	47	0	0	68	106
7:15 AM	7	0	22	0	29	0	0	0	0	0	0	15	5	0	20	37	49	0	0	86	135
7:30 AM	6	0	31	0	37	0	0	0	0	0	0	17	2	0	19	45	49	0	0	94	150
7:45 AM	3	0	24	0	27	0	0	0	0	0	0	17	3	0	20	31	38	0	0	69	116
Total Volume	20	0	97	0	117	0	0	0	0	0	0	59	14	0	73	134	183	0	0	317	507
% App. Total	17.1	0.0	82.9	0.0	100	0.0	0.0	0.0	0.0	0	0.0	80.8	19.2	0.0	100	42.3	57.7	0.0	0.0	100	
PHF	0.797										0.864					0.853					0.875
Cars, PU, Vans	19	0	95	0	114	0	0	0	0	0	0	58	14	0	72	129	179	0	0	308	494
% Cars, PU, Vans	95.0	0.0	97.9	0.0	97.4	0.0	0.0	0.0	0.0	0.0	0.0	98.3	100.0	0.0	98.6	96.3	97.8	0.0	0.0	97.2	97.4
Heavy trucks	1	0	2	0	3	0	0	0	0	0	0	1	0	0	1	5	4	0	0	9	13
%Heavy trucks	5.0	0.0	2.1	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	1.4	3.7	2.2	0.0	0.0	2.8	2.6

PM

	Roberts Rd W Northbound					Roberts Rd W Southbound					Washington Pike Eastbound					Washington Pike Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 04:00 PM - 06:00 PM																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
4:15 PM	11	0	37	0	48	0	0	0	0	0	0	30	7	0	37	21	12	0	0	33	118
4:30 PM	9	0	35	0	44	0	0	0	0	0	0	47	7	0	54	22	21	0	0	43	141
4:45 PM	7	0	31	0	38	0	0	0	0	0	0	36	11	0	47	23	13	0	0	36	121
5:00 PM	6	0	41	0	47	0	0	0	0	0	0	38	8	0	46	19	13	0	0	32	125
Total Volume	33	0	144	0	177	0	0	0	0	0	0	151	33	0	184	85	59	0	0	144	505
% App. Total	18.6	0.0	81.4	0.0	100	0.0	0.0	0.0	0.0	0	0.0	82.1	17.9	0.0	100	59.0	41.0	0.0	0.0	100	
PHF	0.922										0.829					0.809					0.868
Cars, PU, Vans	33	0	132	0	165	0	0	0	0	0	0	151	32	0	183	80	57	0	0	137	485
% Cars, PU, Vans	100.0	0.0	91.7	0.0	93.2	0.0	0.0	0.0	0.0	0.0	0.0	100.0	97.0	0.0	99.5	94.1	96.6	0.0	0.0	95.1	96.0
Heavy trucks	0	0	12	0	12	0	0	0	0	0	0	0	1	0	1	5	2	0	0	7	20
%Heavy trucks	0.0	0.0	8.3	0.0	6.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.5	5.9	3.4	0.0	0.0	4.9	4.0



APPENDIX B | TRIP GENERATION

Land Use: 210

Single-Family Detached Housing

Description

A single-family detached housing site includes any single-family detached home on an individual lot. A typical site surveyed is a suburban subdivision.

Specialized Land Use

Data have been submitted for several single-family detached housing developments with homes that are commonly referred to as patio homes. A patio home is a detached housing unit that is located on a small lot with little (or no) front or back yard. In some subdivisions, communal maintenance of outside grounds is provided for the patio homes. The three patio home sites total 299 dwelling units with overall weighted average trip generation rates of 5.35 vehicle trips per dwelling unit for weekday, 0.26 for the AM adjacent street peak hour, and 0.47 for the PM adjacent street peak hour. These patio home rates based on a small sample of sites are lower than those for single-family detached housing (Land Use 210), lower than those for single-family attached housing (Land Use 251), and higher than those for senior adult housing -- single-family (Land Use 251). Further analysis of this housing type will be conducted in a future edition of *Trip Generation Manual*.

Additional Data

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

For 30 of the study sites, data on the number of residents and number of household vehicles are available. The overall averages for the 30 sites are 3.6 residents per dwelling unit and 1.5 vehicles per dwelling unit.

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

Source Numbers

100, 105, 114, 126, 157, 167, 177, 197, 207, 211, 217, 267, 275, 293, 300, 319, 320, 356, 357, 367, 384, 387, 407, 435, 522, 550, 552, 579, 598, 601, 603, 614, 637, 711, 716, 720, 728, 735, 868, 869, 903, 925, 936, 1005, 1007, 1008, 1010, 1033, 1066, 1077, 1078, 1079

Single-Family Detached Housing

(210)

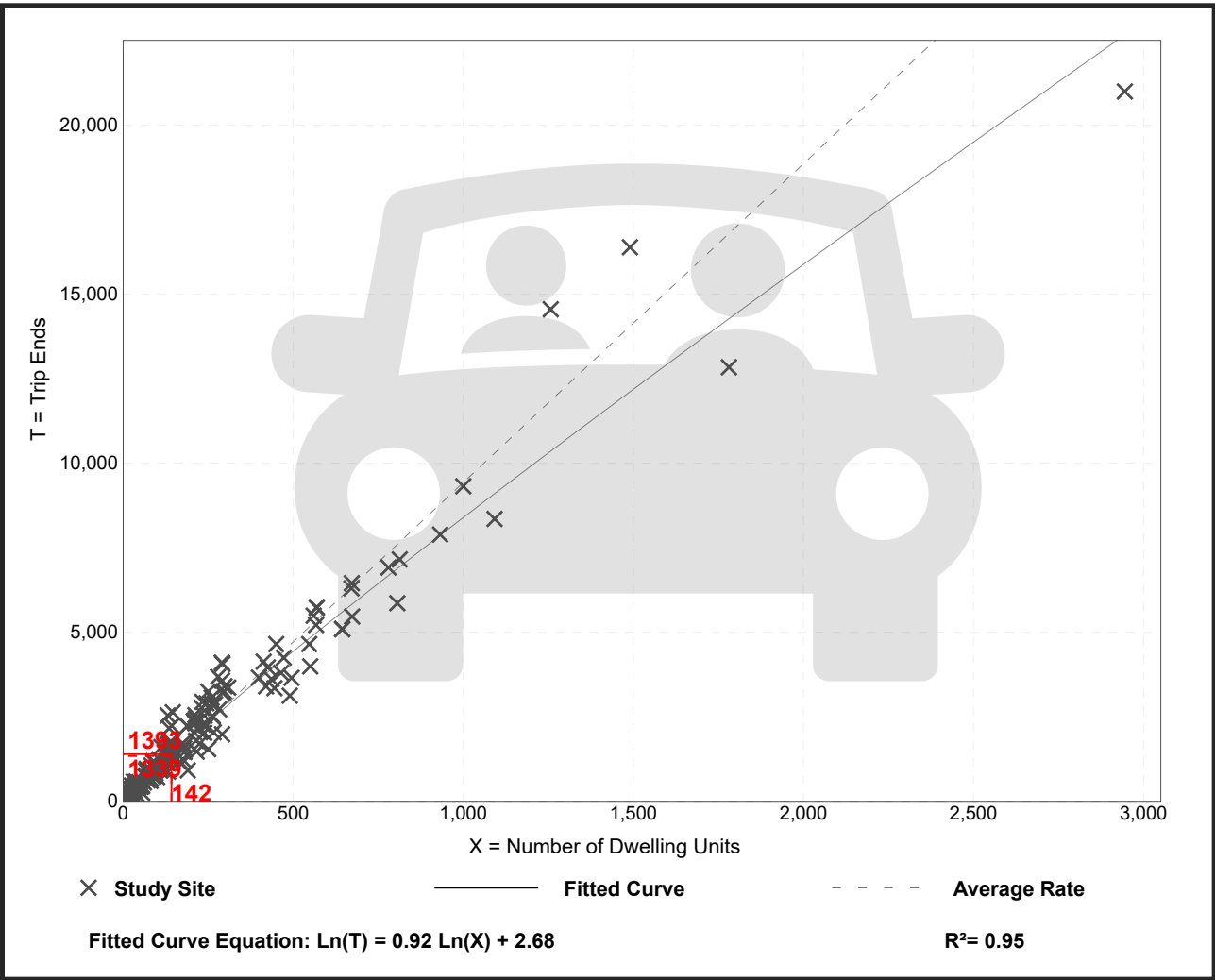
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 174
Avg. Num. of Dwelling Units: 246
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.43	4.45 - 22.61	2.13

Data Plot and Equation



Single-Family Detached Housing

(210)

Vehicle Trip Ends vs:

Dwelling Units

On a:

Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location:

General Urban/Suburban

Number of Studies:

192

Avg. Num. of Dwelling Units:

226

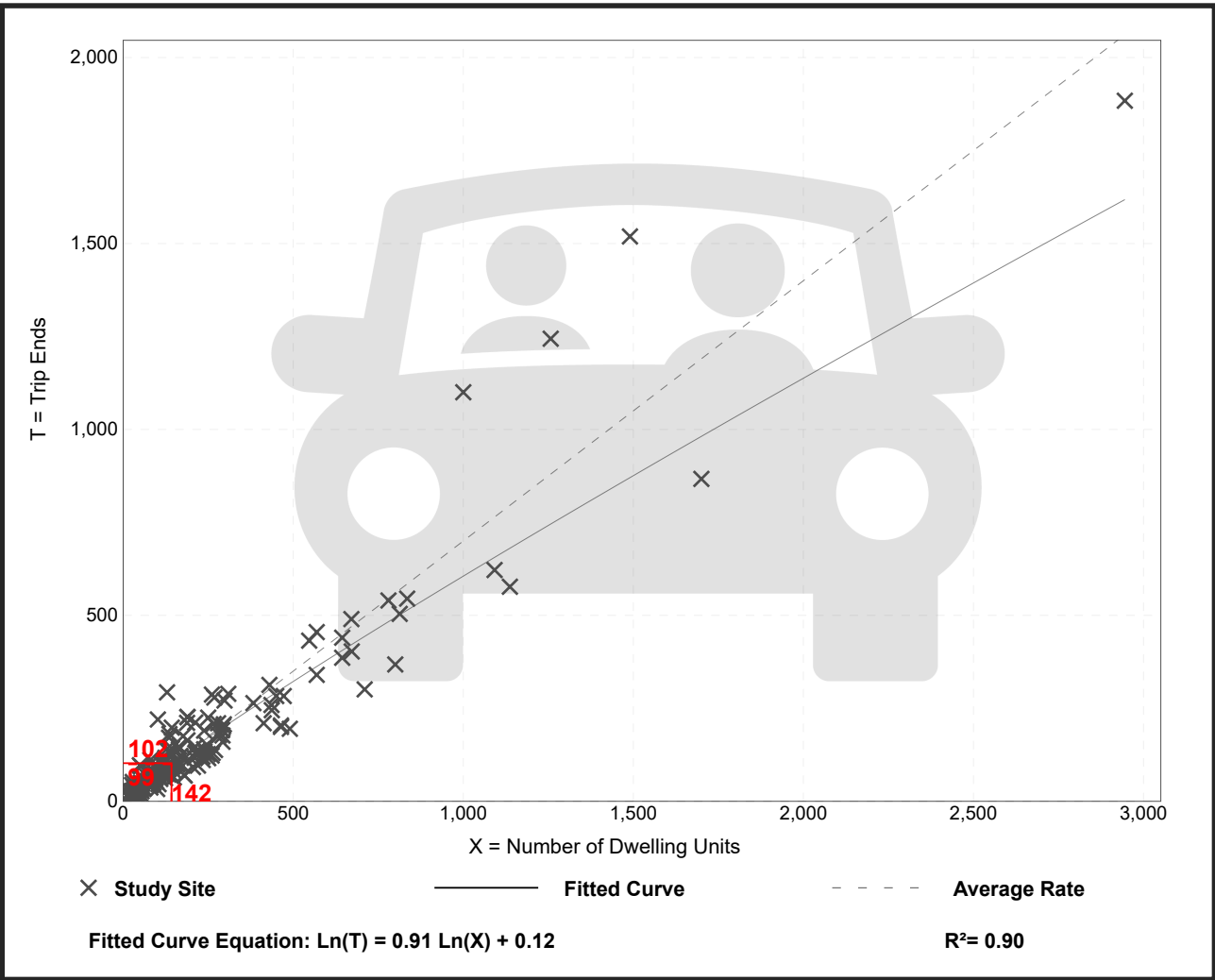
Directional Distribution:

25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.70	0.27 - 2.27	0.24

Data Plot and Equation



Single-Family Detached Housing

(210)

Vehicle Trip Ends vs:

Dwelling Units

On a:

Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Setting/Location:

General Urban/Suburban

Number of Studies:

208

Avg. Num. of Dwelling Units:

248

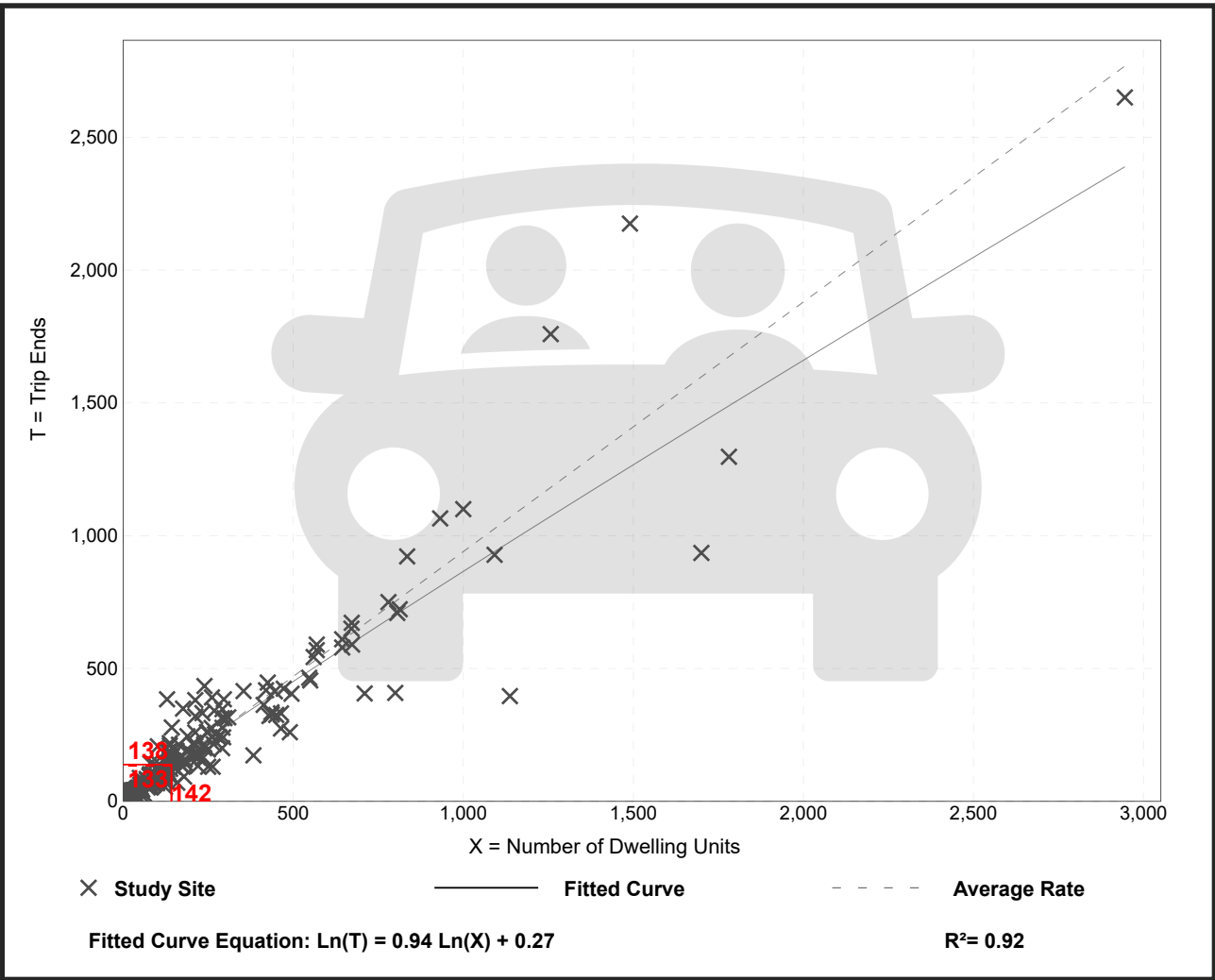
Directional Distribution:

63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

Data Plot and Equation



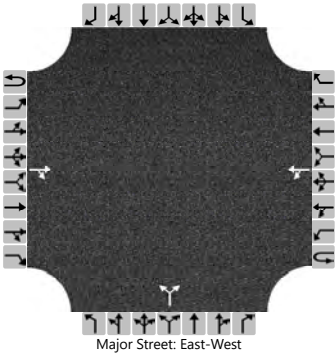


APPENDIX C | CAPACITY ANALYSES

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Wesley Stokes	Intersection	Roberts Rd at E Emory Rd
Agency/Co.	Cannon & Cannon, Inc	Jurisdiction	Knox County
Date Performed	9/12/2024	East/West Street	E. Emory Road
Analysis Year	2024	North/South Street	Roberts Road
Time Analyzed	AM Peak	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Existing		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			92	50		126	172			75		33				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.13					6.43		6.23			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.23					3.53		3.33			

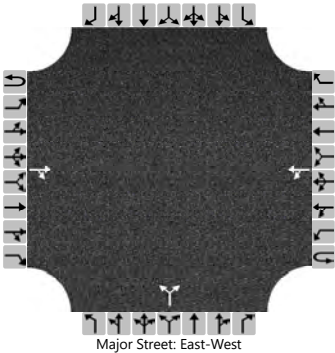
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						137						117				
Capacity, c (veh/h)						1420						503				
v/c Ratio						0.10						0.23				
95% Queue Length, Q ₉₅ (veh)						0.3						0.9				
Control Delay (s/veh)						7.8	0.8					14.3				
Level of Service (LOS)						A	A					B				
Approach Delay (s/veh)					3.8				14.3							
Approach LOS					A				B							

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Wesley Stokes	Intersection	Roberts Rd at E Emory Rd
Agency/Co.	Cannon & Cannon, Inc	Jurisdiction	Knox County
Date Performed	9/12/2024	East/West Street	E. Emory Road
Analysis Year	2024	North/South Street	Roberts Road
Time Analyzed	PM Peak	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Existing		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			156	75		35	90			82		102				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

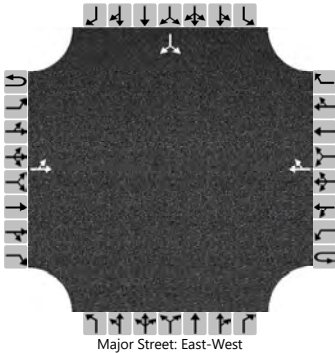
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)					38					200						
Capacity, c (veh/h)					1309					706						
v/c Ratio					0.03					0.28						
95% Queue Length, Q ₉₅ (veh)					0.1					1.2						
Control Delay (s/veh)					7.8	0.2				12.1						
Level of Service (LOS)					A	A				B						
Approach Delay (s/veh)					2.4				12.1							
Approach LOS					A				B							

