EZ STOP CONCORD ROAD

KNOX COUNTY, TENNESSEE

TRAFFIC IMPACT STUDY

CONCORD ROAD
KNOX COUNTY, TENNESSEE

CCI PROJECT NO. 01634-0010.000

REV. 1

PREPARED FOR:

Calloway-Hunt Real Estate
P.O. Box 6618
Maryville, TN 37802

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REVISION NO. 1
MAY 23
2024

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TIS Version 2
5/23/2024

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REVISION 1 (05/23/2024)
This report replaces the previous version of the traffic impact study dated 04/25/2024 prepared for this project in its entirety. The associated changes are related to incorporation of review comments from the Town of Farragut, Knox County, Knoxville-Knox County Planning, and TDOT.

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EXECUTIVE SUMMARY

This report provides a summary of a traffic impact study that was performed for a proposed mixed-use development to be located at the northeast corner of Concord Road and 2nd Drive in Knox County, Tennessee. The project site is located on the east side of Concord Road and north side of 2nd Drive. The development plan for this site proposes a 7,015 square-foot Convenience Store / Gas Station with 14 fueling stations, and two 2,800 square-foot retail buildings with unknown usage. For the purposes of this study, it was assumed that these retail buildings would both be fast food restaurants with drive through windows, to accommodate for the potential maximum amount of traffic to be generated. The proposed development will have one partial access on Concord Road approximately 390 feet north of 2nd Drive, where a driveway cut currently exists. The partial access will be a right-in / right-out only access on Concord Road. Additionally, the development will have one full access on 2nd Drive approximately 150 feet east of Concord Road.

The purpose of this study was the evaluation of the traffic operational and safety impacts of the proposed development upon roadways in the vicinity of the project site. Comments received from Knox County Engineering, Knoxville-Knox County Planning, and the Town of Farragut resulted in the existing intersections of Concord Road at Turkey Creek Road / Summerdale Drive, Concord Road at 2nd Drive, and Concord Road at Northshore Drive being identified for detailed study. Appropriate intersection evaluations such as capacity analyses, turn-lane warrants, and signal warrants were conducted at the study intersections for existing and future conditions, both with and without site generated traffic, in order to determine the anticipated impacts and to establish recommended measures to mitigate these impacts. Additionally, the proposed site accesses on Concord Road and 2nd Drive were evaluated for turn lane warrants and sight distance.

The primary conclusion of this study is that the traffic generated from the proposed development will have only minor impacts at the study intersections. However, some improvements are recommended to improve operations, safety, and capacity. The following is a list of recommendations developed with this traffic impact study:

1) A northbound right turn lane onto 2nd Drive from Concord Road should be constructed with a storage length of 50 feet and a taper length of 120 feet.
2) Ensure that grading, landscaping, signing, and other site features do not restrict lines of sight exiting the development. The sight distance looking left when exiting the site onto 2nd Drive should be improved to at least 250 feet.
3) The lanes on 2nd Drive should be widened to at least 10 feet per Knox County requirements.

INTRODUCTION & PURPOSE OF STUDY

This report provides a summary of a traffic impact study that was performed for a proposed mixed-use development to be located at the northeast corner of Concord Road and 2nd Drive in Knox County, Tennessee. The project site is located on the east side of Concord Road and the north side of 2nd Drive. FIGURE 1 is a location map showing the major roadways in the project site vicinity.

FIGURE 1
LOCATION MAP

The development plan for this site proposes a 7,015 square-foot Convenience Store / Gas Station with 14 fueling stations, and two 2,800 square-foot retail buildings with unknown usage. For the purposes of this study, it was assumed that these retail buildings would both be fast food restaurants with drive through windows, to accommodate for the potential maximum amount of traffic to be generated. The proposed development will have one partial access on Concord Road approximately 390 feet north of 2nd Drive, where a driveway cut currently exists. The partial access will be a right-in / right-out only access on Concord Road. Additionally, the development will have one full access on 2nd Drive approximately 150 feet east of Concord Road. FIGURE 2 is a Conceptual Site Plan detailing the proposed site.

The purpose of this study was the evaluation of the traffic operational and safety impacts of the proposed development upon roadways in the vicinity of the project site. Comments received from Knox County Engineering, Knoxville-Knox County Planning, and the Town of Farragut resulted in the existing intersections of Concord Road at Turkey Creek Road / Summerdale Drive, Concord Road at 2nd Drive, and Concord Road at Northshore Drive being identified for detailed study. Appropriate intersection evaluations such as capacity analyses, turn-lane warrants, and signal warrants were conducted at the study intersections for existing and future conditions, both with and without site generated traffic, in order to determine the anticipated impacts and to establish recommended measures to mitigate these impacts. Additionally, the proposed site accesses on Concord Road and 2nd Drive were evaluated for turn lane warrants and sight distance.

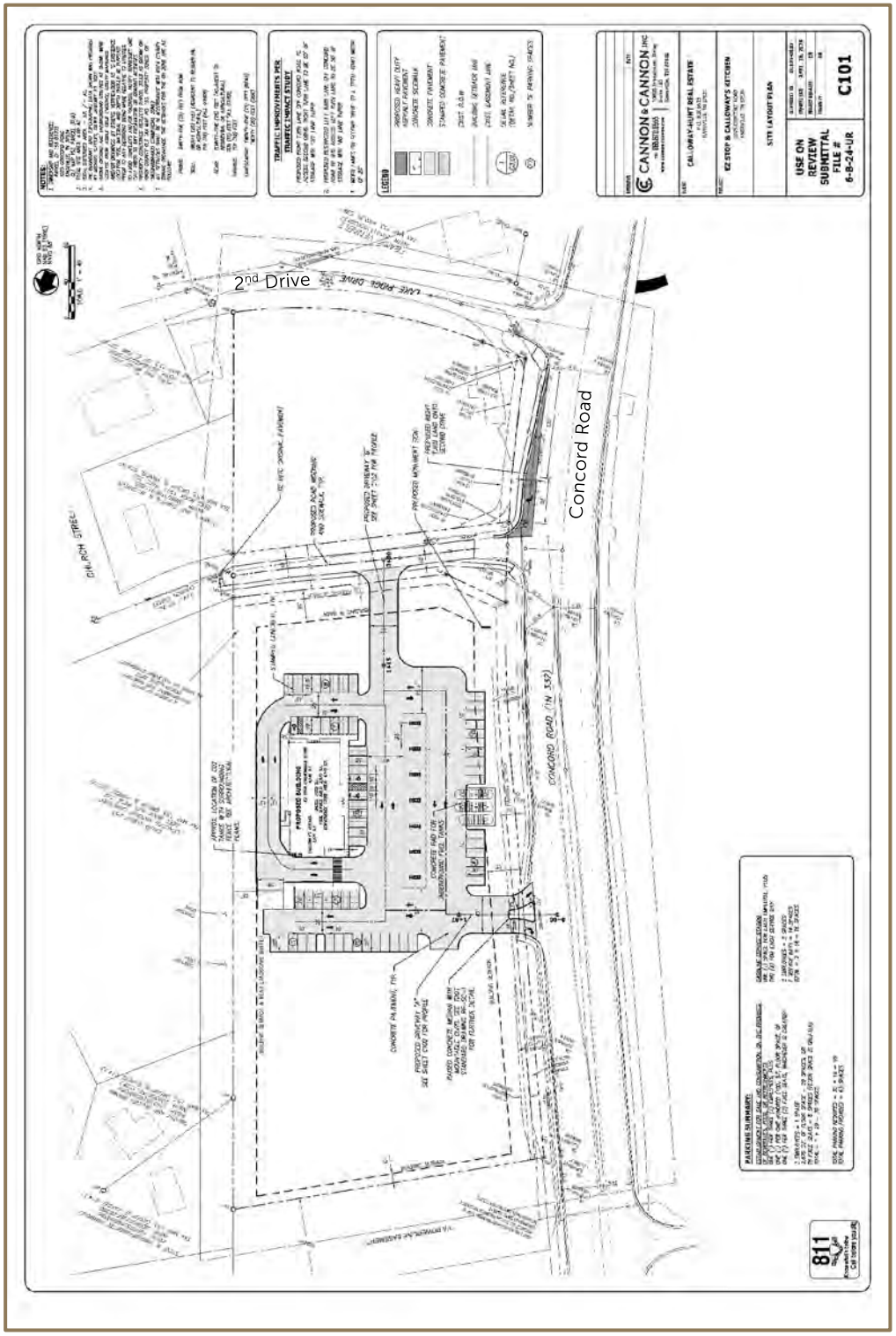


FIGURE 2
CONCEPTUAL SITE PLAN

EXISTING CONDITIONS

EXISTING ROADWAY CONDITIONS

Concord Road is classified as a Minor Arterial per the Tennessee Department of Transportation (TDOT) Functional Classification Maps and runs south to north from Northshore Drive to Kingston Pike. Within the study limits, Concord Road varies between a divided four-lane roadway with 2 travel lanes in each direction and an undivided five-lane roadway with two travel lanes in each direction and a center two-way left turn lane. In the study vicinity, Concord Road has 12-foot travel lanes and a posted speed limit of 40 mph. Concord Road has curb and gutter, bike lanes, and sidewalk on both sides of the roadway within the vicinity of the study

Turkey Creek Road is classified as a Major Collector per the TDOT Functional Classification Maps and runs west to east from Virtue Road to Concord Road. Turkey Creek Road is a two-lane road with one travel lane in each direction. Within this section, Turkey Creek Road has 12-foot travel lanes and a posted speed limit of 40 mph. Turkey Creek Road has curb and gutter on both sides and sidewalk on the north side in the study vicinity.

2nd Drive is a local road with no pavement markings except at the intersection with Concord Road, and one travel lane each direction ranging from 7 to 8 feet wide. 2nd Drive has a posted speed limit of 25 mph, and it does not have curb and gutter or sidewalk.

Northshore Drive is a west to east road running from Beals Chapel Road to Papermill Drive. East of Concord Road, Northshore Drive is classified as a Minor Arterial per the TDOT Functional Classification Maps; west of Concord Road it is classified as a Major Collector. In the study vicinity, Northshore Drive is a two-lane road with one travel lane in each direction, has no curb and gutter or sidewalk, and has a posted speed limit of 40 mph. Northshore Drive has 12-foot lane widths east of Concord Road and 11-foot lane widths west of Concord Road in the study vicinity.

The existing intersection of Concord Road at Turkey Creek Road / Summerdale Drive is a four-legged signalized intersection. Concord Road is considered the north-south street, and Turkey Creek Road / Summerdale Drive are considered the east-west streets. The southbound Concord Road approach contains one exclusive left turn lane, two exclusive through lanes, and one exclusive right turn lane. The left turn lane has storage of approximately 90 feet, and the right turn storage is 470 feet. The northbound Concord Road approach contains one exclusive left turn lane, one exclusive through lane, and a shared through / right turn lane. The left turn lane storage is approximately 70 feet. The eastbound approach, Turkey Creed Road, contains one exclusive left turn lane and one lane that services all movements with a storage length of approximately 165 feet. The westbound approach, Summerdale Drive, consists of one lane to service all movements. Marked crosswalks and actuated pedestrian signal phases exist crossing all legs of the intersection.

The existing intersection of Concord Road at 2nd Drive is a three-legged, side-street stop controlled intersection. Concord Road is the north-south street and 2nd Drive is the east-west street. The southbound approach of Concord Road contains one exclusive left turn lane and two exclusive through lanes. The left turn lane has a storage length of approximately 65 feet. The northbound approach of Concord Road contains one exclusive through lane and one shared through / right turn

lane. The westbound approach of 2nd Drive has one lane to service all movements. A marked crosswalk exists crossing the east leg of the intersection.

The existing intersection of Concord Road at Northshore Drive is a three-legged intersection controlled by a roundabout. Concord Road is considered the north-south street and Northshore Drive is considered the east-west street. The southbound approach of Concord Road contains one exclusive, yield controlled right turn bypass lane and an additional lane entering the roundabout. The eastbound approach of Northshore Drive has one lane entering the roundabout. The westbound approach of Northshore Drive contains one exclusive, free flowing right turn bypass lane and an additional lane entering the roundabout.

EXISTING SITE CONDITIONS

The project site is located at the intersection of Concord Road and 2nd Drive on the east side of Concord Road and the north side of 2nd Drive. The area of the site is approximately 20.6 acres, and it is currently zoned Neighborhood Commercial. The site is relatively flat and wooded throughout with no existing structures. A driveway cut currently exists on the west side of the site to Concord Road. FIGURE 3 provides an aerial view of the project site and the surrounding area.

FIGURE 3
EXISTING SITE CONDITIONS

EXISTING TRAFFIC DATA

Two types of traffic data were gathered for this study. The Tennessee Department of Transportation (TDOT) collects annual average daily traffic (AADT) data on roadways in the study area. Three count stations, located on Turkey Creek Road east of Brixworth Boulevard, Northshore Drive east of Concord Park Drive, and Concord Road at Clarity Pointe Lane, were found near the project site that were felt to have particular relevance for this study. The most currently available data from these stations can be found in TABLE 1.

TABLE 1: ANNUAL AVERAGE DAILY TRAFFIC COUNT SUMMARY

COUNT YEAR	TDOT COUNT STATION 47000305 TURKEY CREEK ROAD	TDOT COUNT STATION 47000361 NORTHSHORE DRIVE	TDOT COUNT STATION 47000455 CONCORD ROAD
2018	2,889	13,682	10,070
2019	2,664	13,523	11,530
2020	2,264	13,793	11,464
2021	4,453	17,152	12,037
2022	4,404	15,495	11,905
2023	3,062	15,305	15,482

In addition to the available AADT data, intersection turning movement counts (TMC) were conducted at the existing study intersections to determine the current morning (AM) and evening (PM) peak hour operating volumes. These peak hour volumes are the traffic volumes with which the study's capacity analyses are based. The intersection TMC data were collected on March 20, 2024. The 2024 existing peak hour traffic volumes are summarized in FIGURE 4, and the raw data traffic count summary sheets are contained in APPENDIX A.

EXISTING CAPACITY ANALYSES

Capacity analyses employing the methods of the *Highway Capacity Manual* were conducted for the existing conditions at the study intersections. These analyses were performed with the 2024 existing traffic volumes, shown in FIGURE 4, and existing intersection geometry, traffic control, and signal timing. *Synchro 11* software was utilized for the capacity analyses for the intersection of Concord Road at Turkey Creek Road / Summerdale Drive. *HCS 2022* software was utilized for the capacity analysis for the intersections of Concord Road at 2nd Drive and Concord Road at Northshore Drive. The EVALUATIONS section of this report may be referenced for discussion and tabular summaries 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 titled "Capacity and Level of Service Concepts," which provides a description of the utilized procedures.

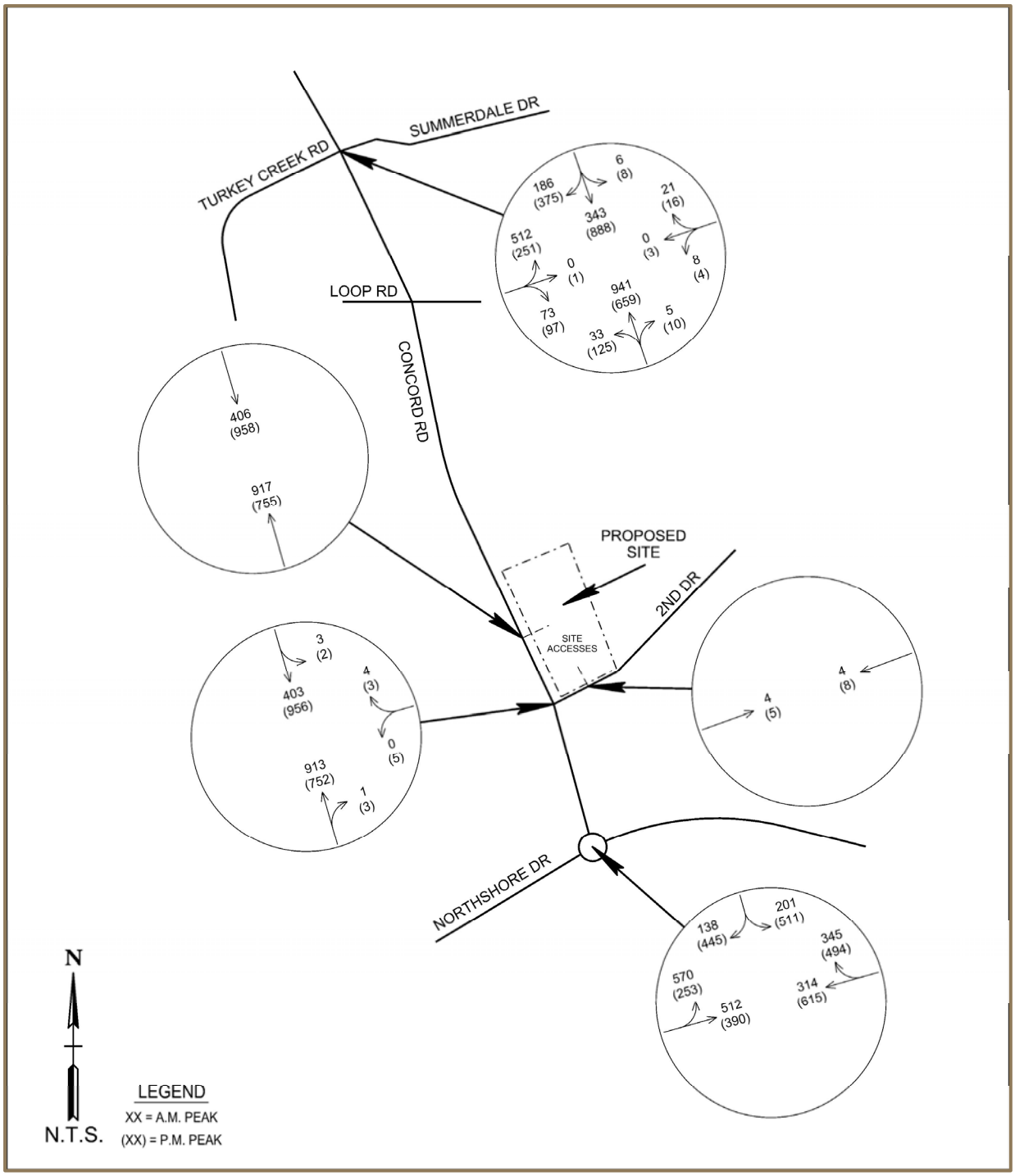


FIGURE 4
2024 EXISTING TRAFFIC VOLUMES

BACKGROUND CONDITIONS

BACKGROUND TRAFFIC GROWTH

The year for full buildout of the proposed development is unknown, however, the gas station / convenience store is anticipated to be completed in 2026. Therefore, Year 2026 was established as the appropriate design / analysis year for the study. In order to determine traffic volumes resulting solely from background traffic growth to Year 2026, it was necessary to establish an annual growth rate for existing traffic. The TDOT 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, a background annual growth rate of 3.5% was assumed. FIGURE 5 contains the background traffic volumes that would result from this annual growth rate from Year 2024, when the counts were conducted, to Year 2026.

BACKGROUND CAPACITY ANALYSES / LEVELS-OF-SERVICE

Capacity analyses as described in the EXISTING CONDITIONS section of this report were conducted utilizing the Year 2026 background volumes shown in FIGURE 5 and existing intersection geometry, traffic control, and signal timing. The EVALUATIONS section of this report may be referenced for discussion and tabular summaries of these analyses, while more detailed summaries are presented on the computer printouts contained in APPENDIX C.

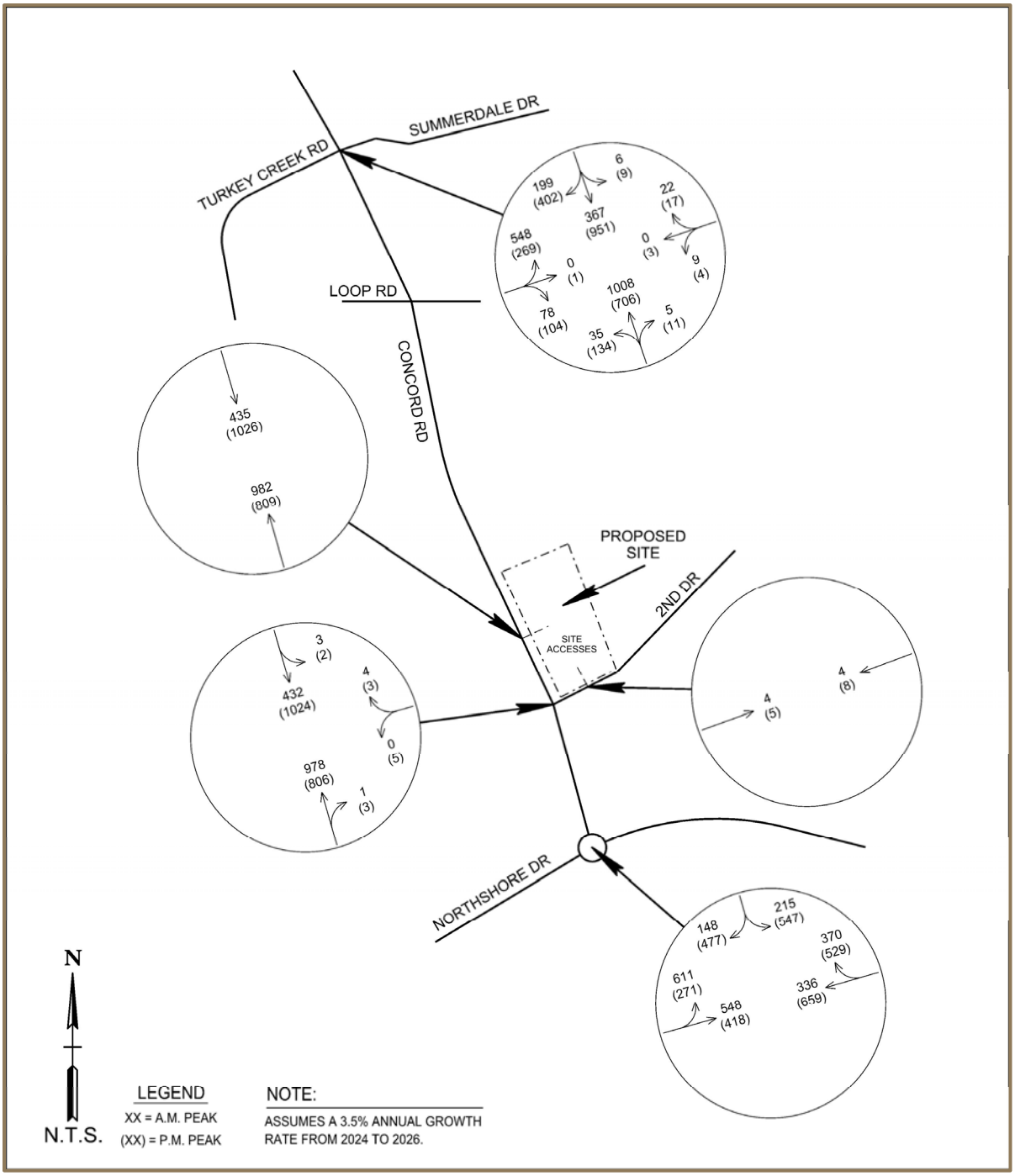


FIGURE 5
2026 BACKGROUND TRAFFIC VOLUMES

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 (ITE) were utilized. The proposed development will include a gas station / convenience store that is 7,015 square feet and has 14 vehicle fueling stations, as well as two undetermined use retail buildings. These buildings are 2,800 square feet each, and were assumed to be fast food restaurants with drive throughs to account for the reasonable worst-case scenario traffic generated. The ITE *Trip Generation Manual 11th Edition* was utilized for estimating traffic generated. The generated traffic volumes were determined based on the data for the peak hours of adjacent street traffic. Per guidance from a Knoxville-Knox County memorandum regarding pass-by rates for several land uses, a 65% pass-by rate was applied to the trip generation for the convenience market / gas station, and a 40% pass-by rate was applied to the trip generation for the fast-food restaurant. Pass-by trips are traffic volumes that are currently on the roadway and enter/exit the development as they "pass by" on their way to another destination. Additional trip generation information is contained in APPENDIX B. See TABLE 2 for a summary of the traffic generated for this development.

TABLE 2: TRIP GENERATION SUMMARY

LAND USE	SIZE	WEEKDAY (TRIPS/DAY)	AM PEAK HOUR (TRIPS/HOUR)	PM PEAK HOUR (TRIPS/HOUR)
Fast-Food Restaurant with Drive-Through Window LUC (934)	2,800 sqft	1,309	125	92
Entering Trips Exiting Trips		655 (50%) 654 (50%)	64 (51%) 61 (49%)	48 (52%) 44 (48%)
Fast-Food Restaurant with Drive-Through Window LUC (934)	2,800 sqft	1,309	125	92
Entering Trips Exiting Trips		654 (50%) 655 (50%)	64 (51%) 61 (49%)	48 (52%) 44 (48%)
Convenience Store / Gas Station LUC (945)	7,015 Sqft 14 pumps	4,841	442	377
Entering Trips Exiting Trips		2,420 (50%) 2,421 (50%)	221 (50%) 221 (50%)	188 (50%) 189 (50%)
Total Trips		7,459	692	561
Entering Trips Exiting Trips		3,729 3,730	349 343	284 277
Internal Trips		N/A	90	129
Entering Trips Exiting Trips		N/A	45 45	65 64
Net External Trips		7,459	602	432
Entering Trips Exiting Trips		3,729 3,730	304 298	219 213
Pass-by Trips		4,194	387	319
Entering Trips Exiting Trips		2,097 2,097	195 192	161 158
Non-Pass-by Trips		3,265	215	113
Entering Trips Exiting Trips		1,632 1,633	109 106	58 55

A.M. Peak Hour trip generation is based on Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m.
P.M. Peak Hour trip generation is based on Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m.

TRIP DISTRIBUTION AND ASSIGNMENT

The proposed trip distribution for this development was determined through a review of existing travel patterns, local knowledge of the study area, proposed site location in relation to the surrounding roadway network, and engineering judgment. Primary trips and pass-by trips were separated based on the Knoxville-Knox County Metropolitan Planning Commission pass-by rates. FIGURES 6A and 6B provide a summary of how the above site generated trips would be assigned to the study intersections. FIGURES 7A-7C provide the proposed trip assignment volumes to the study intersections.

FUTURE TRAFFIC VOLUMES

Future projected traffic volumes for the study intersections were developed by adding the generated and assigned trips shown in FIGURE 7C to the 2026 background traffic volumes developed in the previous section and shown in FIGURE 5. These combined 2026 volumes reflect the existing traffic, the background traffic growth, and the generated traffic from the proposed development. These future volumes are shown on FIGURE 8 and are the combined volumes used in the analyses of future conditions with the proposed development.

FUTURE CAPACITY ANALYSES / LEVELS-OF-SERVICE

Capacity analyses as described in the EXISTING CONDITIONS section of this report were conducted utilizing the Year 2026 combined volumes shown in FIGURE 8 and existing intersection geometry, traffic control, and signal timing, as well as some improvement alternatives. Tabular summaries of the analyses results and associated discussion are also contained in the EVALUATIONS section. In addition, detailed computer printout summaries of the analyses are contained in APPENDIX C.