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Wesley Stokes	Intersection	Roberts Rd at Washington Pike (Eastern)
Agency/Co.	Cannon & Cannon, Inc	Jurisdiction	Knox County
Date Performed	9/12/2024	East/West Street	Washington Pike
Analysis Year	2024	North/South Street	Roberts Road
Time Analyzed	AM Peak	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Existing		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		96	70				144	11						6		185
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

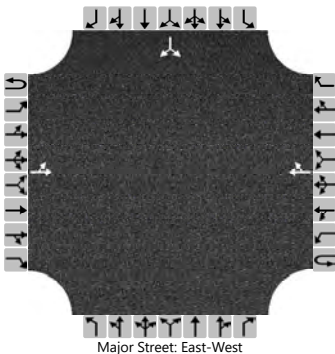
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		104													208	
Capacity, c (veh/h)		1403													861	
v/c Ratio		0.07													0.24	
95% Queue Length, Q ₉₅ (veh)		0.2													0.9	
Control Delay (s/veh)		7.8	0.6												10.5	
Level of Service (LOS)		A	A												B	
Approach Delay (s/veh)	4.7												10.5			
Approach LOS	A												B			

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Wesley Stokes	Intersection	Roberts Rd at Washington Pike (Eastern)
Agency/Co.	Cannon & Cannon, Inc	Jurisdiction	Knox County
Date Performed	9/12/2024	East/West Street	Washington Pike
Analysis Year	2024	North/South Street	Roberts Road
Time Analyzed	PM Peak	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Existing		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		178	111				59	3						8		116
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

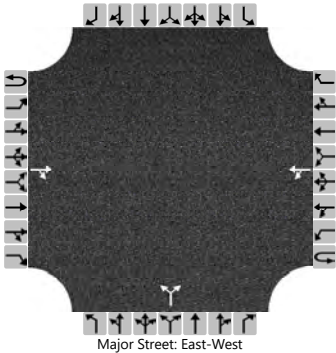
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		193													135	
Capacity, c (veh/h)		1528													913	
v/c Ratio		0.13													0.15	
95% Queue Length, Q ₉₅ (veh)		0.4													0.5	
Control Delay (s/veh)		7.7	1.0												9.6	
Level of Service (LOS)		A	A												A	
Approach Delay (s/veh)	5.1												9.6			
Approach LOS	A												A			

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Wesley Stokes	Intersection	Roberts Rd at Washington Pike (Western)
Agency/Co.	Cannon & Cannon, Inc	Jurisdiction	Knox County
Date Performed	9/12/2024	East/West Street	Washington Pike
Analysis Year	2024	North/South Street	Roberts Road
Time Analyzed	AM Peak	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Existing		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			59	14		134	183			20		97				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

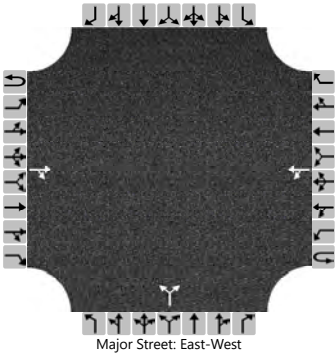
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						146					127					
Capacity, c (veh/h)						1512					811					
v/c Ratio						0.10					0.16					
95% Queue Length, Q ₉₅ (veh)						0.3					0.6					
Control Delay (s/veh)						7.6	0.8				10.3					
Level of Service (LOS)						A	A				B					
Approach Delay (s/veh)					3.7				10.3							
Approach LOS					A				B							

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Wesley Stokes	Intersection	Roberts Rd at Washington Pike (Western)
Agency/Co.	Cannon & Cannon, Inc	Jurisdiction	Knox County
Date Performed	9/12/2024	East/West Street	Washington Pike
Analysis Year	2024	North/South Street	Roberts Road
Time Analyzed	PM Peak	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Existing		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			151	33		85	59			33		144				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.13					6.43		6.23			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.23					3.53		3.33			

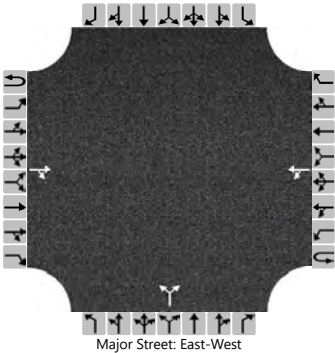
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						92						192				
Capacity, c (veh/h)						1366						773				
v/c Ratio						0.07						0.25				
95% Queue Length, Q ₉₅ (veh)						0.2						1.0				
Control Delay (s/veh)						7.8	0.5					11.2				
Level of Service (LOS)						A	A					B				
Approach Delay (s/veh)					4.8				11.2							
Approach LOS					A				B							

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Wesley Stokes	Intersection	Roberts Rd at E Emory Rd
Agency/Co.	Cannon & Cannon, Inc	Jurisdiction	Knox County
Date Performed	9/12/2024	East/West Street	E. Emory Road
Analysis Year	2024	North/South Street	Roberts Road
Time Analyzed	AM Peak	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Background		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			100	54		136	186			81		36				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.13					6.43		6.23			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.23					3.53		3.33			

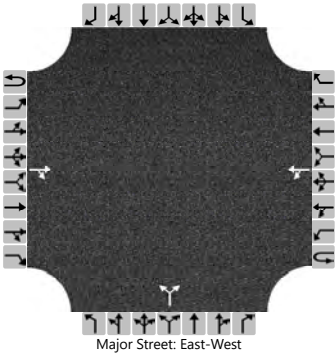
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						148						127				
Capacity, c (veh/h)						1404						471				
v/c Ratio						0.11						0.27				
95% Queue Length, Q ₉₅ (veh)						0.4						1.1				
Control Delay (s/veh)						7.9	0.9					15.4				
Level of Service (LOS)						A	A					C				
Approach Delay (s/veh)					3.9				15.4							
Approach LOS					A				C							

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Wesley Stokes	Intersection	Roberts Rd at E Emory Rd
Agency/Co.	Cannon & Cannon, Inc	Jurisdiction	Knox County
Date Performed	9/12/2024	East/West Street	E. Emory Road
Analysis Year	2024	North/South Street	Roberts Road
Time Analyzed	PM Peak	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Background		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			169	81		38	97			89		110				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.13					6.43		6.23			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.23					3.53		3.33			

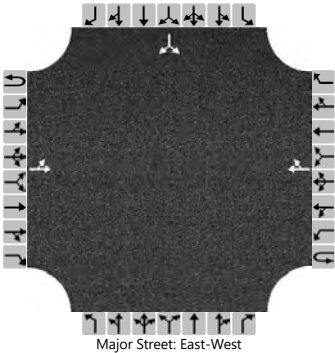
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						41						216				
Capacity, c (veh/h)						1286						682				
v/c Ratio						0.03						0.32				
95% Queue Length, Q ₉₅ (veh)						0.1						1.4				
Control Delay (s/veh)						7.9	0.3					12.7				
Level of Service (LOS)						A	A					B				
Approach Delay (s/veh)					2.4				12.7							
Approach LOS					A				B							

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Wesley Stokes	Intersection	Roberts Rd at Washington Pike (Eastern)
Agency/Co.	Cannon & Cannon, Inc	Jurisdiction	Knox County
Date Performed	9/12/2024	East/West Street	Washington Pike
Analysis Year	2024	North/South Street	Roberts Road
Time Analyzed	AM Peak	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Background		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		104	76				156	12						6		200
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

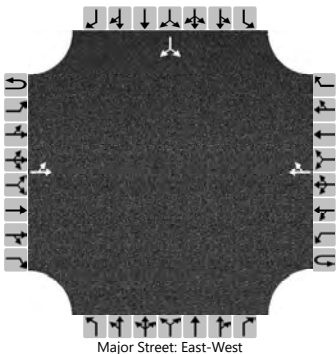
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		113													224	
Capacity, c (veh/h)		1386													846	
v/c Ratio		0.08													0.26	
95% Queue Length, Q ₉₅ (veh)		0.3													1.1	
Control Delay (s/veh)		7.8	0.7												10.8	
Level of Service (LOS)		A	A												B	
Approach Delay (s/veh)	4.8												10.8			
Approach LOS	A												B			

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Wesley Stokes	Intersection	Roberts Rd at Washington Pike (Eastern)
Agency/Co.	Cannon & Cannon, Inc	Jurisdiction	Knox County
Date Performed	9/12/2024	East/West Street	Washington Pike
Analysis Year	2024	North/South Street	Roberts Road
Time Analyzed	PM Peak	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Background		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		193	120				64	3						9		126
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

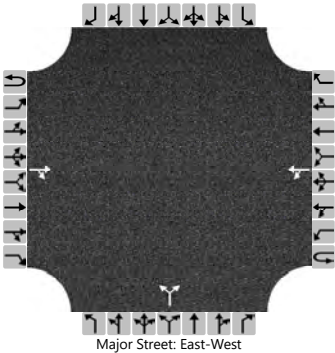
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		210													147	
Capacity, c (veh/h)		1521													894	
v/c Ratio		0.14													0.16	
95% Queue Length, Q ₉₅ (veh)		0.5													0.6	
Control Delay (s/veh)		7.7	1.2												9.8	
Level of Service (LOS)		A	A												A	
Approach Delay (s/veh)	5.2												9.8			
Approach LOS	A												A			