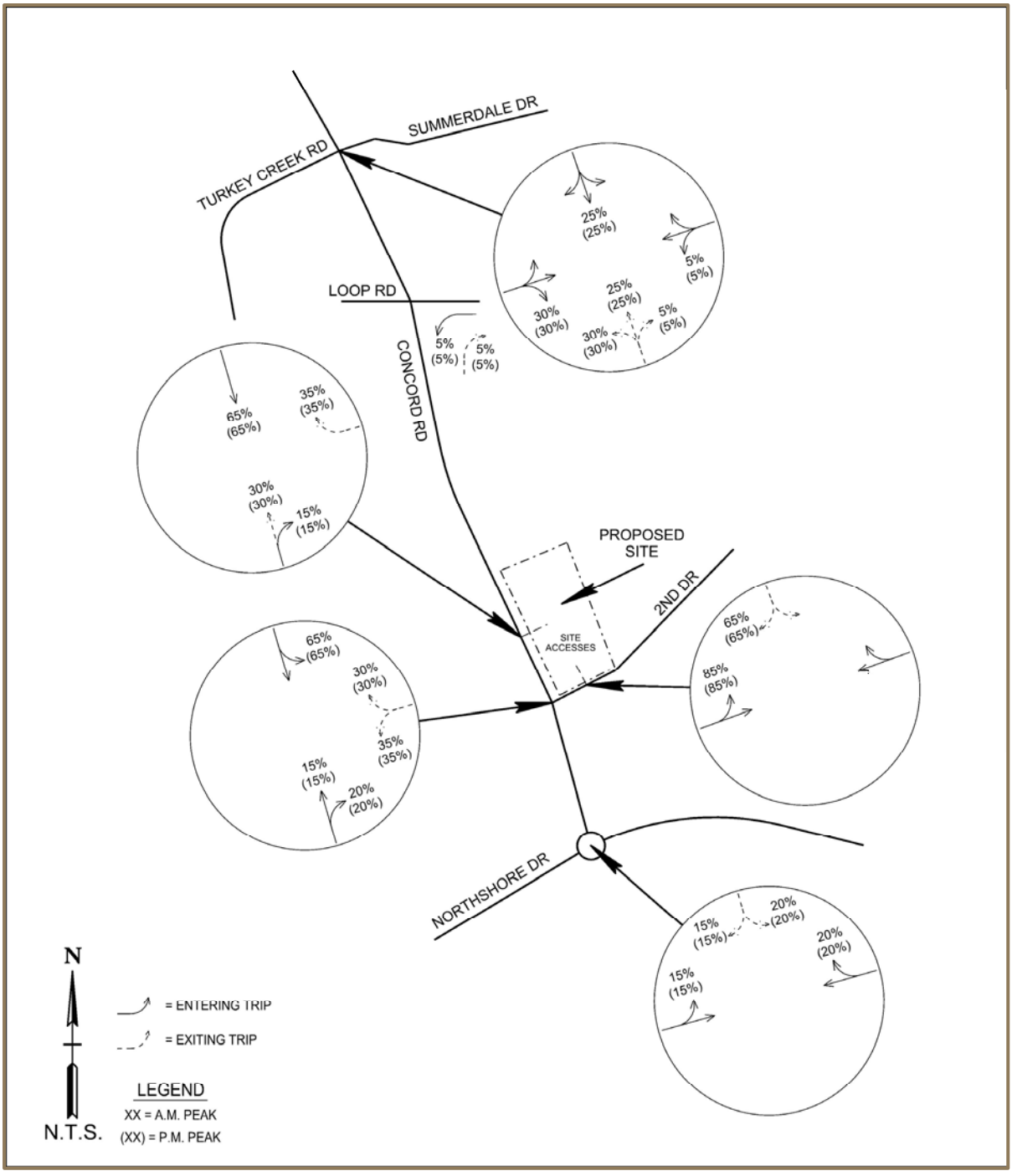


FIGURE 6A
PRIMARY TRIP DISTRIBUTION

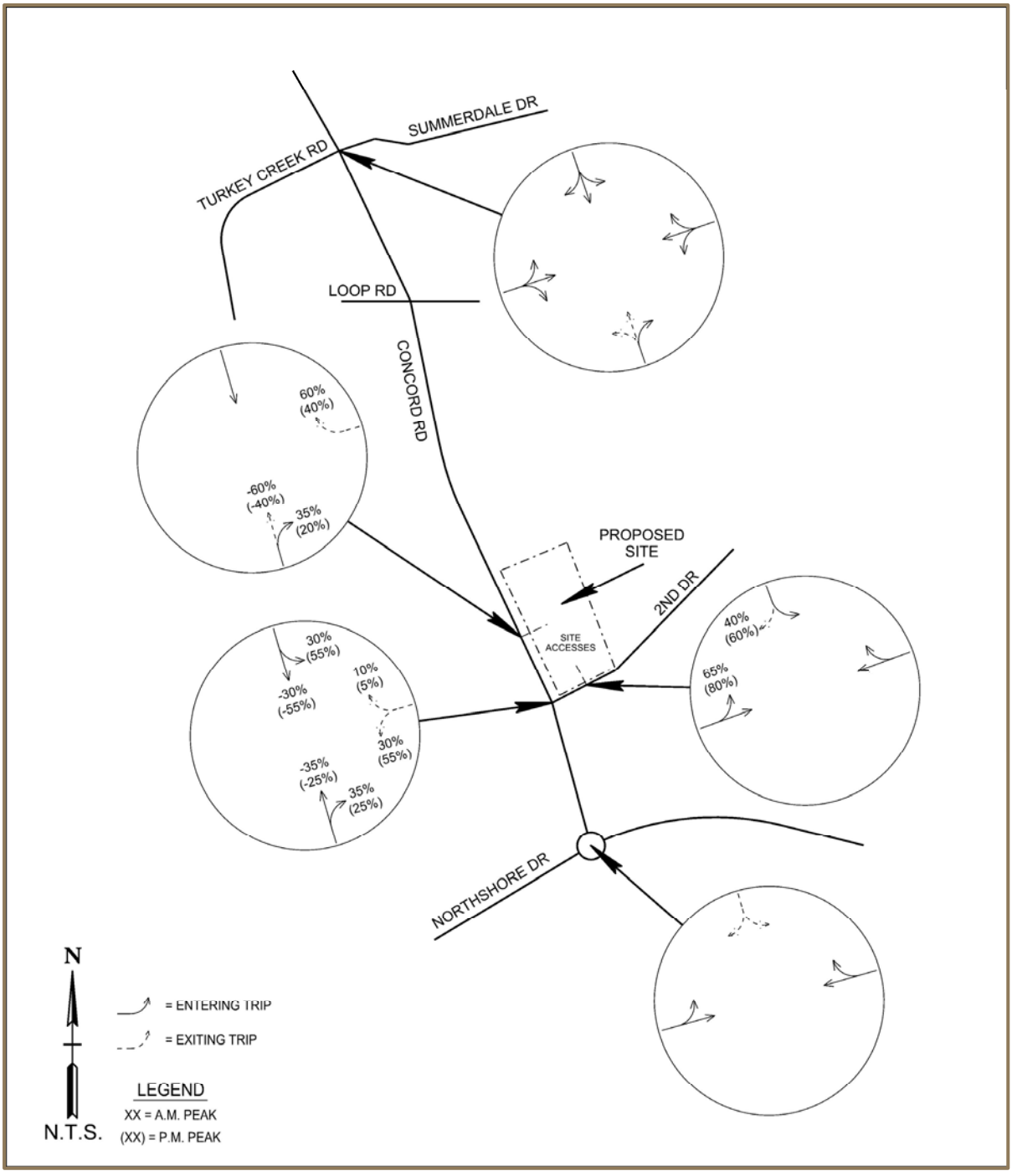


FIGURE 6B
PASS-BY TRIP DISTRIBUTION

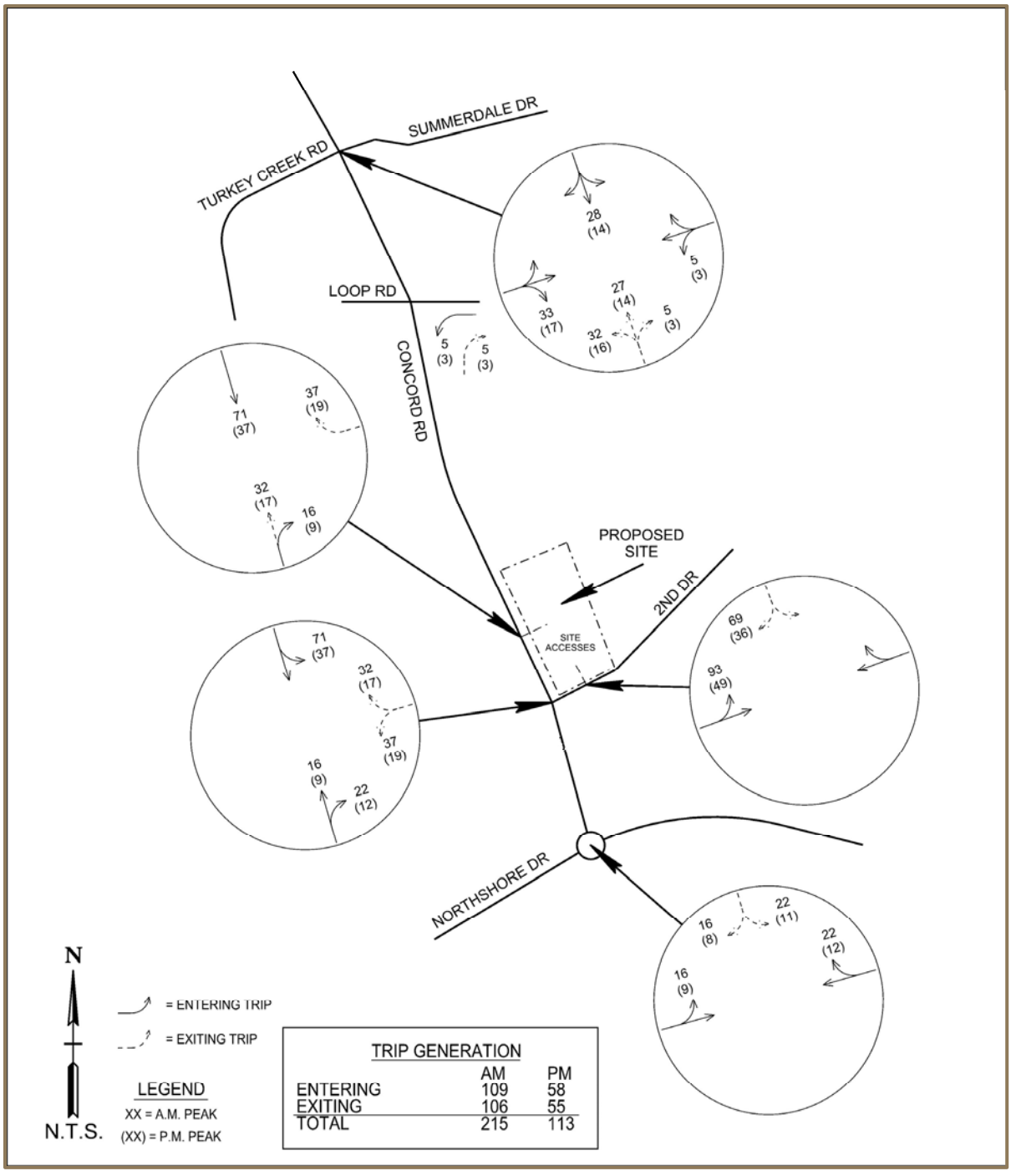


FIGURE 7A
PRIMARY TRIP ASSIGNMENT

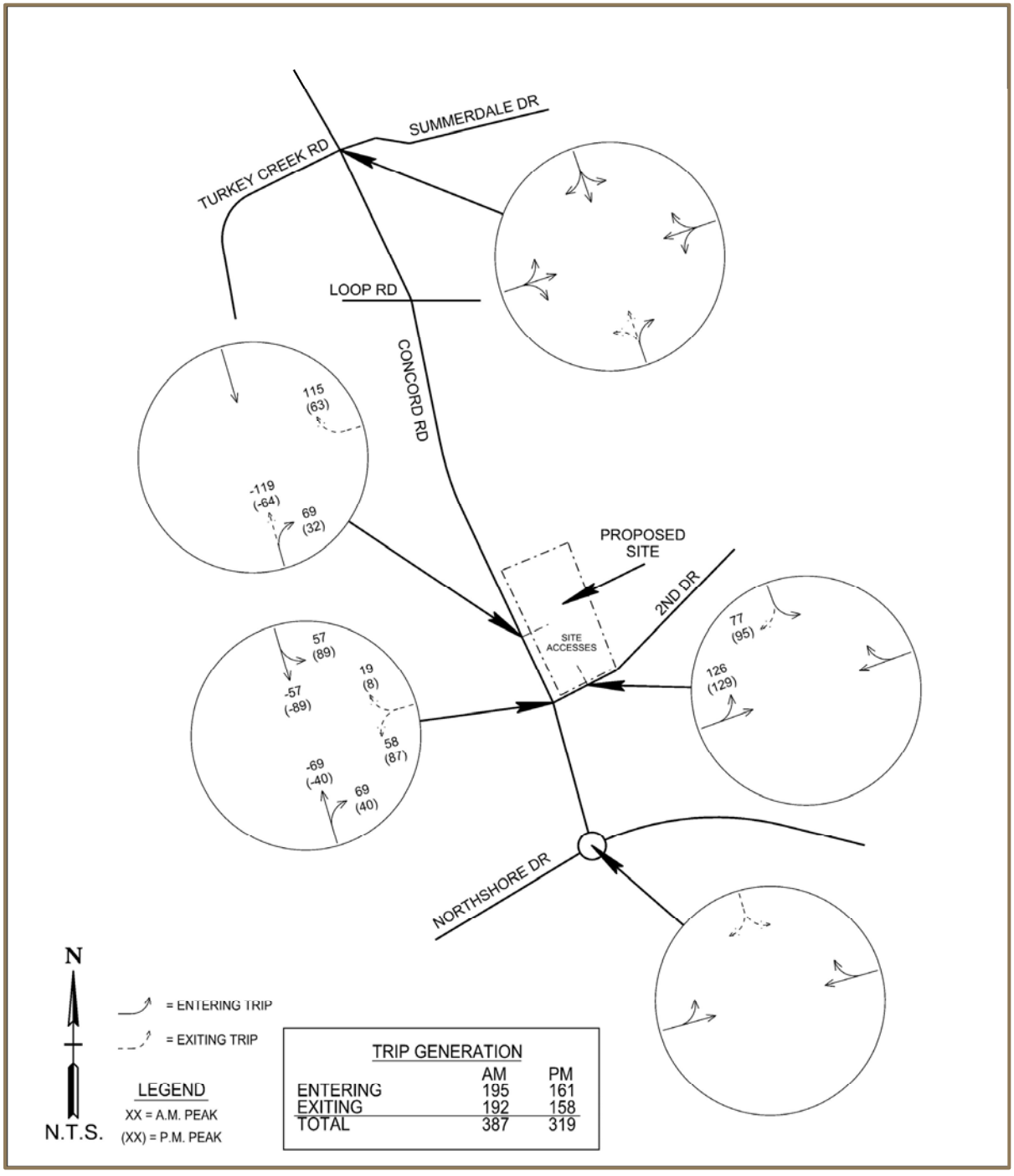


FIGURE 7B
PASS-BY TRIP ASSIGNMENT

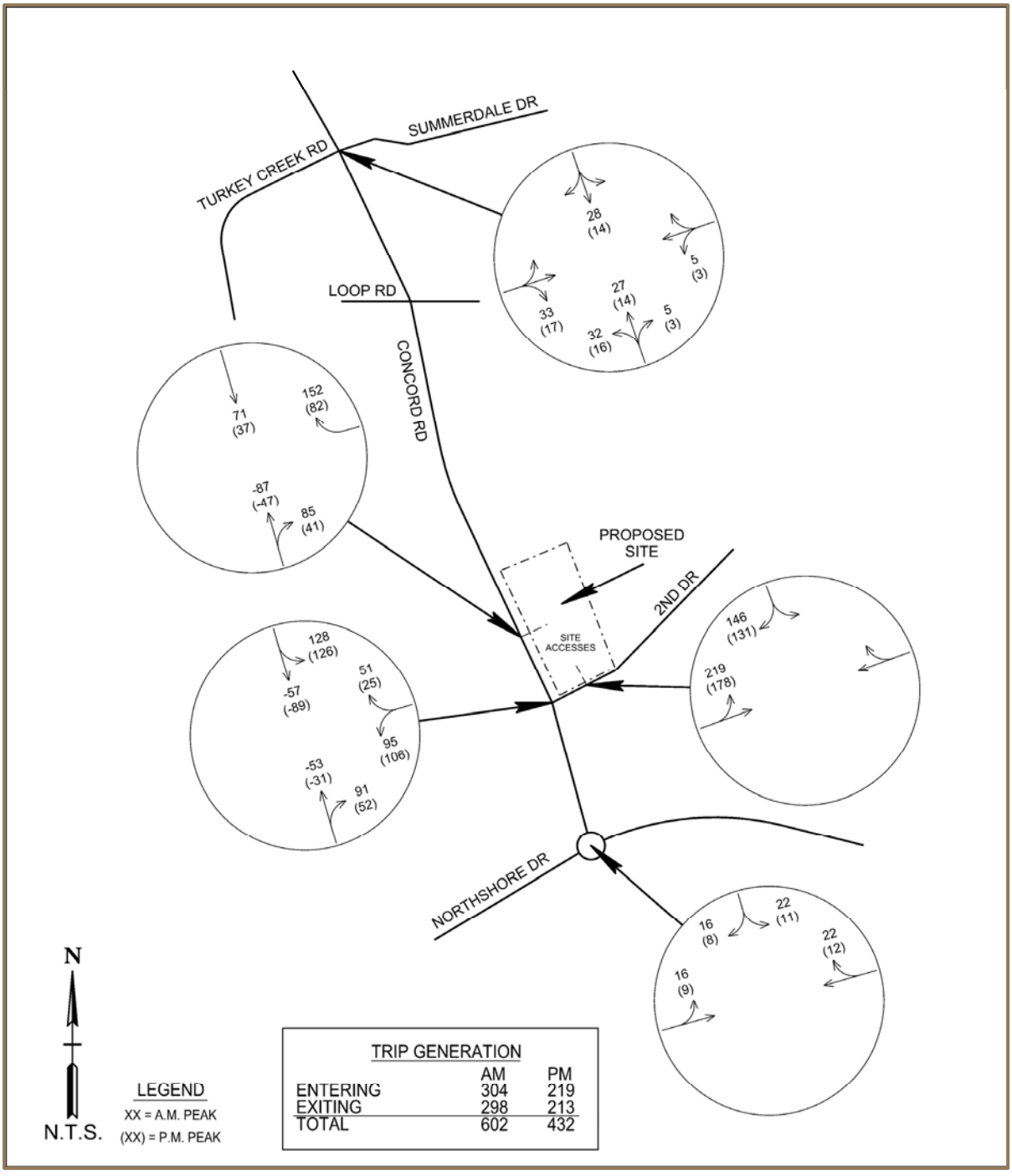


FIGURE 7C
TOTAL TRIP ASSIGNMENT

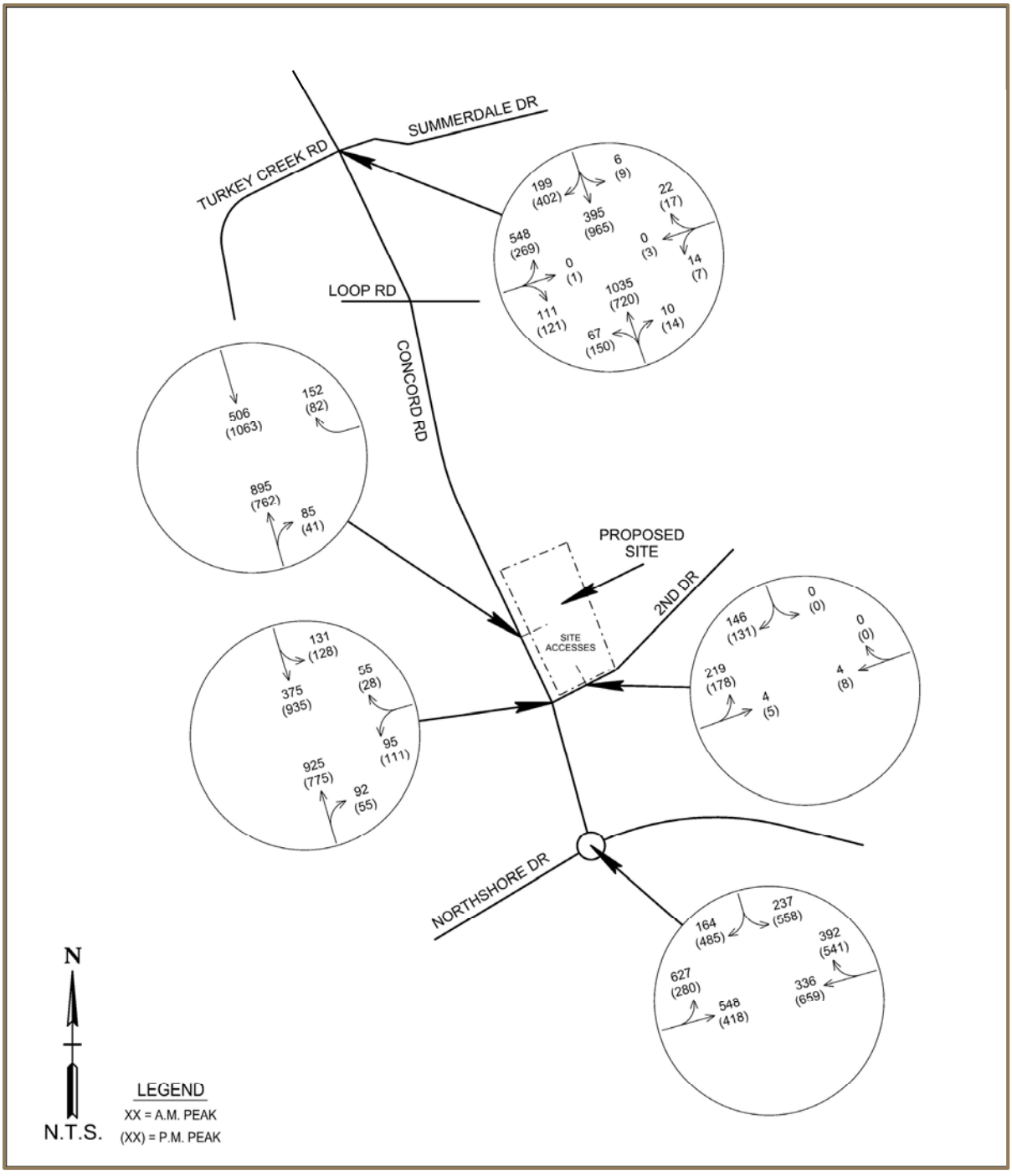


FIGURE 8
2026 COMBINED TRAFIC VOLUMES

EVALUATIONS

INTERSECTION CAPACITY ANALYSES

Intersection capacity analyses were performed for the study intersections. The capacity analyses employed the procedures of the *Highway Capacity Manual* utilizing *Synchro 11* software. A description of the fundamentals of these procedures is contained in the APPENDIX C section titled "Capacity and Level-of-Service Concepts." The results of these analyses for the existing, background and combined future traffic conditions are presented and discussed by individual intersection in the subsections below. Capacity analyses summaries are presented for each intersection in these individual subsections, which are accompanied by tables showing level-of-service (LOS) and queuing results. More detailed information is contained on the capacity software output summaries contained in APPENDIX C.