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Wesley Stokes	Intersection	Roberts Rd at Washington Pike (Western)
Agency/Co.	Cannon & Cannon, Inc	Jurisdiction	Knox County
Date Performed	9/12/2024	East/West Street	Washington Pike
Analysis Year	2024	North/South Street	Roberts Road
Time Analyzed	AM Peak	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Background		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			64	15		145	198			22		105				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.13					6.43		6.23			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.23					3.53		3.33			

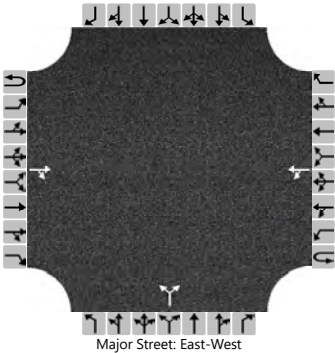
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						158						138				
Capacity, c (veh/h)						1504						785				
v/c Ratio						0.10						0.18				
95% Queue Length, Q ₉₅ (veh)						0.4						0.6				
Control Delay (s/veh)						7.7	0.9					10.6				
Level of Service (LOS)						A	A					B				
Approach Delay (s/veh)					3.8				10.6							
Approach LOS					A				B							

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Wesley Stokes	Intersection	Roberts Rd at Washington Pike (Western)
Agency/Co.	Cannon & Cannon, Inc	Jurisdiction	Knox County
Date Performed	9/12/2024	East/West Street	Washington Pike
Analysis Year	2024	North/South Street	Roberts Road
Time Analyzed	PM Peak	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Background		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			163	36		92	64			36		156				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.13					6.43		6.23			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.23					3.53		3.33			

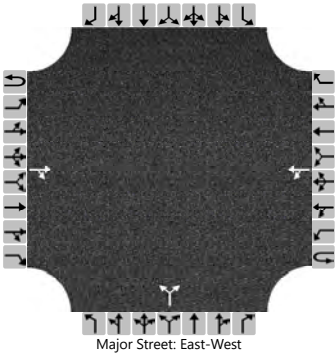
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						100					209					
Capacity, c (veh/h)						1348					750					
v/c Ratio						0.07					0.28					
95% Queue Length, Q ₉₅ (veh)						0.2					1.1					
Control Delay (s/veh)						7.9	0.6				11.6					
Level of Service (LOS)						A	A				B					
Approach Delay (s/veh)					4.9				11.6							
Approach LOS					A				B							

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Wesley Stokes	Intersection	Roberts Rd at E Emory Rd
Agency/Co.	Cannon & Cannon, Inc	Jurisdiction	Knox County
Date Performed	9/12/2024	East/West Street	E. Emory Road
Analysis Year	2024	North/South Street	Roberts Road
Time Analyzed	AM Peak	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Combined		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			100	59		138	186			96		43				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.13					6.43		6.23			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.23					3.53		3.33			

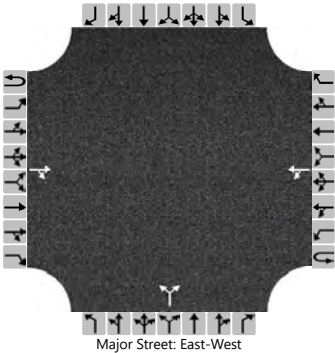
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						150						151				
Capacity, c (veh/h)						1398						467				
v/c Ratio						0.11						0.32				
95% Queue Length, Q ₉₅ (veh)						0.4						1.4				
Control Delay (s/veh)						7.9	1.0					16.4				
Level of Service (LOS)						A	A					C				
Approach Delay (s/veh)					3.9				16.4							
Approach LOS					A				C							

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Wesley Stokes	Intersection	Roberts Rd at E Emory Rd
Agency/Co.	Cannon & Cannon, Inc	Jurisdiction	Knox County
Date Performed	9/12/2024	East/West Street	E. Emory Road
Analysis Year	2024	North/South Street	Roberts Road
Time Analyzed	PM Peak	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Combined		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			169	98		46	97			99		115				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.13					6.43		6.23			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.23					3.53		3.33			

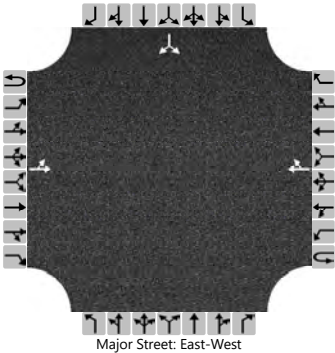
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						50						233				
Capacity, c (veh/h)						1266						659				
v/c Ratio						0.04						0.35				
95% Queue Length, Q ₉₅ (veh)						0.1						1.6				
Control Delay (s/veh)						8.0	0.3					13.4				
Level of Service (LOS)						A	A					B				
Approach Delay (s/veh)					2.8				13.4							
Approach LOS					A				B							

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Wesley Stokes	Intersection	Roberts Rd at Washington Pike (Eastern)
Agency/Co.	Cannon & Cannon, Inc	Jurisdiction	Knox County
Date Performed	9/12/2024	East/West Street	Washington Pike
Analysis Year	2024	North/South Street	Roberts Road
Time Analyzed	AM Peak	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Combined		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		120	76				156	14						10		248
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

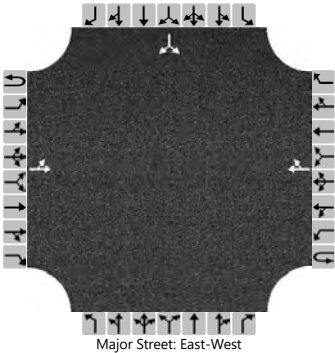
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		130													280	
Capacity, c (veh/h)		1384													835	
v/c Ratio		0.09													0.34	
95% Queue Length, Q ₉₅ (veh)		0.3													1.5	
Control Delay (s/veh)		7.9	0.8												11.5	
Level of Service (LOS)		A	A												B	
Approach Delay (s/veh)	5.1												11.5			
Approach LOS	A												B			

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Wesley Stokes	Intersection	Roberts Rd at Washington Pike (Eastern)
Agency/Co.	Cannon & Cannon, Inc	Jurisdiction	Knox County
Date Performed	9/12/2024	East/West Street	Washington Pike
Analysis Year	2024	North/South Street	Roberts Road
Time Analyzed	PM Peak	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Combined		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		248	120				64	7						11		158
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

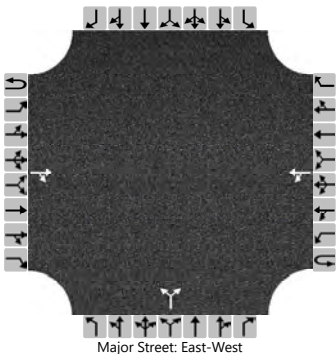
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		270													184	
Capacity, c (veh/h)		1515													862	
v/c Ratio		0.18													0.21	
95% Queue Length, Q ₉₅ (veh)		0.6													0.8	
Control Delay (s/veh)		7.9	1.5												10.3	
Level of Service (LOS)		A	A												B	
Approach Delay (s/veh)	5.8												10.3			
Approach LOS	A												B			

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Wesley Stokes	Intersection	Roberts Rd at Washington Pike (Western)
Agency/Co.	Cannon & Cannon, Inc	Jurisdiction	Knox County
Date Performed	9/12/2024	East/West Street	Washington Pike
Analysis Year	2024	North/South Street	Roberts Road
Time Analyzed	AM Peak	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Combined		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			73	15		167	224			22		112				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.13					6.43		6.23			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.23					3.53		3.33			

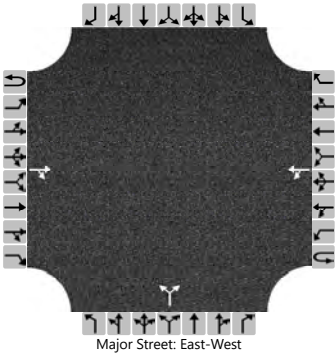
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						182					146					
Capacity, c (veh/h)						1492					750					
v/c Ratio						0.12					0.19					
95% Queue Length, Q ₉₅ (veh)						0.4					0.7					
Control Delay (s/veh)						7.7	1.1				10.9					
Level of Service (LOS)						A	A				B					
Approach Delay (s/veh)					3.9				10.9							
Approach LOS					A				B							

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Wesley Stokes	Intersection	Roberts Rd at Washington Pike (Western)
Agency/Co.	Cannon & Cannon, Inc	Jurisdiction	Knox County
Date Performed	9/12/2024	East/West Street	Washington Pike
Analysis Year	2024	North/South Street	Roberts Road
Time Analyzed	PM Peak	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Combined		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			193	36		107	81			36		181				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.13					6.43		6.23			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.23					3.53		3.33			

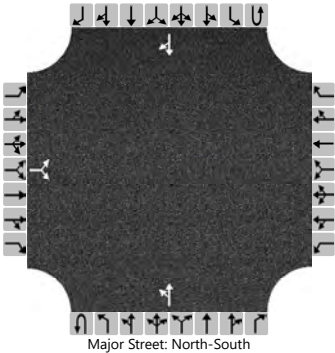
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						116						236				
Capacity, c (veh/h)						1311						713				
v/c Ratio						0.09						0.33				
95% Queue Length, Q ₉₅ (veh)						0.3						1.4				
Control Delay (s/veh)						8.0	0.7					12.5				
Level of Service (LOS)						A	A					B				
Approach Delay (s/veh)					4.9				12.5							
Approach LOS					A				B							