Potential mitigation measures were identified at intersections experiencing poor LOS or where vehicle queuing may become an issue. These mitigation strategies, where applicable, are described for each intersection in their respective subsections. The accompanying LOS and queue length tables show comparisons between the intersections under existing geometry, traffic control, and signal timing to these mitigation strategies in order to provide a quantitative measure of effectiveness of the mitigation.

Intersection #1: Concord Road at Turkey Creek Road / Summerdale Drive

As shown in TABLE 3, this intersection currently operates at overall LOS "C" during the peak hours. The intersection is expected to continue to operate at the same LOS under combined traffic conditions upon construction and full buildout of the proposed development. The eastbound shared left turn lane / through lane / right turn lane queue exceeds the current storage length in all scenarios, but lengthening the storage for this lane is not feasible due to the bridge. Queues for the northbound left turn lane may exceed the storage length; however, the two-way left turn lane provides plenty of spillback storage. Based on these analyses, the development will have only minimal impacts on intersection operations.

TABLE 3: CAPACITY ANALYSES SUMMARY – CONCORD ROAD AT TURKEY CREEK ROAD / SUMMERDALE DRIVE

SCENARIO		MOVEMENT/ APPROACH	AM PEAK (LOS/DELAY)	PM PEAK (LOS/DELAY)
2024 Existing	Existing Geometry, Traffic Control & Signal Timing	EB WB NB SB Overall	C 28.0 A 0.7 C 26.5 B 16.4 C 24.0	D 42.8 C 33.3 B 16.7 C 22.7 C 23.7
2026 Background	Existing Geometry, Traffic Control & Signal Timing	EB WB NB SB Overall	C 30.2 A 0.8 C 27.9 B 16.4 C 25.3	D 45.4 C 34.0 B 17.2 C 24.2 C 25.1
2026 Combined	Existing Geometry, Traffic Control & Signal Timing	EB WB NB SB Overall	C 33.3 A 0.9 C 29.9 B 19.6 C 27.8	D 45.8 D 37.6 B 17.8 C 25.7 C 26.1

TABLE 4: 95TH PERCENTIAL QUEUE SUMMARY – CONCORD ROAD AT TURKEY CREEK ROAD / SUMMERDALE DRIVE

SCENARIO		MOVEMENT/ APPROACH	AM PEAK	PM PEAK
2024 Existing	Existing Geometry, Traffic Control & Signal Timing	EBL EBL/T/R WBL/T/R NBL NBT/R SBL SBT SBR	404' 178' 0' 31' 443' 10' 145' 19'	248' 193' 36' 92' 293' 12' 468' 33'
2026 Background	Existing Geometry, Traffic Control & Signal Timing	EBL EBL/T/R WBL/T/R NBL NBT/R SBL SBT SBR	445' 206' 0' 32' 488' 10' 155' 20'	271' 216' 37' 98' 320' 13' 532' 35'
2026 Combined	Existing Geometry, Traffic Control & Signal Timing	EBL EBL/T/R WBL/T/R NBL NBT/R SBL SBT SBR	483' 227' 0' 53' 508' 10' 172' 21'	289' 220' 44' 115' 330' 12' 560' 38'

Intersection #2: Concord Road at 2nd Drive

TABLE 3A indicates that the westbound approach of this intersection currently operates at overall LOS "B" during the AM peak hour and LOS "C" during the PM peak hour. The approach is anticipated to worsen to LOS "E" during the AM peak hour and "F" during the PM peak hour upon full buildout of the development under existing geometry and traffic control. The westbound approach currently experiences minimal traffic, with the resulting delay mainly affecting users of the development rather than other users. Several mitigation scenarios were evaluated, resulting in marginal improvements for the westbound approach but potentially worsening conditions for other approaches. Signalizing this intersection would cause unnecessary delays to Concord Road that would not exist even with the full buildout of this development. While separating the left and right lanes on the westbound approach would lead to slightly shorter delays and queue lengths, the benefits are not significant enough to justify the cost and effort involved. According to the charts by M.D. Harmelink in the *TDOT - Roadway Design Guidelines*, the storage warranted for the southbound left turn lane is 200 feet. However, as seen in TABLE 4A, the queue length for this movement is projected to be 25 feet under the 2026 Combined scenario.

TABLE 3A: CAPACITY ANALYSES SUMMARY – CONCORD ROAD AT 2ND DRIVE

SCENARIO		MOVEMENT/ APPROACH	AM PEAK (LOS/DELAY)	PM PEAK (LOS/DELAY)
2024 Existing	Existing Geometry & Traffic Control	WB SBL	B 12.2 B 12.5	C 16.1 A 9.6
2026 Background	Existing Geometry & Traffic Control	WB SBL	B 12.6 B 13.2	C 17.0 A 9.8
2026 Combined	Existing Geometry & Traffic Control	WB SBL	E 49.9 B 13.0	F 56.6 B 11.1
2026 Combined	Exclusive Left & Right Turn Lanes On 2nd Drive	WB SBL	E 35.2 B 13.0	E 47.7 B 11.1
2026 Combined	Northbound Right Turn Lane On Concord Road	WB SBL	E 44.3 B 13.0	F 53.6 B 11.1
2026 Combined	Signalized	WB NB SB Overall	C 20.7 B 16.3 A 5.2 B 13.3	C 34.2 B 13.0 A 5.6 B 10.5

TABLE 4A: 95TH PERCENTIAL QUEUE SUMMARY – CONCORD ROAD AT 2ND DRIVE

SCENARIO		MOVEMENT/ APPROACH	AM PEAK	PM PEAK
2024 Existing	Existing Geometry & Traffic Control	WB SBL	0' 0'	3' 0'
2026 Background	Existing Geometry & Traffic Control	WB SBL	0' 0'	3' 0'
2026 Combined	Existing Geometry & Traffic Control	WB SBL	118' 25'	120' 18'
2026 Combined	Exclusive Left & Right Turn Lanes On 2nd Drive	WBL WBR SBL	78' 13' 25'	100' 5' 18'
2026 Combined	Northbound Right Turn Lane On Concord Road	WB SBL	108' 25'	115' 18'
2026 Combined	Signalized	WB NB SBL SBT	79' 317' 41' 49'	110' 222' 42' 148'

Intersection #3: Concord Road at Northshore Drive

As indicated in TABLES 3B and 4B, the existing overall intersection LOS is an "F" during the AM peak hour, primarily due to significant delays and queues on the eastbound approach. This is projected to worsen to a more severe "F" through the background and combined scenarios. During the PM peak hour, the LOS is expected to worsen from "E" to "F" due to background traffic growth, with only a marginal increase in delay and queue length attributed to the development. The queue length and approach delay are anticipated to increase more significantly because of background conditions rather than the impact of the development.

TABLE 3B: CAPACITY ANALYSES SUMMARY – CONCORD ROAD AT NORTHSHORE DRIVE

SCENARIO		MOVEMENT/ APPROACH	AM PEAK (LOS/DELAY)	PM PEAK (LOS/DELAY)
2024 Existing	Existing Geometry & Traffic Control	EB WB SB Overall	F 103.1 A 6.5 A 6.1 F 56.7	E 36.3 A 7.1 C 23.0 C 19.7
2026 Background	Existing Geometry & Traffic Control	EB WB SB Overall	F 145.4 A 7.7 A 6.5 F 79.1	F 58.7 A 8.4 D 32.3 D 28.8
2026 Combined	Existing Geometry & Traffic Control	EB WB SB Overall	F 167.9 A 7.8 A 6.8 F 89.3	F 65.7 A 8.5 D 34.3 D 31.2

TABLE 4B: 95TH PERCENTIAL QUEUE SUMMARY – CONCORD ROAD AT NORTHSHORE DRIVE

SCENARIO		MOVEMENT/ APPROACH	AM PEAK	PM PEAK
2024 Existing	Existing Geometry & Traffic Control	EB WB SBL SBR	880′ 78′ 25′ 15′	298′ 120′ 198′ 135′
2026 Background	Existing Geometry & Traffic Control	EB WB SBL SBR	1148′ 98′ 28′ 18′	418′ 150′ 273′ 178′
2026 Combined	Existing Geometry & Traffic Control	EB WB SBL SBR	1268′ 100′ 33′ 20′	450′ 153′ 290′ 188′

Intersection #4: Concord Road at Site Access

As shown in TABLES 3C and 4C, the site access on Concord Road with the proposed geometry has sufficient capacity for the development. The worst approach, westbound, has a LOS of "C" during the AM peak hour and "B" during the PM peak hour under the combined traffic scenario. The proposed condition analyzed a restricted access with right turn only from Concord Road into the site and a right turn only exiting the site onto Concord Road. There is currently a right turn flare at the driveway cut that exists where the proposed site access will be located.

TABLE 3C: CAPACITY ANALYSES SUMMARY – CONCORD ROAD AT SITE ACCESS

SCENARIO		MOVEMENT/ APPROACH	AM PEAK (LOS/DELAY)	PM PEAK (LOS/DELAY)
2026 Combined	Proposed Geometry & Traffic Control	WB	C 16.7	B 12.7

TABLE 4C: 95TH PERCENTIAL QUEUE SUMMARY – CONCORD ROAD AT SITE ACCESS

SCENARIO		MOVEMENT/ APPROACH	AM PEAK	PM PEAK
2026 Combined	Proposed Geometry & Traffic Control	WBR	40′	15′

Intersection #5: 2nd Drive at Site Access

As shown in TABLES 3D and 4D, the site access on 2nd Drive with the proposed geometry has sufficient capacity for the development. All approaches have a LOS "A" during both peak hours under the combined traffic scenario. The proposed condition analyzed one lane servicing all movements for each approach.

TABLE 3D: CAPACITY ANALYSES SUMMARY – 2ND DRIVE AT SITE ACCESS

SCENARIO		MOVEMENT/ APPROACH	AM PEAK (LOS/DELAY)	PM PEAK (LOS/DELAY)
2026 Combined	Proposed Geometry & Traffic Control	EB SB	A 7.5 A 8.9	A 7.4 A 8.9

TABLE 4D: 95TH PERCENTIAL QUEUE SUMMARY – 2ND DRIVE AT SITE ACCESS

SCENARIO		MOVEMENT/ APPROACH	AM PEAK	PM PEAK
2026 Combined	Proposed Geometry & Traffic Control	EBL SB	13′ 13′	10′ 13′

TURN LANE WARRANT EVALUATIONS

Turn lane evaluations were conducted for a potential right lane entering the site from Concord Road and potential left and right lanes entering from 2nd Drive under combined volume scenarios, as well as a potential right turn lane from Concord Road onto 2nd Drive. The methods employed for the turn lane evaluation on 2nd Drive were those developed by M.D. Harmelink, as provided by in a series of tables from the Knox County publication *Access Control and Driveway Design Policy*. The results of these evaluations were that neither right nor left turn lanes are warranted on 2nd Drive entering the proposed development's access.

The methods used for determining if turn lanes are warranted on Concord Road are the tables provided in TDOT's *Highway Systems Access Manual Volume 3*. A right turn lane into the site access from Concord Road and a right turn lane onto 2nd Drive from Concord Road were found to be warranted. Additional information can be found on the turn lane evaluation worksheets contained in APPENDIX D. Because a left turn lane exists from Concord Road onto 2nd Drive, a left turn lane warrant was not analyzed at this location.

SIGNAL WARRANT EVALUATIONS

A signal warrant evaluation was performed for the intersection of Concord Road at 2nd Drive using the methods provided in the *Manual on Uniform Traffic Control Devices*. None of the four hours of traffic data collected meet the warrant for existing and background conditions at this intersection. Under the combined condition, both AM and PM peak hours meet the signal warrant for Concord Road at 2nd Drive. An 8-hour warrant has not been evaluated; however, due to not having enough data. Additional information can be found on the signal warrant evaluation worksheets contained in APPENDIX E.

SIGHT DISTANCE ASSESSMENT

Intersection sight distance was evaluated at the proposed intersections of Concord Road at the site access and 2nd Drive at the site access through field measurements. Measurements were taken looking right and left from the proposed site access approach at each location. According to AASHTO's *A Policy on Geometric Design of Highways and Streets* sight distance requirements for 40 mph roadways, 445 feet of sight distance is necessary when looking right and 385 feet is necessary when looking left from the proposed site access onto Concord Road. The sight distance looking left extends to the intersection with Northshore Drive. Sight distance looking right was not measured due to only having a right turn out of the site.

For 25 mph roadways, Knox County mandates 250 feet of sight distance looking left and right from the proposed site access onto 2nd Drive. The sight distance looking right onto 2nd Drive extends to the intersection of Concord Road. However, the sight distance looking left is obstructed to 225 feet due to a horizontal curve caused by vegetation and the current elevation of the corner of the proposed property. These issues can be mitigated by clearing and grading the proposed site to achieve a sight distance of at least 250 feet.

CONCLUSIONS & RECOMMENDATIONS

The primary conclusion of this study is that the traffic generated from the proposed development will have only minor impacts at the study intersections. Major congestion issues during peak hours do currently exist at the intersection of Concord Road at Northshore Drive, but the additional development impacts to this intersection would be marginal. The largest operational impacts would occur at the intersection of Concord Roat at 2nd Drive on the westbound 2nd Drive approach. This approach currently has very little traffic, and the majority of delay would be to users of the new development. The Knox County Engineering Department requested that the minimum width of 2nd Drive be increased to at least 20 feet. This width was deemed adequate, as heavy trucks are not expected to use this access into and out of the site. Turn lanes were warranted along Concord Road at the proposed site access and at 2nd Drive, and some were found to improve the operations of their respective intersections. Although a right turn lane is warranted into the site access from Concord Drive, there is currently a driveway flare that should be sufficient to serve the development. Furthermore, constructing of a right turn lane would require the relocation of a new large transmission pole. The signal warrant analysis at Concord Road at 2nd Drive determined that both peak hours meet the warrant under the combined scenario. However, because of the intersection's adequate performance as a side-street stop-controlled intersection, it is not recommended to install a signal at this time. Additionally, the southbound left turn volumes theoretically warrant an increase of the storage length to 200 feet, but the projected queue length is only around 25 feet. This being said, no changes to the existing turn lane are recommended.

Based on the above conclusions and other discussions throughout the report, the following is a list of recommendations developed with this traffic impact study:

1) A northbound right turn lane onto 2nd Drive from Concord Road should be constructed with a storage length of 50 feet and a taper length of 120 feet.
2) Ensure that grading, landscaping, signing, and other site features do not restrict lines of sight exiting the development. The sight distance looking left when exiting the site onto 2nd Drive should be improved to at least 250 feet.
3) The lanes on 2nd Drive should be widened to at least 10 feet per Knox County requirements.