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Wesley Stokes	Intersection	Roberts Rd at Site Access #1
Agency/Co.	Cannon & Cannon, Inc	Jurisdiction	Knox County
Date Performed	9/12/2024	East/West Street	Roberts Rd
Analysis Year	2024	North/South Street	Site Access #1
Time Analyzed	AM Peak	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Combined		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		4		41						14	116				204	1
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

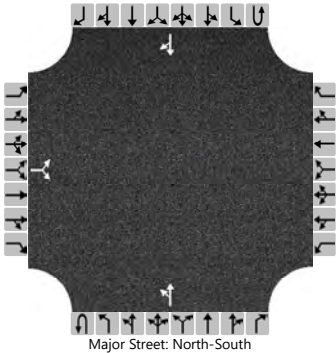
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			49							15						
Capacity, c (veh/h)			792							1340						
v/c Ratio			0.06							0.01						
95% Queue Length, Q ₉₅ (veh)			0.2							0.0						
Control Delay (s/veh)			9.8							7.7	0.1					
Level of Service (LOS)			A							A	A					
Approach Delay (s/veh)	9.8								0.9							
Approach LOS	A								A							

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Wesley Stokes	Intersection	Roberts Rd at Site Access #1
Agency/Co.	Cannon & Cannon, Inc	Jurisdiction	Knox County
Date Performed	9/12/2024	East/West Street	Roberts Rd
Analysis Year	2024	North/South Street	Site Access #1
Time Analyzed	AM Peak	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Combined		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		3		27						46	215				127	4
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

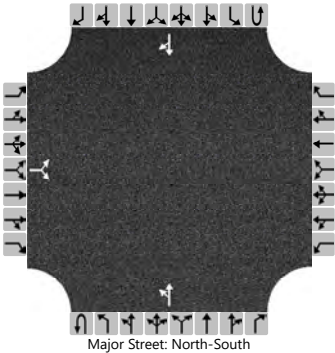
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			33							50						
Capacity, c (veh/h)			844							1434						
v/c Ratio			0.04							0.03						
95% Queue Length, Q ₉₅ (veh)			0.1							0.1						
Control Delay (s/veh)			9.4							7.6	0.3					
Level of Service (LOS)			A							A	A					
Approach Delay (s/veh)	9.4								1.6							
Approach LOS	A								A							

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Wesley Stokes	Intersection	Roberts Rd at Site Access #1
Agency/Co.	Cannon & Cannon, Inc	Jurisdiction	Knox County
Date Performed	9/12/2024	East/West Street	Roberts Rd
Analysis Year	2024	North/South Street	Site Access #1
Time Analyzed	AM Peak	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Combined		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		18		11						4	116				194	6
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2					4.1							
Critical Headway (sec)		6.43		6.23					4.13							
Base Follow-Up Headway (sec)		3.5		3.3					2.2							
Follow-Up Headway (sec)		3.53		3.33					2.23							

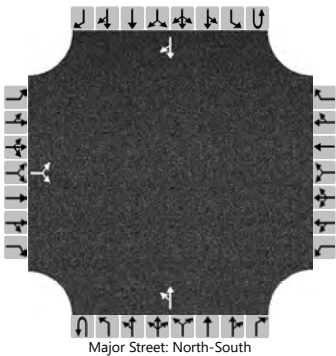
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			32						4							
Capacity, c (veh/h)			702						1346							
v/c Ratio			0.04						0.00							
95% Queue Length, Q ₉₅ (veh)			0.1						0.0							
Control Delay (s/veh)			10.4						7.7	0.0						
Level of Service (LOS)			B						A	A						
Approach Delay (s/veh)	10.4								0.3							
Approach LOS	B								A							

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	Wesley Stokes	Intersection	Roberts Rd at Site Access #1
Agency/Co.	Cannon & Cannon, Inc	Jurisdiction	Knox County
Date Performed	9/12/2024	East/West Street	Roberts Rd
Analysis Year	2024	North/South Street	Site Access #1
Time Analyzed	PM Peak	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Combined		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		12		7						13	205				124	21
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

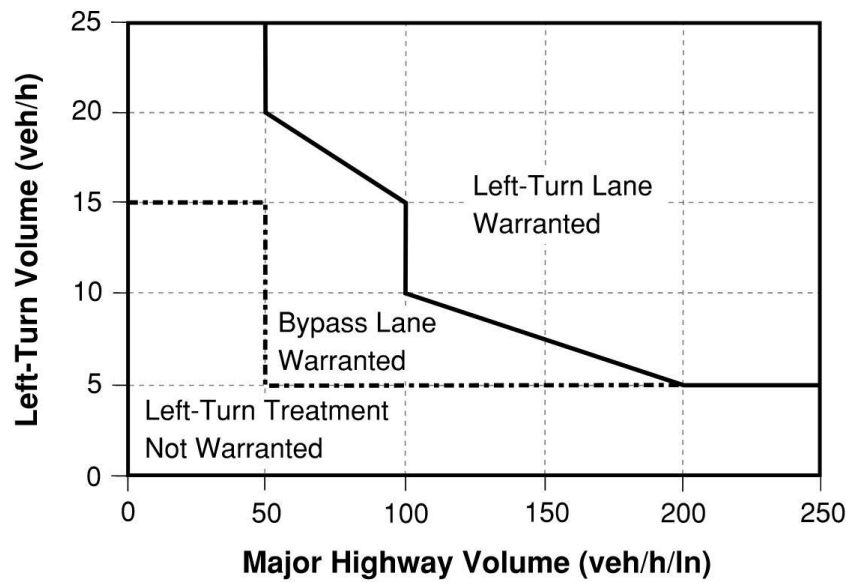
Flow Rate, v (veh/h)			21							14						
Capacity, c (veh/h)			683							1416						
v/c Ratio			0.03							0.01						
95% Queue Length, Q ₉₅ (veh)			0.1							0.0						
Control Delay (s/veh)			10.4							7.6	0.1					
Level of Service (LOS)			B							A	A					
Approach Delay (s/veh)	10.4								0.5							
Approach LOS	B								A							



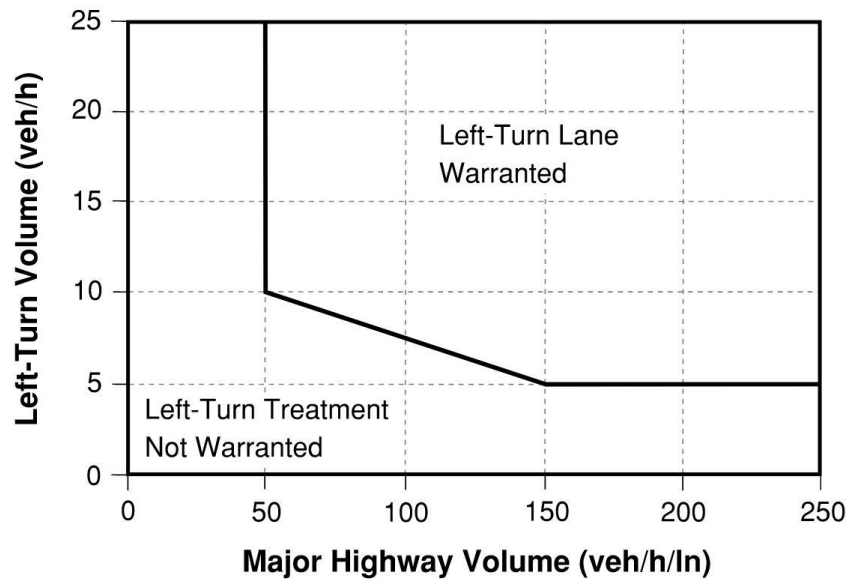
APPENDIX E | TURN LANE WARRANT EVALUATIONS

AM Peak: Left-Turn = 126 veh; Opposing = 142 veh

PM Peak: Left-Turn = 35 veh; Opposing = 231 veh



(a) Three-Leg Intersections



(b) Four-Leg Intersections

STATE OF TENNESSEE

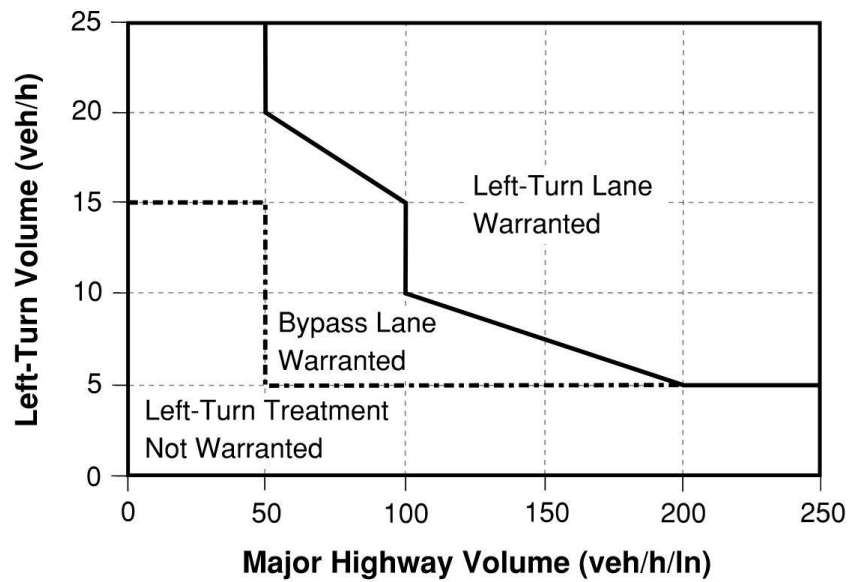
LEFT-TURN LANE WARRANT FOR TWO-LANE
RURAL HIGHWAYS (UNSIGNALIZED)

FIGURE B.2

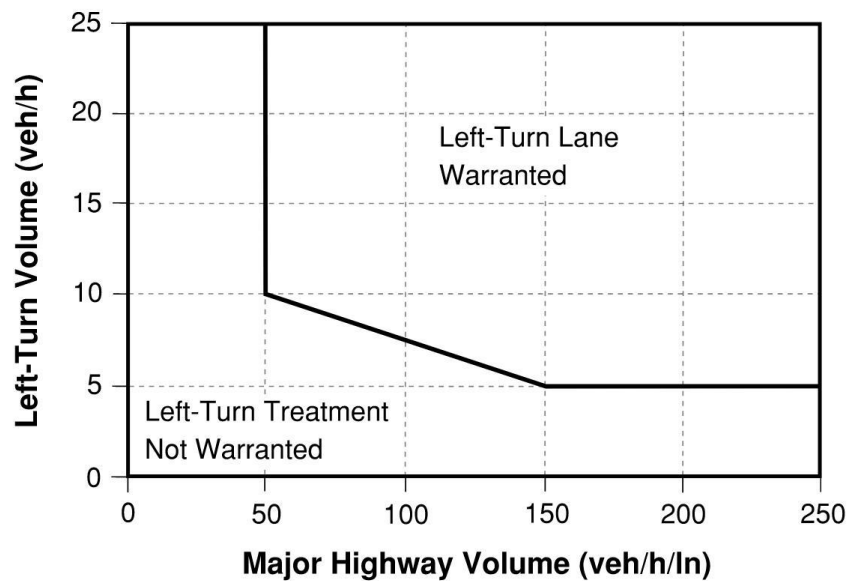
Figure B.2: Left-Turn Lane Warrant for two-Lane Rural Roadways (Unsignalized)

AM Peak: Left-Turn = 136 veh; Opposing = 154 veh

PM Peak: Left-Turn = 36 veh; Opposing = 250 veh



(a) Three-Leg Intersections



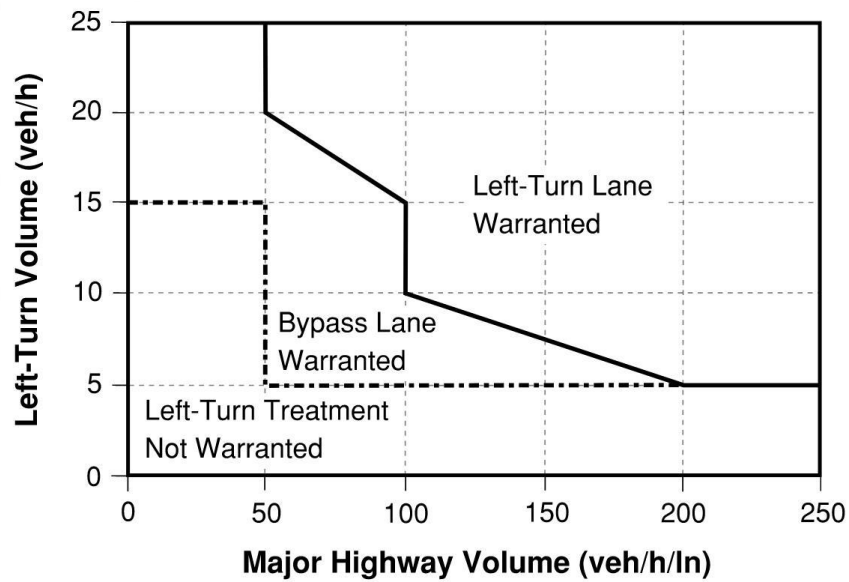
(b) Four-Leg Intersections

STATE OF TENNESSEE	FIGURE B.2
LEFT-TURN LANE WARRANT FOR TWO-LANE RURAL HIGHWAYS (UNSIGNALIZED)	

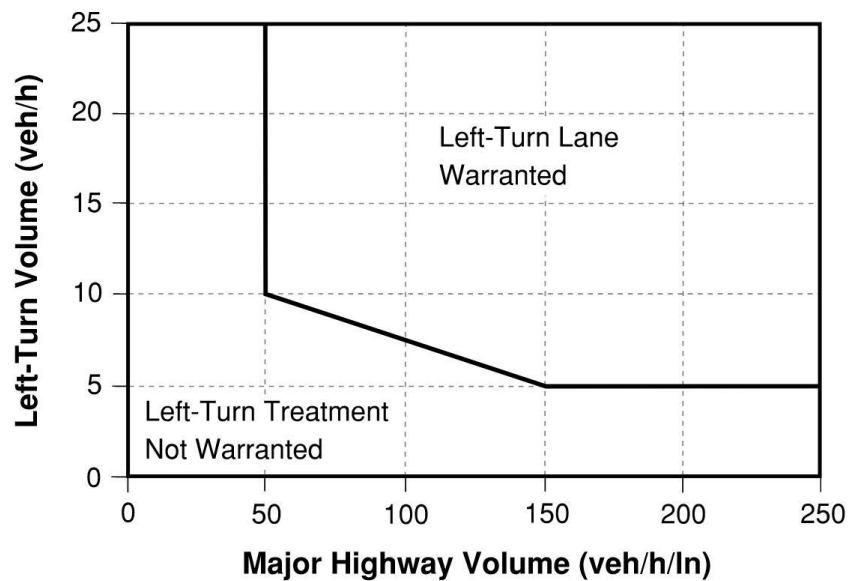
Figure B.2: Left-Turn Lane Warrant for two-Lane Rural Roadways (Unsignalized)

AM Peak: Left-Turn = 138 veh; Opposing = 159 veh

PM Peak: Left-Turn = 46 veh; Opposing = 267 veh



(a) Three-Leg Intersections



(b) Four-Leg Intersections

STATE OF TENNESSEE	FIGURE B.2
LEFT-TURN LANE WARRANT FOR TWO-LANE RURAL HIGHWAYS (UNSIGNALIZED)	

Figure B.2: Left-Turn Lane Warrant for two-Lane Rural Roadways (Unsignalized)

AM Peak: Right-Turn = 50 veh; Through = 92 veh
PM Peak: Right-Turn = 75 veh; Through = 156 veh

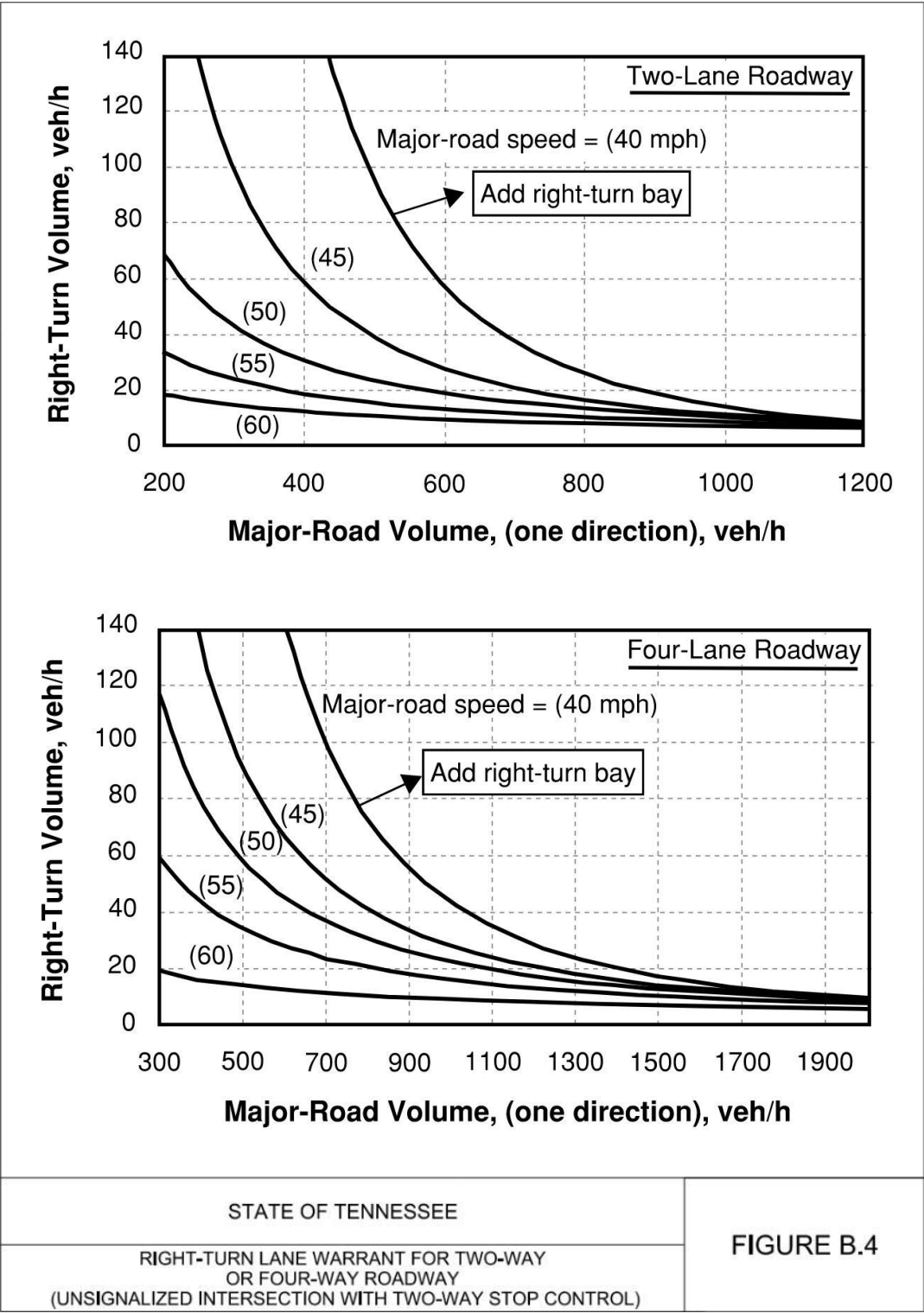


Figure B.4: Right-Turn Lane Warrant for Two-Way or Four-Way Roadway (Unsignalized Intersection with Two-Way Stop Control)