APPENDIX

A. TRAFFIC DATA

B. TRIP GENERATION INFORMATION

C. CAPACITY ANALYSES

D. TURN LANE WARRANT EVALUATIONS

E. SIGNAL WARRANT EVALUATIONS

APPENDIX A – TRAFFIC DATA

TRAFFIC GROWTH

Source:	TDOT
Location:	Concord Rd
	SR332
Route #:	
Route Type:	
Station:	47000455
Capacity:	

Count Year	Volume	Growth Rate
2003		
2004		#DIV/0!
2005		#DIV/0!
2006	9125	#DIV/0!
2007	9399	3.00
2008	13128	39.67
2009	8232	-37.29
2010	9390	14.07
2011	9072	-3.39
2012	9996	10.19
2013	10402	4.06
2014	11048	6.21
2015	11529	4.35
2016	11898	3.20
2017	12462	4.74
2018	10070	-19.19
2019	11530	14.50
2020	11464	-0.57
2021	12037	5.00
2022	11905	-1.10
2023	15482	30.05

Avg. 1 Year Rate 2003-2023	#DIV/0!
Avg. 1 Year Rate 2013-2023	4.72
Avg. 1 Year Rate 2018-2023	9.57

Source:	TDOT
Location:	S. Northshore Dr.
	Southeast of Farragut
Route #:	
Route Type:	
Station:	47000361
Capacity:	

Count Year	Volume	Growth Rate
2003	9036	
2004	8820	-2.39
2005	10107	14.59
2006	9769	-3.34
2007	9429	-3.48
2008	9411	-0.19
2009	8802	-6.47
2010	9802	11.36
2011	9621	-1.85
2012	9372	-2.59
2013	10453	11.53
2014	11846	13.33
2015	12099	2.14
2016	12576	3.94
2017	13709	9.01
2018	13682	-0.20
2019	13523	-1.16
2020	13793	2.00
2021	17152	24.35
2022	15495	-9.66
2023	15305	-1.23

Avg. 1 Year Rate 2003-2023	2.98
Avg. 1 Year Rate 2013-2023	4.25
Avg. 1 Year Rate 2018-2023	2.86

Source:	TDOT
Location:	Turkey Creek Rd
	Near Loudon Co. Line
Route #:	
Route Type:	
Station:	47000305
Capacity:	

Count Year	Volume	Growth Rate
2003	1441	
2004	1484	2.98
2005	1629	9.77
2006	1487	-8.72
2007	1708	14.86
2008	1828	7.03
2009	1526	-16.52
2010	1676	9.83
2011	1831	9.25
2012	1915	4.59
2013	1823	-4.80
2014	2050	12.45
2015	2213	7.95
2016	2423	9.49
2017	2969	22.53
2018	2889	-2.69
2019	2664	-7.79
2020	2264	-15.02
2021	4453	96.69
2022	4404	-1.10
2023	3062	-30.47

Avg. 1 Year Rate 2003-2023	6.02
Avg. 1 Year Rate 2013-2023	7.93
Avg. 1 Year Rate 2018-2023	8.46

Prepared by National Data & Surveying Services

SR 332/Concord Rd & Turkey Crk Rd/Summerdale Dr

Peak Hour Turning Movement Count

ID: 24-190012-001
City: Knoxville

Day: Wednesday
Date: 3/20/2024

PEAK HOURS
AM: 07:30 AM - 08:30 AM
NOON: NONE
PM: 05:00 PM - 06:00 PM

COUNT PERIODS
AM: 7:00 AM - 09:00 AM
NOON: NONE
PM: 4:00 PM - 06:00 PM

SOUTHBOUND (SR 332/Concord Rd)

AM	186	343	6	0	1474	AM
NOON	0	0	0	0	0	NOON
PM	375	888	8	0	926	PM
	1	2	1	0		

EASTBOUND (Turkey Crk Rd/Summerdale Dr)

AM	NOON	PM		
219	0	503		
0	0	0	0	
512	0	251	1.3	
0	0	1	0.3	
73	0	97	0.3	
AM	NOON	PM		

WESTBOUND (Turkey Crk Rd/Summerdale Dr)

PM	NOON	AM	
16	0	21	0
3	0	0	1
4	0	8	0
0	0	0	0
19	0	11	
PM	NOON	AM	

NORTHBOUND (SR 332/Concord Rd)

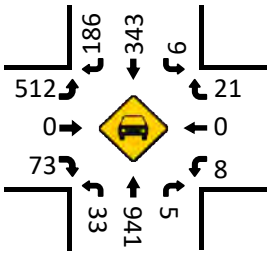
PM	989	0	125	659	10	PM
NOON	0	0	0	0	0	NOON
AM	424	0	33	941	5	AM
		0	1	2	0	

CONTROL

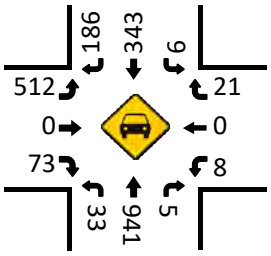
Signalized

TEV	2128 AM	0 NOON	2437 PM
PHF	0.88		0.90

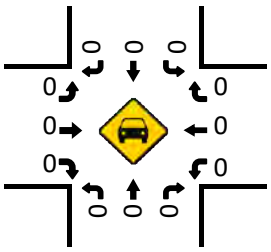
Totals (AM)



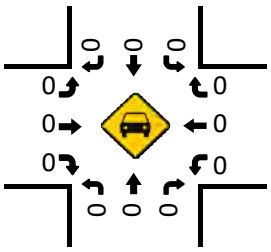
Totals (AM)



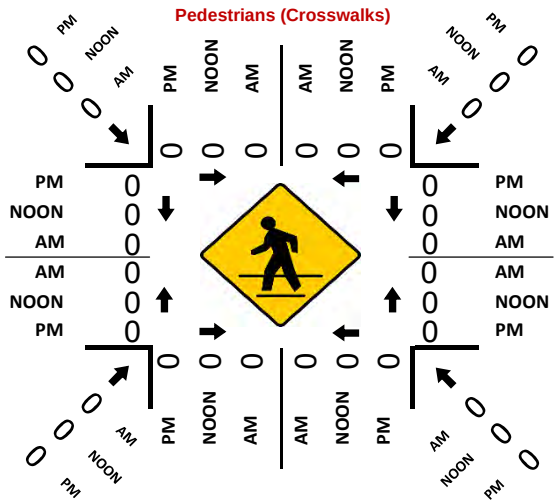
Totals (NOON)



Totals (NOON)



Pedestrians (Crosswalks)



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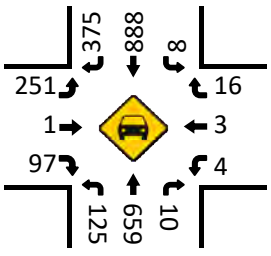
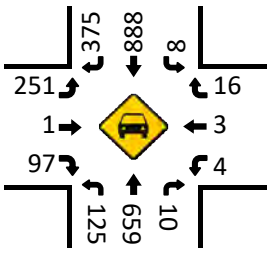


Totals (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: SR 332/Concord Rd & Turkey Crk Rd/Summerdale Dr
City: Knoxville
Control: Signalized

Project ID: 24-190012-001
Date: 3/20/2024

Data - Totals

NS/EW Streets:	SR 332/Concord Rd				SR 332/Concord Rd				Turkey Crk Rd/Summerdale Dr				Turkey Crk Rd/Summerdale Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	1	2	1	0	1.3	0.3	0.3	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	3	117	0	0	0	38	15	0	100	0	10	0	3	0	4	0	290
7:15 AM	5	166	0	0	0	42	33	0	132	0	16	0	0	0	7	0	401
7:30 AM	8	252	0	0	2	66	30	0	123	0	8	0	0	0	13	0	502
7:45 AM	5	271	1	0	2	88	55	0	149	0	24	0	4	0	4	0	603
8:00 AM	11	213	1	0	1	92	53	0	125	0	22	0	2	0	3	0	523
8:15 AM	9	205	3	0	1	97	48	0	115	0	19	0	2	0	1	0	500
8:30 AM	4	195	0	0	2	115	43	0	106	0	12	0	0	0	3	0	480
8:45 AM	6	159	0	0	1	83	34	0	84	0	12	0	1	0	2	0	382
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	51	1578	5	0	9	621	311	0	934	0	123	0	12	0	37	0	3681
APPROACH %'s :	3.12%	96.57%	0.31%	0.00%	0.96%	65.99%	33.05%	0.00%	88.36%	0.00%	11.64%	0.00%	24.49%	0.00%	75.51%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	33	941	5	0	6	343	186	0	512	0	73	0	8	0	21	0	2128
PEAK HR FACTOR :	0.750	0.868	0.417	0.000	0.750	0.884	0.845	0.000	0.859	0.000	0.760	0.000	0.500	0.000	0.404	0.000	0.882
		0.884				0.916				0.845				0.558			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	0	0	1	2	1	0	1.3	0.3	0.3	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	23	138	1	0	1	203	115	0	49	0	15	0	4	0	1	0	550
4:15 PM	34	148	2	0	1	169	76	0	45	0	20	0	0	0	1	0	496
4:30 PM	24	135	3	0	8	217	94	0	58	0	23	0	1	0	2	0	565
4:45 PM	20	155	1	0	2	197	89	0	82	0	14	0	0	0	2	0	562
5:00 PM	30	143	4	0	0	229	93	0	60	0	21	0	0	1	6	0	587
5:15 PM	35	188	4	0	2	243	101	0	70	1	29	0	2	0	2	0	677
5:30 PM	37	161	0	0	5	216	93	0	51	0	23	0	1	0	4	0	591
5:45 PM	23	167	2	0	1	200	88	0	70	0	24	0	1	2	4	0	582
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	226	1235	17	0	20	1674	749	0	485	1	169	0	9	3	22	0	4610
APPROACH %'s :	15.29%	83.56%	1.15%	0.00%	0.82%	68.52%	30.66%	0.00%	74.05%	0.15%	25.80%	0.00%	26.47%	8.82%	64.71%	0.00%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	125	659	10	0	8	888	375	0	251	1	97	0	4	3	16	0	2437
PEAK HR FACTOR :	0.845	0.876	0.625	0.000	0.400	0.914	0.928	0.000	0.896	0.250	0.836	0.000	0.500	0.375	0.667	0.000	0.900
		0.874				0.918				0.873				0.821			

Prepared by National Data & Surveying Services

SR 332/Concord Rd & 2nd Dr/2nd St

Peak Hour Turning Movement Count

ID: 24-190012-002
City: Knoxville

Day: Wednesday
Date: 3/20/2024

PEAK HOURS	COUNT PERIODS
07:30 AM - 08:30 AM	7:00 AM - 09:00 AM
NONE	NONE
05:00 PM - 06:00 PM	4:00 PM - 06:00 PM

SR 332/Concord Rd — SOUTHBOUND

AM	0	403	2	1	918	AM
NOON	0	0	0	0	0	NOON
PM	0	956	2	0	756	PM

EASTBOUND (2nd Dr/2nd St)

AM	NOON	PM	
0	0	0	
0	0	0	0
0	0	1	0
0	0	0	0
0	0	0	0
AM	NOON	PM	

WESTBOUND (2nd Dr/2nd St)

PM	NOON	AM	
3	0	4	0
0	0	0	1
5	0	0	0
0	0	0	0
5	0	3	
PM	NOON	AM	

CONTROL

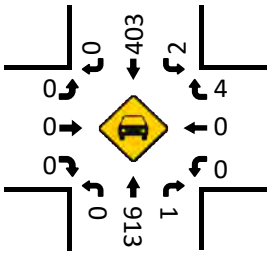
1-Way Stop(EB)

	AM	NOON	PM
TEV	1324	0	1722
PHF	0.89		0.90

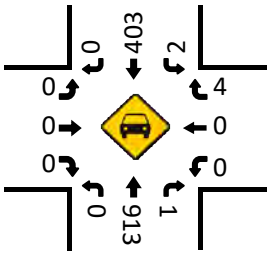
SR 332/Concord Rd — NORTHBOUND

PM	961	0	0	752	3	PM
NOON	0	0	0	0	0	NOON
AM	403	0	0	913	1	AM

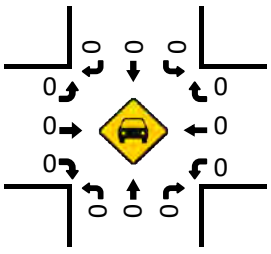
Totals (AM)



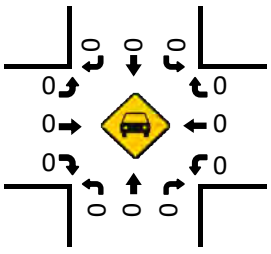
Totals (AM)



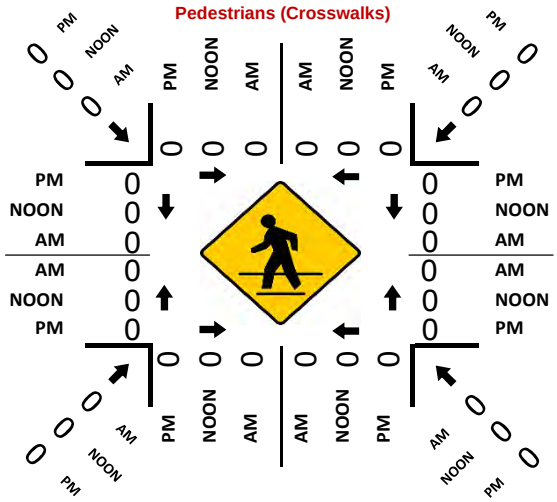
Totals (NOON)



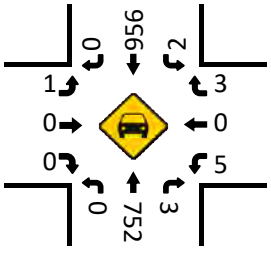
Totals (NOON)



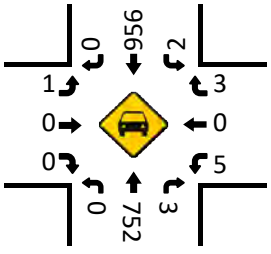
Pedestrians (Crosswalks)



Totals (PM)



Totals (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: SR 332/Concord Rd & 2nd Dr/2nd St
City: Knoxville
Control: 1-Way Stop(EB)

Project ID: 24-190012-002
Date: 3/20/2024

Data - Totals

NS/EW Streets:	SR 332/Concord Rd				SR 332/Concord Rd				2nd Dr/2nd St				2nd Dr/2nd St				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	1	2	0	0	0	0	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	106	0	0	0	44	0	0	0	0	0	0	1	0	2	0	153
7:15 AM	0	151	0	0	0	62	0	0	0	0	0	0	0	0	2	0	215
7:30 AM	0	255	0	0	0	76	0	0	0	0	0	0	0	0	1	0	332
7:45 AM	0	261	0	0	1	107	0	0	0	0	0	0	0	0	1	0	370
8:00 AM	0	195	0	0	0	113	0	0	0	0	0	0	0	0	1	0	309
8:15 AM	0	202	1	0	1	107	0	1	0	0	0	0	0	0	1	0	313
8:30 AM	0	186	1	0	1	122	0	0	0	0	0	0	0	0	1	0	311
8:45 AM	0	164	1	0	1	86	0	0	0	0	0	0	1	0	0	0	253
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1520	3	0	4	717	0	1	0	0	0	0	2	0	9	0	2256
APPROACH %'s :	0.00%	99.80%	0.20%	0.00%	0.55%	99.31%	0.00%	0.14%					18.18%	0.00%	81.82%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	913	1	0	2	403	0	1	0	0	0	0	0	0	4	0	1324
PEAK HR FACTOR :	0.000	0.875	0.250	0.000	0.500	0.892	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.895
	0.875				0.898								1.000				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	1	2	0	0	0	0	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	159	0	0	0	219	0	1	0	0	0	0	0	0	1	0	380
4:15 PM	0	155	1	0	0	197	0	0	0	0	0	0	0	0	2	0	355
4:30 PM	0	159	1	0	2	227	0	0	0	0	0	0	0	0	1	0	390
4:45 PM	0	168	0	0	1	203	0	0	0	0	0	0	1	0	1	0	374
5:00 PM	0	170	1	0	0	247	0	0	0	0	0	0	1	0	1	0	420
5:15 PM	0	212	1	0	1	261	0	0	1	0	0	0	0	0	0	0	476
5:30 PM	0	179	1	0	0	253	0	0	0	0	0	0	1	0	0	0	434
5:45 PM	0	191	0	0	1	195	0	0	0	0	0	0	3	0	2	0	392
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1393	5	0	5	1802	0	1	1	0	0	0	6	0	8	0	3221
APPROACH %'s :	0.00%	99.64%	0.36%	0.00%	0.28%	99.67%	0.00%	0.06%	100.00%	0.00%	0.00%	0.00%	42.86%	0.00%	57.14%	0.00%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	0	752	3	0	2	956	0	0	1	0	0	0	5	0	3	0	1722
PEAK HR FACTOR :	0.000	0.887	0.750	0.000	0.500	0.916	0.000	0.000	0.250	0.000	0.000	0.000	0.417	0.000	0.375	0.000	0.904
	0.886				0.914				0.250				0.400				