AM Peak: Right-Turn = 54 veh; Through = 100 veh
PM Peak: Right-Turn = 81 veh; Through = 169 veh

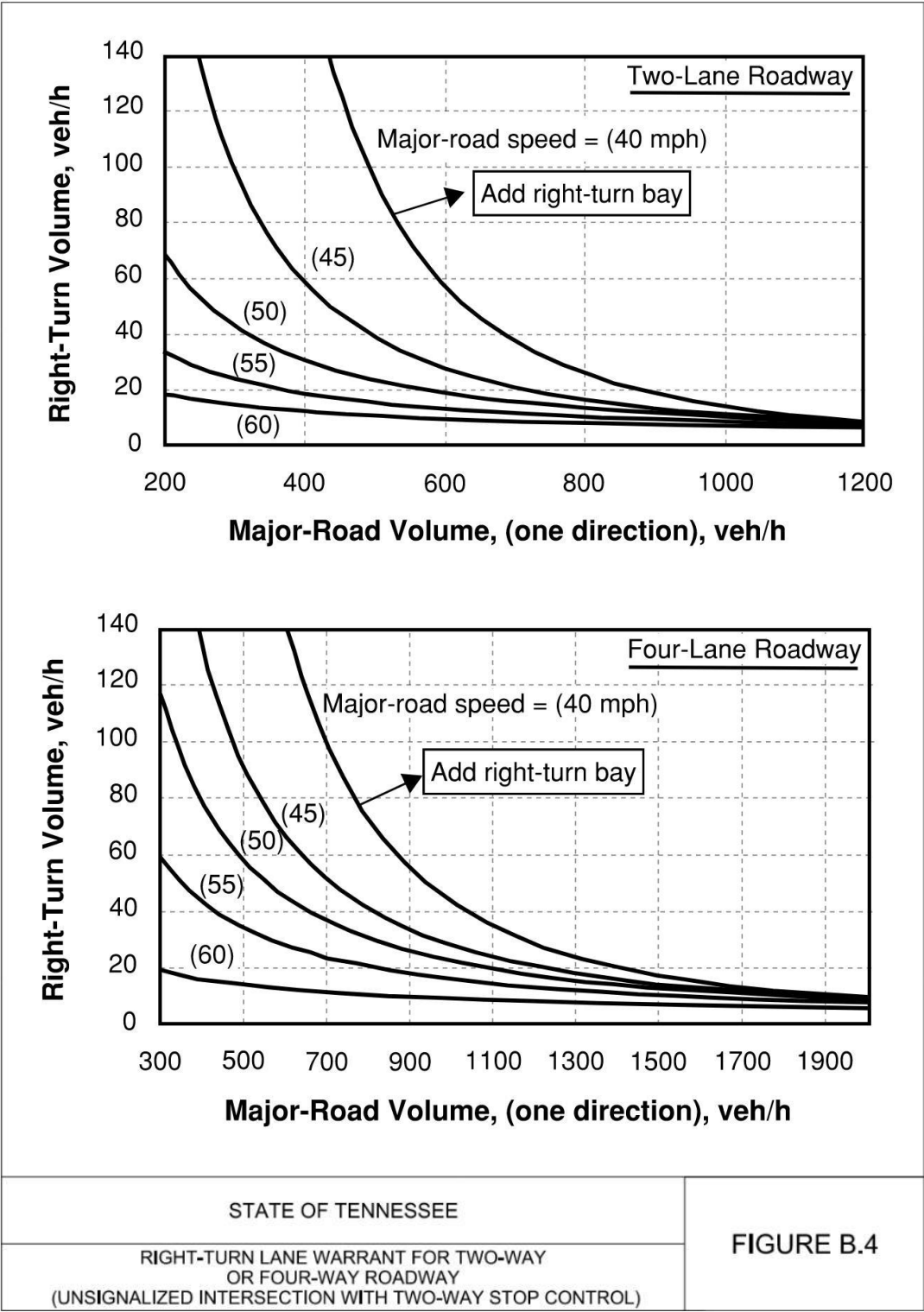


Figure B.4: Right-Turn Lane Warrant for Two-Way or Four-Way Roadway (Unsignalized Intersection with Two-Way Stop Control)

AM Peak: Right-Turn = 59 veh; Through = 100 veh
PM Peak: Right-Turn = 96 veh; Through = 169 veh

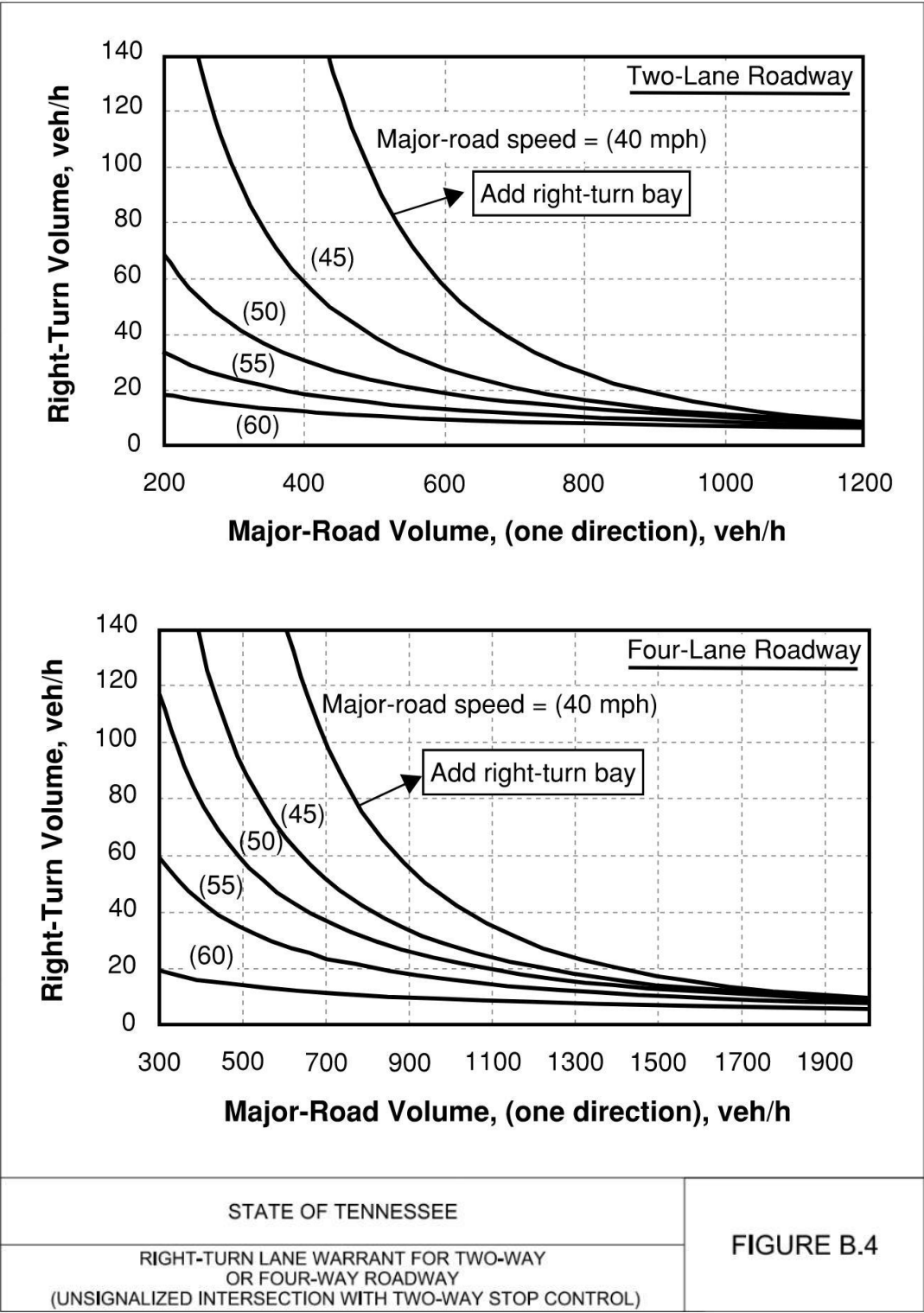


Figure B.4: Right-Turn Lane Warrant for Two-Way or Four-Way Roadway (Unsignalized Intersection with Two-Way Stop Control)

TABLE 6A
KNOX COUNTY LEFT-TURN LANE VOLUME THRESHOLDS
FOR 2-LANE ROADWAYS WITH A PREVAILING SPEED OF 46 to 55 MPH

Project No: 01203-0003
Project Name: Roberts Rd Residential TIL
Notes: Existing Traffic

(If the left-turn volume exceeds the table value a left-turn lane is needed)

OPPOSING VOLUME	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
	100 - 149	150 - 199	200 - 249	250 - 299	300 - 349	350 - 399
100 - 149	200	140	100	75	60	50
150 - 199	175	120	85	65	55	45
200 - 249	150	100	75	60	50	40
250 - 299	130	85	65	55	45	35
300 - 349	110	75	60	50	40	30
350 - 399	95	65	55	45	35	25
400 - 449	80	60	50	40	30	25
450 - 499	70	55	45	35	25	20
500 - 549	60	50	40	30	25	20
550 - 599	50	45	35	25	20	20
600 - 649	45	40	30	25	20	20
650 - 699	40	35	30	20	20	20
700 - 749	35	35	25	20	20	15
750 or More	35	35	25	20	15	15

OPPOSING VOLUME	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 599	= / > 600
100 - 149	50	45	40	35	30	25
150 - 199	45	40	35	30	30	25
200 - 249	40	35	30	25	25	20
250 - 299	35	35	30	25	25	20
300 - 349	30	30	25	25	20	20
350 - 399	25	25	25	20	20	20
400 - 449	25	25	20	20	20	15
450 - 499	20	20	20	20	20	15
500 - 549	20	20	20	20	15	15
550 - 599	20	20	20	15	15	15
600 - 649	20	20	15	15	15	15
650 - 699	20	15	15	15	15	15
700 - 749	15	15	15	15	15	15
750 or More	15	15	15	15	15	15

* Or through volume only if a right-turn lane exists

Intersection	Time Period	Opposing Volume	Through Volume	Left-Turn Volume	Warrant Threshold	Left-Turn Lane Warranted (Yes / No)
Rob. @ Wash (E)	AM Peak	155	70	96	175	NO
Rob. @ Wash (E)	PM Peak	62	111	178	200	NO
Rob. @ Wash (W)	AM Peak	73	183	134	140	NO
Rob. @ Wash (W)	PM Peak	184	59	85	175	NO

TABLE 6A
KNOX COUNTY LEFT-TURN LANE VOLUME THRESHOLDS
FOR 2-LANE ROADWAYS WITH A PREVAILING SPEED OF 46 to 55 MPH

Project No: 01203-0003
Project Name: Roberts Rd Residential TIL
Notes: Background Traffic

(If the left-turn volume exceeds the table value a left-turn lane is needed)

OPPOSING VOLUME	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
	100 - 149	150 - 199	200 - 249	250 - 299	300 - 349	350 - 399
100 - 149	200	140	100	75	60	50
150 - 199	175	120	85	65	55	45
200 - 249	150	100	75	60	50	40
250 - 299	130	85	65	55	45	35
300 - 349	110	75	60	50	40	30
350 - 399	95	65	55	45	35	25
400 - 449	80	60	50	40	30	25
450 - 499	70	55	45	35	25	20
500 - 549	60	50	40	30	25	20
550 - 599	50	45	35	25	20	20
600 - 649	45	40	30	25	20	20
650 - 699	40	35	30	20	20	20
700 - 749	35	35	25	20	20	15
750 or More	35	35	25	20	15	15

OPPOSING VOLUME	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 599	= / > 600
100 - 149	50	45	40	35	30	25
150 - 199	45	40	35	30	30	25
200 - 249	40	35	30	25	25	20
250 - 299	35	35	30	25	25	20
300 - 349	30	30	25	25	20	20
350 - 399	25	25	25	20	20	20
400 - 449	25	25	20	20	20	15
450 - 499	20	20	20	20	20	15
500 - 549	20	20	20	20	15	15
550 - 599	20	20	20	15	15	15
600 - 649	20	20	15	15	15	15
650 - 699	20	15	15	15	15	15
700 - 749	15	15	15	15	15	15
750 or More	15	15	15	15	15	15

* Or through volume only if a right-turn lane exists

Intersection	Time Period	Opposing Volume	Through Volume	Left-Turn Volume	Warrant Threshold	Left-Turn Lane Warranted (Yes / No)
Rob. @ Wash (E)	AM Peak	168	76	104	175	NO
Rob. @ Wash (E)	PM Peak	67	120	193	200	NO
Rob. @ Wash (W)	AM Peak	79	198	145	140	YES
Rob. @ Wash (W)	PM Peak	199	64	92	175	NO

TABLE 6A
KNOX COUNTY LEFT-TURN LANE VOLUME THRESHOLDS
FOR 2-LANE ROADWAYS WITH A PREVAILING SPEED OF 46 to 55 MPH

Project No: 01203-0003
 Project Name: Roberts Rd Residential TIL
 Notes: Combined Traffic

(If the left-turn volume exceeds the table value a left-turn lane is needed)

OPPOSING VOLUME	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
	100 - 149	150 - 199	200 - 249	250 - 299	300 - 349	350 - 399
100 - 149	200	140	100	75	60	50
150 - 199	175	120	85	65	55	45
200 - 249	150	100	75	60	50	40
250 - 299	130	85	65	55	45	35
300 - 349	110	75	60	50	40	30
350 - 399	95	65	55	45	35	25
400 - 449	80	60	50	40	30	25
450 - 499	70	55	45	35	25	20
500 - 549	60	50	40	30	25	20
550 - 599	50	45	35	25	20	20
600 - 649	45	40	30	25	20	20
650 - 699	40	35	30	20	20	20
700 - 749	35	35	25	20	20	15
750 or More	35	35	25	20	15	15

OPPOSING VOLUME	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 599	= / > 600
100 - 149	50	45	40	35	30	25
150 - 199	45	40	35	30	30	25
200 - 249	40	35	30	25	25	20
250 - 299	35	35	30	25	25	20
300 - 349	30	30	25	25	20	20
350 - 399	25	25	25	20	20	20
400 - 449	25	25	20	20	20	15
450 - 499	20	20	20	20	20	15
500 - 549	20	20	20	20	15	15
550 - 599	20	20	20	15	15	15
600 - 649	20	20	15	15	15	15
650 - 699	20	15	15	15	15	15
700 - 749	15	15	15	15	15	15
750 or More	15	15	15	15	15	15

* Or through volume only if a right-turn lane exists

Intersection	Time Period	Opposing Volume	Through Volume	Left-Turn Volume	Warrant Threshold	Left-Turn Lane Warranted (Yes / No)
Rob. @ Wash (E)	AM Peak	170	76	120	175	NO
Rob. @ Wash (E)	PM Peak	71	120	248	200	YES*
Rob. @ Wash (W)	AM Peak	88	224	167	100	YES*
Rob. @ Wash (W)	PM Peak	229	81	107	150	NO

<p>TABLE 6B</p> <p>KNOX COUNTY RIGHT-TURN LANE VOLUME THRESHOLDS</p> <p>FOR 2-LANE ROADWAYS WITH A PREVAILING SPEED OF 46 TO 55 MPH</p>	<p>Project No: 01203-0003</p> <p>Project Name: Roberts Rd Residential TIL</p> <p>Notes: Existing Traffic</p>
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RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	< 100	100 - 199	200 - 249	250 - 299	300 - 349	350 - 399
Fewer Than 25						
25 - 49						
50 - 99						
100 - 149						
150 - 199						Yes
200 - 249					Yes	Yes
250 - 299				Yes	Yes	Yes
300 - 349			Yes	Yes	Yes	Yes
350 - 399			Yes	Yes	Yes	Yes
400 - 449		Yes	Yes	Yes	Yes	Yes
450 - 499		Yes	Yes	Yes	Yes	Yes
500 - 549	Yes	Yes	Yes	Yes	Yes	Yes
550 - 599	Yes	Yes	Yes	Yes	Yes	Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

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

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

Intersection	Time Period	Through Volume	Right-Turn Volume	Right-Turn Lane Warranted (Yes / No)
Rob. @ Wash (E)	AM Peak	144	11	NO
Rob. @ Wash (E)	PM Peak	59	3	NO
Rob. @ Wash (W)	AM Peak	59	14	NO
Rob. @ Wash (W)	PM Peak	151	33	NO

<p>TABLE 6B</p> <p>KNOX COUNTY RIGHT-TURN LANE VOLUME THRESHOLDS</p> <p>FOR 2-LANE ROADWAYS WITH A PREVAILING SPEED OF 46 TO 55 MPH</p>	<p>Project No: 01203-0003</p> <p>Project Name: Roberts Rd Residential TIL</p> <p>Notes: Background Traffic</p>
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RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	< 100	100 - 199	200 - 249	250 - 299	300 - 349	350 - 399
Fewer Than 25						
25 - 49						
50 - 99						
100 - 149						
150 - 199						Yes
200 - 249					Yes	Yes
250 - 299				Yes	Yes	Yes
300 - 349			Yes	Yes	Yes	Yes
350 - 399			Yes	Yes	Yes	Yes
400 - 449		Yes	Yes	Yes	Yes	Yes
450 - 499		Yes	Yes	Yes	Yes	Yes
500 - 549	Yes	Yes	Yes	Yes	Yes	Yes
550 - 599	Yes	Yes	Yes	Yes	Yes	Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

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

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

Intersection	Time Period	Through Volume	Right-Turn Volume	Right-Turn Lane Warranted (Yes / No)
Rob. @ Wash (E)	AM Peak	156	12	NO
Rob. @ Wash (E)	PM Peak	64	3	NO
Rob. @ Wash (W)	AM Peak	64	15	NO
Rob. @ Wash (W)	PM Peak	163	36	NO

TABLE 6B
KNOX COUNTY RIGHT-TURN LANE VOLUME THRESHOLDS
FOR 2-LANE ROADWAYS WITH A PREVAILING SPEED OF 46 TO 55 MPH

Project No: 01203-0003
Project Name: Roberts Rd Residential TIL
Notes: Combined Traffic

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

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

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

Intersection	Time Period	Through Volume	Right-Turn Volume	Right-Turn Lane Warranted (Yes / No)
Rob. @ Wash (E)	AM Peak	156	14	NO
Rob. @ Wash (E)	PM Peak	64	7	NO
Rob. @ Wash (W)	AM Peak	73	15	NO
Rob. @ Wash (W)	PM Peak	193	36	NO