Prepared by National Data & Surveying Services

SR 332/Concord Rd & S Northshore Dr

Peak Hour Turning Movement Count

ID: 24-190012-003
City: Knoxville

Day: Wednesday
Date: 3/20/2024

PEAK HOURS

AM: 07:15 AM - 08:15 AM
NOON: NONE
PM: 05:00 PM - 06:00 PM

COUNT PERIODS

AM: 7:00 AM - 09:00 AM
NOON: NONE
PM: 4:00 PM - 06:00 PM

SR 332/Concord Rd — SOUTHBOUND

AM	138	0	200	1	915	AM
NOON	0	0	0	0	0	NOON
PM	445	0	510	1	747	PM

EASTBOUND — S Northshore Dr

AM	NOON	PM	
451	0	1049	
1	0	1	0
569	0	252	0
512	0	390	1
0	0	0	0
AM	NOON	PM	

WESTBOUND — S Northshore Dr

PM	NOON	AM	
494	0	345	1
603	0	312	1
0	0	0	0
12	0	2	0
912	0	714	
PM	NOON	AM	

NORTHBOUND — SR 332/Concord Rd

PM	0	0	0	0	0	PM
NOON	0	0	0	0	0	NOON
AM	0	0	0	0	0	AM

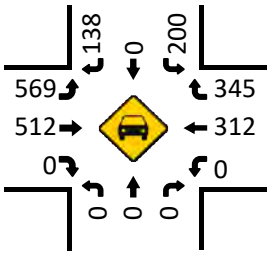
CONTROL: 3-Way Yield(SB/EB/WB)

	AM	NOON	PM
TEV	2080	0	2708
PHF	0.88		0.95

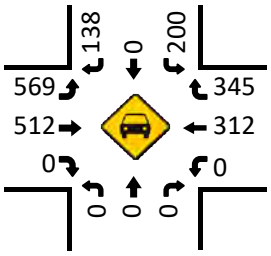
1 0 1 0

0 0 0 0

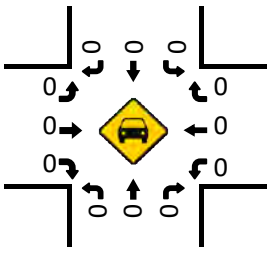
Totals (AM)



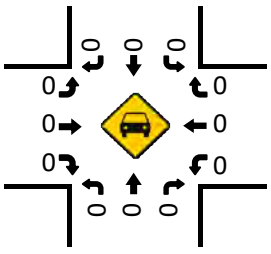
Totals (AM)



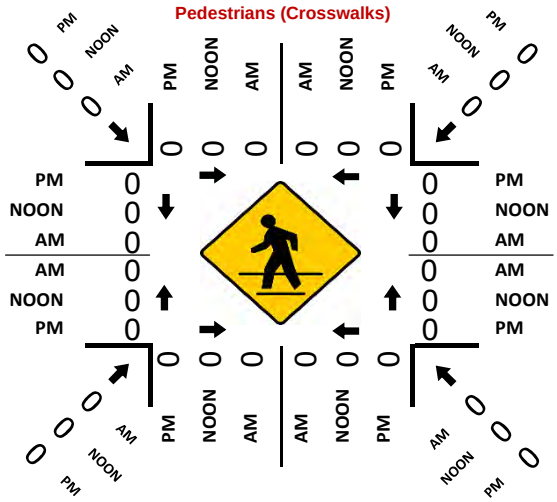
Totals (NOON)



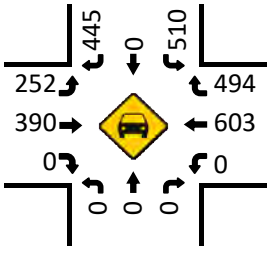
Totals (NOON)



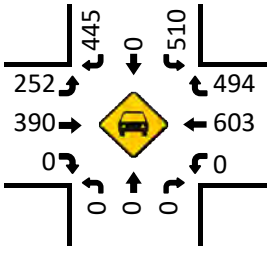
Pedestrians (Crosswalks)



Totals (PM)



Totals (PM)



National Data & Surveying Services

Intersection Turning Movement Count

Location: SR 332/Concord Rd & S Northshore Dr
City: Knoxville
Control: 3-Way Yield(SB/EB/WB)

Project ID: 24-190012-003
Date: 3/20/2024

Data - Totals

NS/EW Streets:	SR 332/Concord Rd				SR 332/Concord Rd				S Northshore Dr				S Northshore Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1	0	1	0	0	1	0	0	0	1	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
7:00 AM	0	0	0	0	30	0	9	0	65	165	0	0	0	29	52	0	350
7:15 AM	0	0	0	0	35	0	14	0	88	187	0	0	0	49	68	0	441
7:30 AM	0	0	0	0	52	0	34	1	153	113	0	1	0	92	102	1	549
7:45 AM	0	0	0	0	52	0	44	0	159	120	0	0	0	98	120	1	594
8:00 AM	0	0	0	0	61	0	46	0	169	92	0	0	0	73	55	0	496
8:15 AM	0	0	0	0	60	0	38	0	80	96	0	0	0	74	88	0	436
8:30 AM	0	0	0	0	72	0	57	0	75	108	0	0	0	72	93	0	477
8:45 AM	0	0	0	0	39	0	48	1	81	113	0	0	0	71	79	0	432
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	401	0	290	2	870	994	0	1	0	558	657	2	3775
APPROACH %'s :					57.86%	0.00%	41.85%	0.29%	46.65%	53.30%	0.00%	0.05%	0.00%	45.85%	53.99%	0.16%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	0	0	0	0	200	0	138	1	569	512	0	1	0	312	345	2	2080
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.820	0.000	0.750	0.250	0.842	0.684	0.000	0.250	0.000	0.796	0.719	0.500	0.875
					0.792				0.970				0.752				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1	0	1	0	0	1	0	0	0	1	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	101	0	107	0	55	84	0	1	0	120	95	0	563
4:15 PM	0	0	0	0	115	0	95	0	50	90	0	0	0	120	101	1	572
4:30 PM	0	0	0	0	115	0	106	0	72	85	0	0	0	122	102	0	602
4:45 PM	0	0	0	0	143	0	52	1	52	92	0	1	0	149	104	1	595
5:00 PM	0	0	0	0	129	0	117	0	63	98	0	0	0	153	116	1	677
5:15 PM	0	0	0	0	133	0	136	0	71	81	0	1	0	157	127	3	709
5:30 PM	0	0	0	0	147	0	100	0	53	109	0	0	0	151	130	7	697
5:45 PM	0	0	0	0	101	0	92	1	65	102	0	0	0	142	121	1	625
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	984	0	805	2	481	741	0	3	0	1114	896	14	5040
APPROACH %'s :					54.94%	0.00%	44.95%	0.11%	39.27%	60.49%	0.00%	0.24%	0.00%	55.04%	44.27%	0.69%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	510	0	445	1	252	390	0	1	0	603	494	12	2708
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.867	0.000	0.818	0.250	0.887	0.894	0.000	0.250	0.000	0.960	0.950	0.429	0.955
					0.888				0.963				0.963				

APPENDIX B – TRIP GENERATION INFORMATION

Land Use: 934
Fast-Food Restaurant with Drive-Through Window

Description

This land use includes any fast-food restaurant with a drive-through window. This type of restaurant is characterized by a large drive-through and large carry-out clientele, long hours of service (some are open for breakfast, all are open for lunch and dinner, some are open late at night or 24 hours a day) and high turnover rates for eat-in customers. The restaurant does not provide table service. A patron generally orders from a menu board and pays before receiving the meal. A typical duration of stay for an eat-in patron is less than 30 minutes. Fast casual restaurant (Land Use 930), high-turnover (sit-down) restaurant (Land Use 932), fast-food restaurant without drive-through window (Land Use 933), and fast-food restaurant with drive-through window and no indoor seating (Land Use 935) are related uses.

Additional Data

Users should exercise caution when applying statistics during the AM peak periods, as the sites contained in the database for this land use may or may not be open for breakfast. In cases where it was confirmed that the sites were not open for breakfast, data for the AM peak hour of the adjacent street traffic were removed from the database.

If the restaurant has outdoor seating, its area is not included in the overall gross floor area. For a restaurant that has significant outdoor seating, the number of seats may be more reliable than GFA as an independent variable on which to establish a trip generation rate.

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/).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alaska, Alberta (CAN), California, Colorado, Florida, Indiana, Kentucky, Maryland, Massachusetts, Minnesota, Montana, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Dakota, Texas, Vermont, Virginia, Washington, and Wisconsin.

Source Numbers

163, 164, 168, 180, 181, 241, 245, 278, 294, 300, 301, 319, 338, 340, 342, 358, 389, 438, 502, 552, 577, 583, 584, 617, 640, 641, 704, 715, 728, 810, 866, 867, 869, 885, 886, 927, 935, 962, 977, 1050, 1053, 1054

Fast-Food Restaurant with Drive-Through Window
(934)

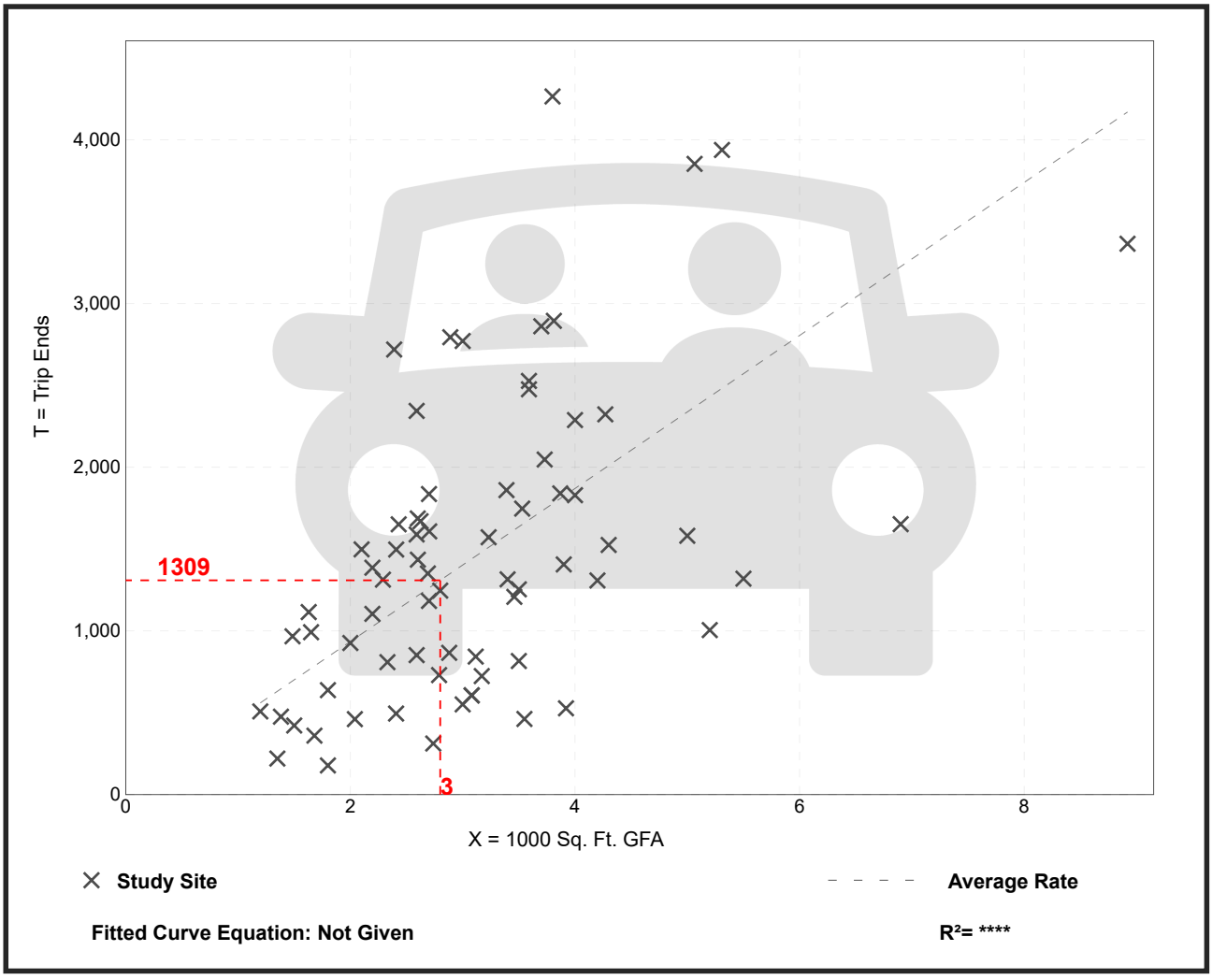
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 71
Avg. 1000 Sq. Ft. GFA: 3
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
467.48	98.89 - 1137.66	238.62

Data Plot and Equation



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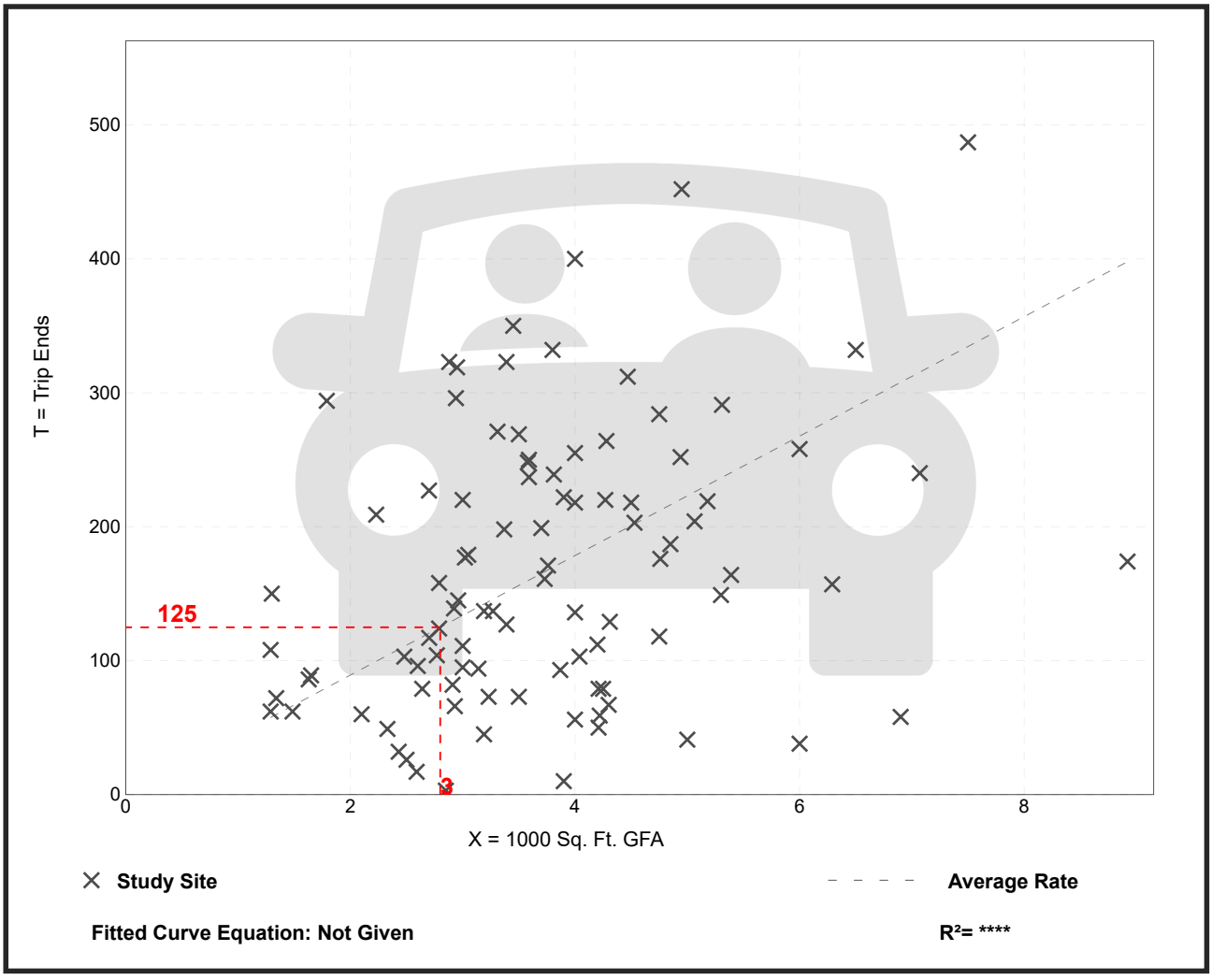
Fast-Food Restaurant with Drive-Through Window
(934)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
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: 96
Avg. 1000 Sq. Ft. GFA: 4
Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
44.61	1.05 - 164.25	27.14

Data Plot and Equation



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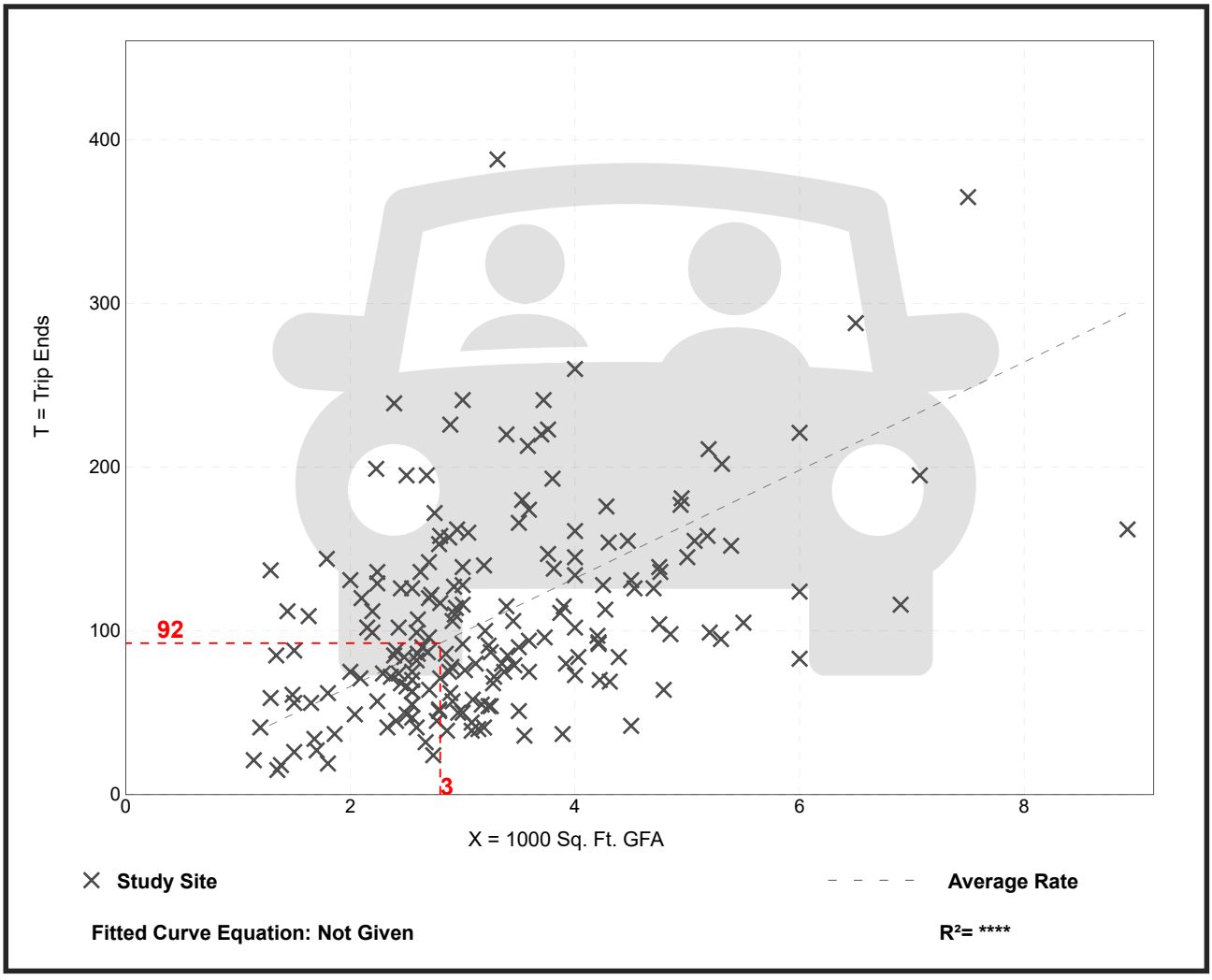
Fast-Food Restaurant with Drive-Through Window
(934)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 190
Avg. 1000 Sq. Ft. GFA: 3
Directional Distribution: 52% entering, 48% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
33.03	8.77 - 117.22	17.59

Data Plot and Equation



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Land Use: 945
Convenience Store/Gas Station

Description

A convenience store/gas station is a facility with a co-located convenience store and gas station. The convenience store sells grocery and other everyday items that a person may need or want as a matter of convenience. The gas station sells automotive fuels such as gasoline and diesel.

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

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

The sites in this land use include both self-pump and attendant-pumped fueling positions and both pre-pay and post-pay operations.

Convenience store (Land Use 851), gasoline/service station (Land Use 944), and truck stop (Land Use 950) are related uses.

Land Use Subcategory

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

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

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

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

Additional Data

ITE recognizes there are existing convenience store/gas station sites throughout North America that are larger than the sites presented in the data plots. However, the ITE database does not include any site with more than 24 VFP or any site with gross floor area greater than 10,000 square feet. Submission of trip generation data for larger sites is encouraged.

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/).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), Arkansas, California, Connecticut, Delaware, Florida, Indiana, Iowa, Kentucky, Maryland, Massachusetts, Minnesota, Nevada, New Hampshire, New Jersey, Pennsylvania, Rhode Island, South Dakota, Texas, Utah, Vermont, Washington, and Wisconsin.

Source Numbers

221, 245, 274, 288, 300, 340, 350, 351, 352, 355, 359, 385, 440, 617, 718, 810, 813, 844, 850, 853, 864, 865, 867, 869, 882, 883, 888, 904, 926, 927, 936, 938, 954, 960, 962, 977, 1004, 1024, 1025, 1027, 1052

Convenience Store/Gas Station - GFA (5.5-10k)
(945)

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

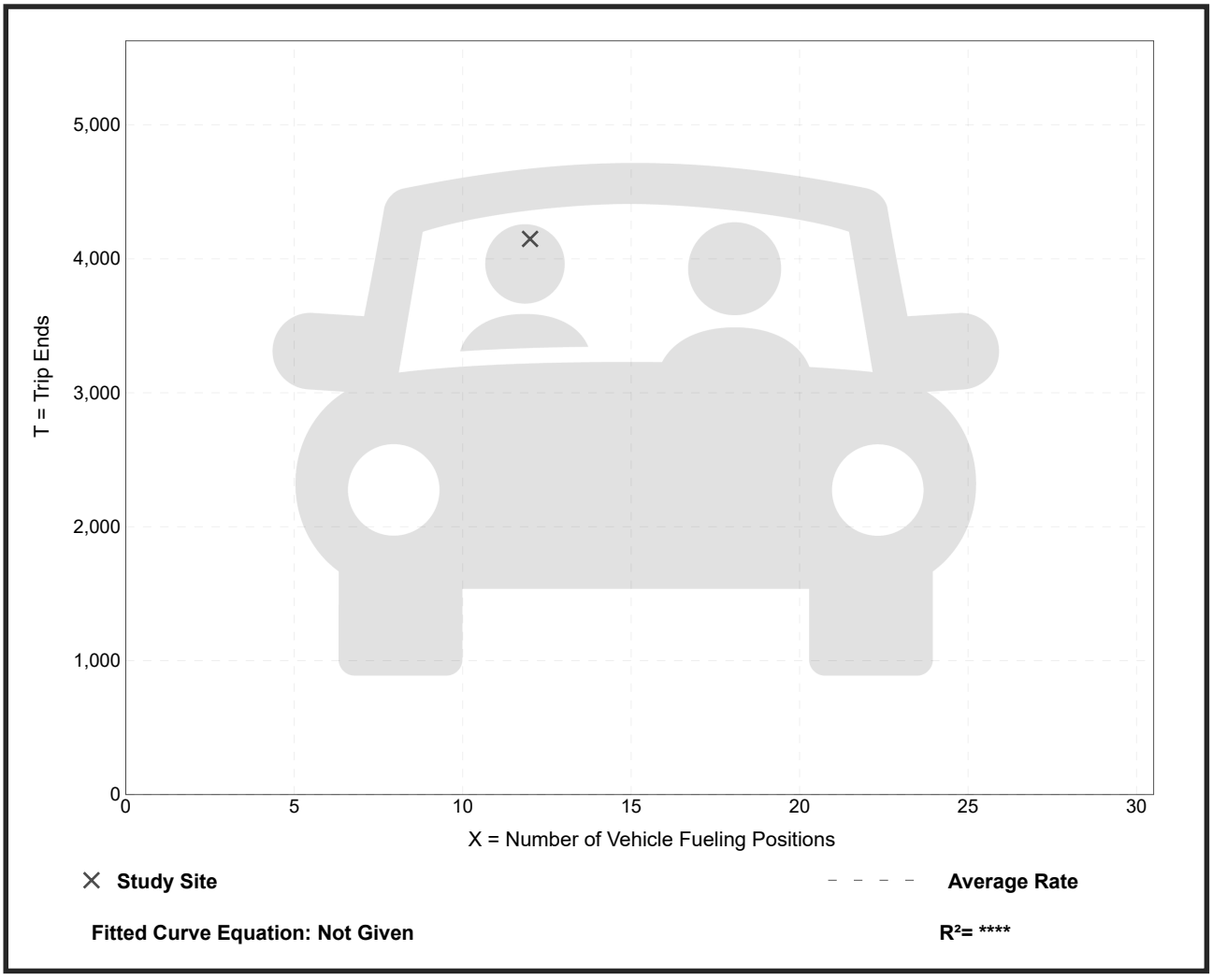
Setting/Location: **General Urban/Suburban**
Number of Studies: 1
Avg. Num. of Vehicle Fueling Positions: 12
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
345.75	345.75 - 345.75	*

Data Plot and Equation

Caution – Small Sample Size



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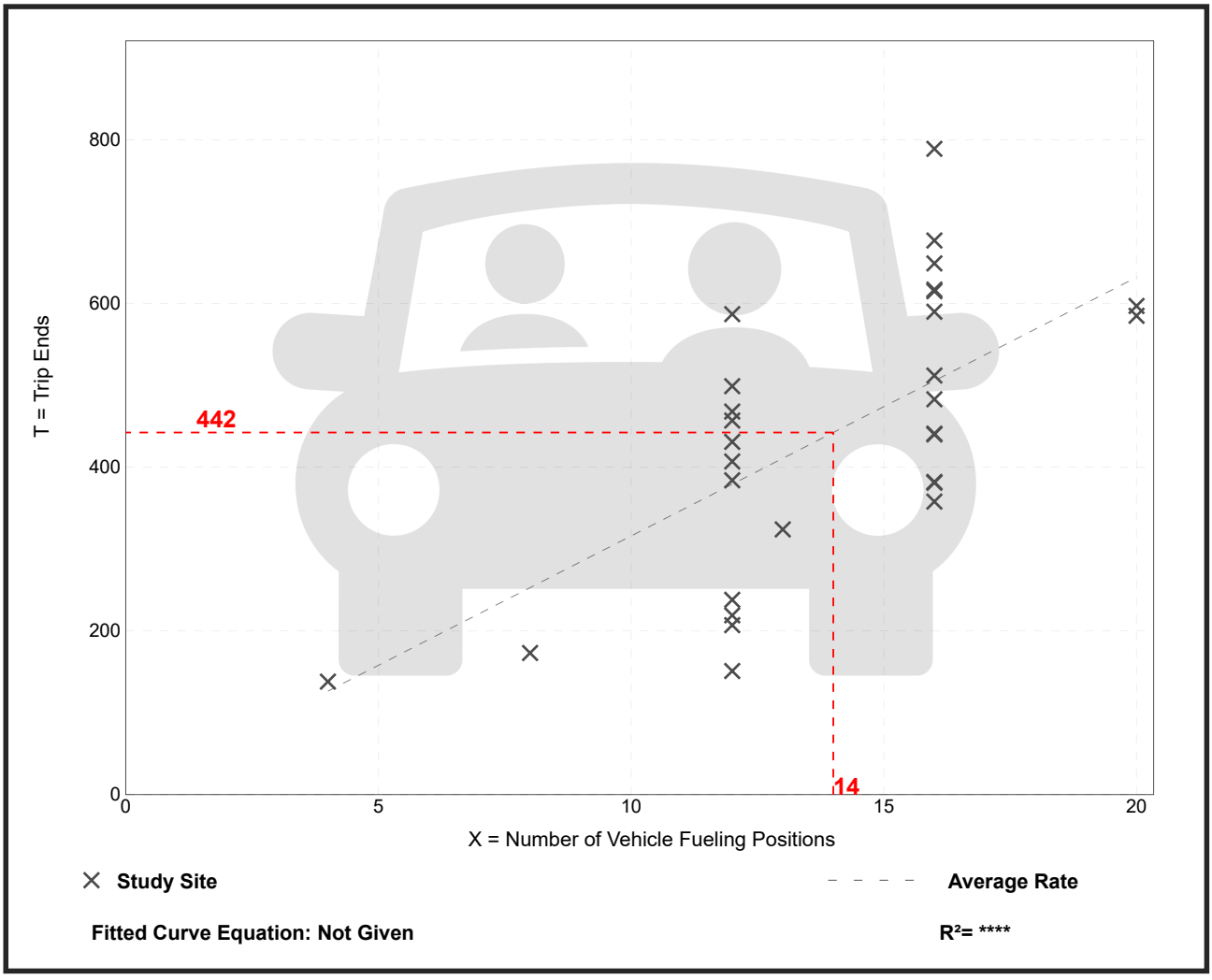
Convenience Store/Gas Station - GFA (5.5-10k)
(945)

Vehicle Trip Ends vs: **Vehicle Fueling Positions**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 29
Avg. Num. of Vehicle Fueling Positions: 14
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
31.60	12.58 - 49.31	9.10

Data Plot and Equation



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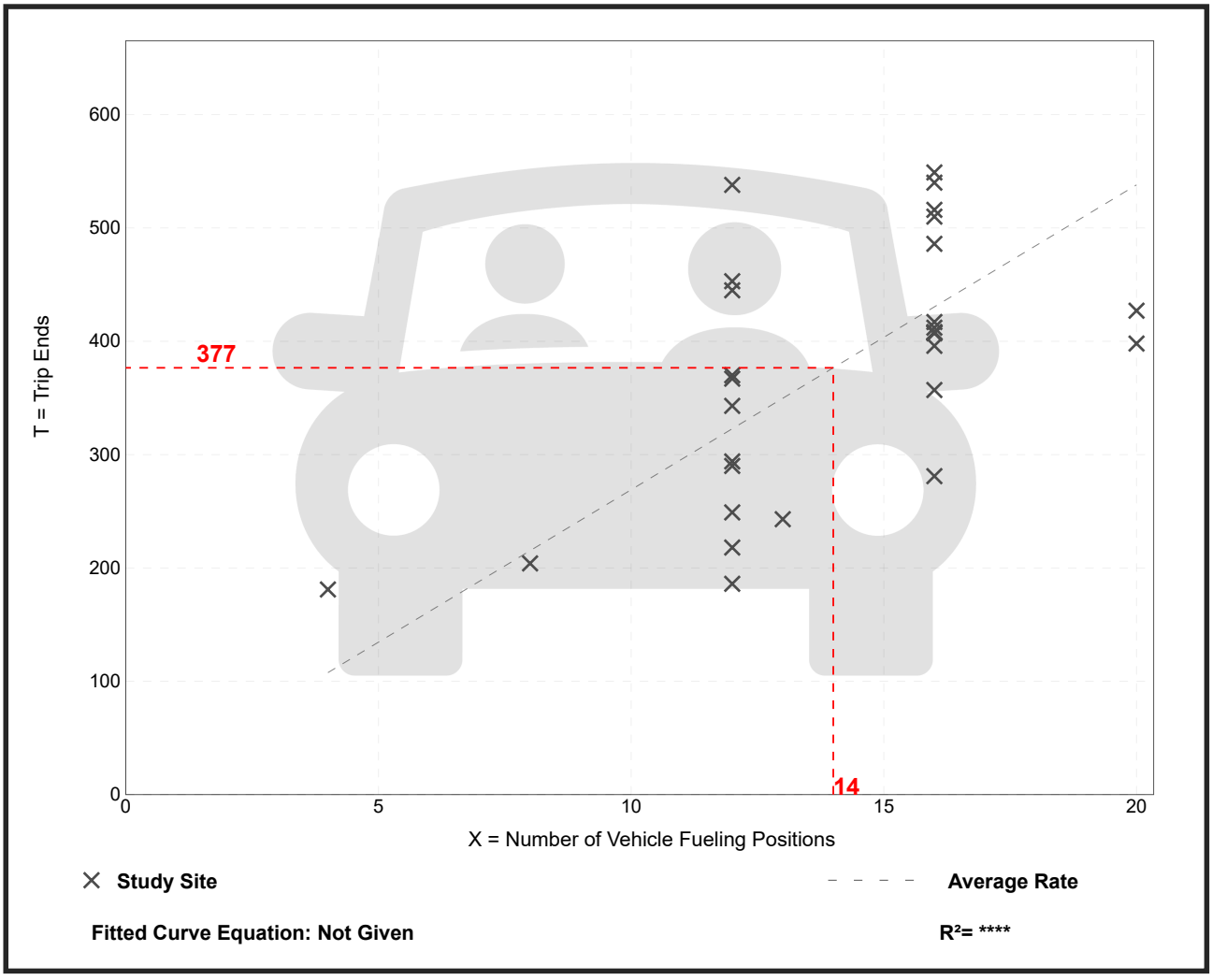
Convenience Store/Gas Station - GFA (5.5-10k)
(945)

Vehicle Trip Ends vs:	**Vehicle Fueling Positions**
On a:	**Weekday,** **Peak Hour of Adjacent Street Traffic,** **One Hour Between 4 and 6 p.m.**
Setting/Location:	**General Urban/Suburban**
Number of Studies:	29
Avg. Num. of Vehicle Fueling Positions:	14
Directional Distribution:	50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
26.90	15.50 - 45.25	6.87

Data Plot and Equation



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NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	E-Z Stop Concord	**Organization:**	Cannon & Cannon, Inc.
Project Location:	Knoxville, TN	**Performed By:**	WDR
Scenario Description:	Full Buildout	**Date:**	4/10/2024
Analysis Year:	2026	**Checked By:**	
Analysis Period:	**AM Street Peak Hour**	**Date:**	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office	n/a	n/a	n/a	0	0	0
Retail	945	7,015sf	n/a	442	221	221
Restaurant	934	5,600sf	n/a	250	128	122
Cinema/Entertainment	n/a	n/a	n/a	0	0	0
Residential	n/a	n/a	n/a	0	0	0
Hotel	n/a	n/a	n/a	0	0	0
All Other Land Uses[2]	n/a	n/a	n/a	0	0	0
				692	349	343

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		29	0	0	0
Restaurant	0	17		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	692	349	343
Internal Capture Percentage	13%	13%	13%
External Vehicle-Trips[5]	600	303	297
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	8%	13%
Restaurant	23%	14%
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	E-Z Stop Concord
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	221	221	1.00	221	221
Restaurant	1.00	128	128	1.00	122	122
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	0	0	1.00	0	0
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	64		29	0	31	0
Restaurant	38	17		0	5	4
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		71	29	0	0	0
Retail	0		64	0	0	0
Restaurant	0	18		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	38	26	0		0
Hotel	0	9	8	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	17	204	221	204	0	0
Restaurant	29	99	128	99	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	29	192	221	192	0	0
Restaurant	17	105	122	105	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	E-Z Stop Concord	**Organization:**	Cannon & Cannon, Inc.
Project Location:	Knoxville, TN	**Performed By:**	WDR
Scenario Description:	Full Buildout	**Date:**	4/10/2024
Analysis Year:	2026	**Checked By:**	
Analysis Period:	**PM Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office	n/a	n/a	n/a	0	0	0
Retail	945	7,015sf	n/a	377	188	189
Restaurant	934	5,600sf	n/a	184	96	88
Cinema/Entertainment	n/a	n/a	n/a	0	0	0
Residential	n/a	n/a	n/a	0	0	0
Hotel	n/a	n/a	n/a	0	0	0
All Other Land Uses[2]	n/a	n/a	n/a	0	0	0
				561	284	277

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		28	0	0	0
Restaurant	0	36		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	561	284	277
Internal Capture Percentage	23%	23%	23%
External Vehicle-Trips[5]	433	220	213
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	19%	15%
Restaurant	29%	41%
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	E-Z Stop Concord
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	188	188	1.00	189	189
Restaurant	1.00	96	96	1.00	88	88
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	0	0	1.00	0	0
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	4		55	8	49	9
Restaurant	3	36		7	16	6
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		15	2	0	0	0
Retail	0		28	0	0	0
Restaurant	0	94		0	0	0
Cinema/Entertainment	0	8	3		0	0
Residential	0	19	13	0		0
Hotel	0	4	5	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	36	152	188	152	0	0
Restaurant	28	68	96	68	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	28	161	189	161	0	0
Restaurant	36	52	88	52	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

FULL BUILD-OUT TRIP GENERATION

Land Use	ITE Code	Size	Weekday (Trips / Day)	AM Peak Hour (Trips/HR)	PM Peak Hour (Trips/HR)
Convenience Store/Gas Stat	945	7,015 sf	4,841	442	377
Entering Trips	*70%*	Pass-by	2,420	221	188
Exiting Trips			2,421	221	189
Fast Food Restaurant with D	934	5,600 sf	2,618	250	184
Entering Trips	*40%*	Pass-by	1,309	128	96
Exiting Trips			1,309	122	88
n/a	n/a	n/a			
Entering Trips					
Exiting Trips					
n/a	n/a	n/a			
Entering Trips					
Exiting Trips					
n/a	n/a	n/a			
Entering Trips					
Exiting Trips					
n/a	n/a	n/a			
Entering Trips					
Exiting Trips					
TOTAL TRIPS			7,459	692	561
Entering Trips			3,729	349	284
Exiting Trips			3,730	343	277
INTERNAL TRIPS				90	129
Entering Trips				45	65
Exiting Trips				45	64
NET EXTERNAL TRIPS			7,459	602	432
Entering Trips			3,729	304	219
Exiting Trips			3,730	298	213
NET EXTERNAL TRIPS					
Pass-by Trips			4,194	387	319
Entering Trips			2,097	195	161
Exiting Trips			2,097	192	158
Non-Pass-by Trips			3,265	215	113
Entering Trips			1,632	109	58
Exiting Trips			1,633	106	55

APPENDIX C – CAPACITY ANALYSES

CAPACITY AND LEVEL-OF-SERVICE CONCEPTS

In a general sense, a roadway is similar to a pipeline or other material carrying conduit in that it has a certain capacity for the amount of material (vehicles) that it can efficiently carry. As the number of vehicles in a given time period gradually increases, the quality of traffic flow gradually decreases. On roadway sections this results in increasing turbulence in the traffic stream, and at intersections it results in increasing stops and delay. As the volumes begin to approach the capacity of the facility, these problems rapidly magnify, with resulting serious levels of congestion, stops, delay, excess fuel consumption, pollutant emissions, etc.

The Transportation Research Board has published the Year 2010 Highway Capacity Manual (HCM2010), which establishes theoretical techniques to quantify the capacity conditions on all types of roadways, intersections, ramps, pedestrian facilities, etc. A basic concept that is applicable to most of these techniques is the idea of level of service (LOS). This concept establishes a rating system that quantifies the quality of traffic flow, as perceived by motorists and/or passengers. The general system is similar to a school grade scale, and is outlined as follows:

Level of Service (LOS)	General Quality of Traffic Flow	Description of Corresponding Conditions
A	Excellent	Roadways – Free flow, high maneuverability Intersections – Very few stops, very low delay
B	Very Good	Roadways – Free flow, slightly lower maneuverability Intersections – Minor stops, low delay
C	Good	Roadways – Stable flow, restricted maneuverability Intersections – Significant stops, significant delay
D	Fair	Roadways – Marginally stable flow, congestion seriously restricts maneuverability Intersections – High stops, long but tolerable delay
E	Poor	Roadways – Unstable flow*, lower operating speeds, congestion severely restricts maneuverability Intersections – All vehicles stop, very long queues and very long intolerable delay
F	Very Poor	Roadways – Forced flow, stoppages may be lengthy, congestion severely restricts maneuverability Intersections – All vehicles stop, extensive queues and extremely long intolerable delay

*Unstable flow is such that minor fluctuations or disruptions can result in rapid degradation to LOS F.

LOS CRITERIA: SIGNALIZED & UNSIGNALIZED INTERSECTIONS

LOS	CONTROL DELAY (S/VEH)		
	SIGNALIZED	UNSIGNALIZED	ROUNDABOUT
A	≤10	≤10	≤10
B	>10-20	>10-15	>10-15
C	>20-35	>15-25	>15-25
D	>35-55	>25-35	>25-35
E	>55-80	>35-50	>35-50
F	>80	>50	>50

Another measure of intersection capacity that is often used in the evaluation of intersection operations is the volume to capacity (V/C) ratio. This ratio is defined as "the ratio of flow rate to capacity", and is a good measure of how much of an intersection's available capacity has been used up by the analysis volumes. Conversely, it also provides an indication of the reserve capacity available for future growth in traffic volumes.

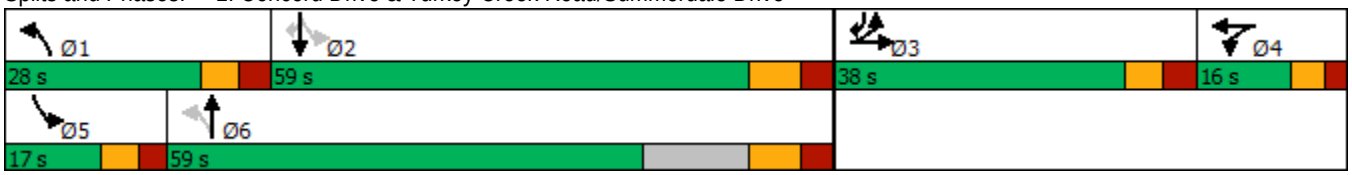
The Intersection Capacity Utilization (ICU) is another measure that expresses a value similar to the V/C ratio. Specifically, the ICU method "sums the amount of the time required to serve all movements at saturation for a given cycle length and divides by that reference cycle length." The ICU is considered a more accurate measure of volume to capacity conditions for a signalized intersection, primarily because it accounts for the effects of the signal timing on intersection capacity.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	512	0	73	8	0	21	33	941	5	6	343	186
Future Volume (vph)	512	0	73	8	0	21	33	941	5	6	343	186
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.962			0.902			0.999				0.850
Flt Protected	0.950	0.964			0.987		0.950			0.950		
Satd. Flow (prot)	1681	1641	0	0	1658	0	1770	3536	0	1770	3539	1583
Flt Permitted	0.950	0.964			0.987		0.478			0.149		
Satd. Flow (perm)	1681	1641	0	0	1658	0	890	3536	0	278	3539	1583
Satd. Flow (RTOR)		205			217							211
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Shared Lane Traffic (%)	42%											
Lane Group Flow (vph)	338	327	0	0	33	0	38	1075	0	7	390	211
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	3	3		4	4		1	6		5	2	3
Permitted Phases							6			2		2
Detector Phase	3	3		4	4		1	6		5	2	3
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	6.0		6.0	15.0		6.0	15.0	8.0
Minimum Split (s)	16.0	16.0		12.0	12.0		14.0	24.0		13.0	24.0	16.0
Total Split (s)	38.0	38.0		16.0	16.0		28.0	59.0		17.0	59.0	38.0
Total Split (%)	27.0%	27.0%		11.3%	11.3%		19.9%	41.8%		12.1%	41.8%	27.0%
Yellow Time (s)	4.0	4.0		3.5	3.5		4.0	5.5		4.0	5.5	4.0
All-Red Time (s)	3.5	3.5		2.5	2.5		3.5	3.5		3.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5			6.0		7.5	9.0		7.0	9.0	7.5
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min		None	Min	None
Act Effct Green (s)	28.2	28.2			6.4		42.5	39.7		39.4	34.1	75.9
Actuated g/C Ratio	0.30	0.30			0.07		0.45	0.42		0.42	0.36	0.81
v/c Ratio	0.67	0.51			0.11		0.08	0.72		0.03	0.30	0.16
Control Delay	40.0	15.6			0.7		15.4	26.9		15.2	24.7	1.1
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	40.0	15.6			0.7		15.4	26.9		15.2	24.7	1.1
LOS	D	B			A		B	C		B	C	A
Approach Delay		28.0			0.7			26.5			16.4	
Approach LOS		C			A			C			B	
Queue Length 50th (ft)	198	62			0		14	298		2	107	0
Queue Length 95th (ft)	#404	178			0		31	443		10	145	19
Internal Link Dist (ft)		497			673			435			693	
Turn Bay Length (ft)							70			95		475
Base Capacity (vph)	579	700			379		616	2439		291	2001	1312
Starvation Cap Reductn	0	0			0		0	0		0	0	0
Spillback Cap Reductn	0	0			0		0	0		0	0	0
Storage Cap Reductn	0	0			0		0	0		0	0	0
Reduced v/c Ratio	0.58	0.47			0.09		0.06	0.44		0.02	0.19	0.16

Intersection Summary

Cycle Length: 141
Actuated Cycle Length: 93.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 24.0 Intersection LOS: C
Intersection Capacity Utilization 64.2% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Concord Drive & Turkey Creek Road/Summerdale Drive

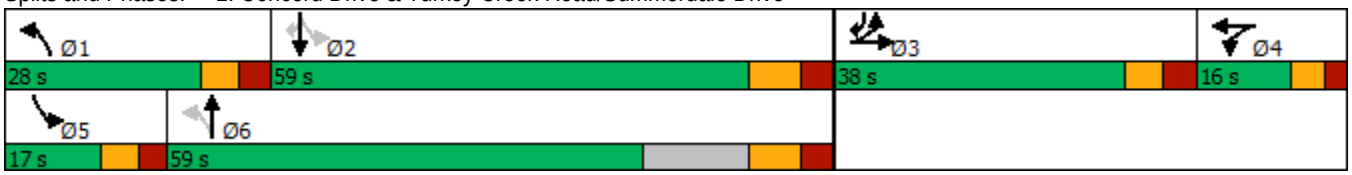


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	251	1	97	4	3	16	125	659	10	8	888	375
Future Volume (vph)	251	1	97	4	3	16	125	659	10	8	888	375
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.913			0.903			0.998				0.850
Flt Protected	0.950	0.980			0.992		0.950			0.950		
Satd. Flow (prot)	1681	1583	0	0	1669	0	1770	3532	0	1770	3539	1583
Flt Permitted	0.950	0.980			0.992		0.157			0.370		
Satd. Flow (perm)	1681	1583	0	0	1669	0	292	3532	0	689	3539	1583
Satd. Flow (RTOR)		45			18			1				417
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)	28%											
Lane Group Flow (vph)	201	187	0	0	25	0	139	743	0	9	987	417
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	3	3		4	4		1	6		5	2	3
Permitted Phases							6			2		2
Detector Phase	3	3		4	4		1	6		5	2	3
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	6.0		6.0	15.0		6.0	15.0	8.0
Minimum Split (s)	16.0	16.0		12.0	12.0		14.0	24.0		13.0	24.0	16.0
Total Split (s)	38.0	38.0		16.0	16.0		28.0	59.0		17.0	59.0	38.0
Total Split (%)	27.0%	27.0%		11.3%	11.3%		19.9%	41.8%		12.1%	41.8%	27.0%
Yellow Time (s)	4.0	4.0		3.5	3.5		4.0	5.5		4.0	5.5	4.0
All-Red Time (s)	3.5	3.5		2.5	2.5		3.5	3.5		3.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5			6.0		7.5	9.0		7.0	9.0	7.5
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min		None	Min	None
Act Effct Green (s)	19.9	19.9			7.0		58.5	54.8		47.6	38.9	68.5
Actuated g/C Ratio	0.20	0.20			0.07		0.58	0.54		0.47	0.38	0.68
v/c Ratio	0.61	0.54			0.19		0.44	0.39		0.02	0.72	0.35
Control Delay	48.7	36.4			33.3		16.6	16.7		13.2	31.7	1.5
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	48.7	36.4			33.3		16.6	16.7		13.2	31.7	1.5
LOS	D	D			C		B	B		B	C	A
Approach Delay		42.8			33.3			16.7			22.7	
Approach LOS		D			C			B			C	
Queue Length 50th (ft)	134	92			5		44	148		3	302	0
Queue Length 95th (ft)	248	193			36		92	293		12	468	33
Internal Link Dist (ft)		497			673			435			693	
Turn Bay Length (ft)							70			95		475
Base Capacity (vph)	546	544			193		491	2334		468	1884	1356
Starvation Cap Reductn	0	0			0		0	0		0	0	0
Spillback Cap Reductn	0	0			0		0	0		0	0	0
Storage Cap Reductn	0	0			0		0	0		0	0	0
Reduced v/c Ratio	0.37	0.34			0.13		0.28	0.32		0.02	0.52	0.31

Intersection Summary

Cycle Length: 141	
Actuated Cycle Length: 101.1	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 23.7	Intersection LOS: C
Intersection Capacity Utilization 68.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: Concord Drive & Turkey Creek Road/Summerdale Drive



HCS Two-Way Stop-Control Report

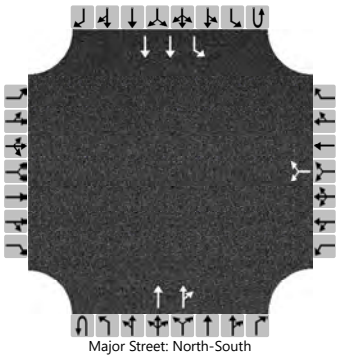
General Information

Analyst	WDR
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	4/10/2024
Analysis Year	2024
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	2024 Existing AM Peak

Site Information

Intersection	Concord Road at 2nd Drive
Jurisdiction	Town of Farragut
East/West Street	2nd Drive
North/South Street	Concord Road
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

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	0	0		0	1	0	0	0	2	0	0	1	2	0
Configuration							LR				T	TR		L	T	
Volume (veh/h)						0		4			913	1	1	2	403	
Percent Heavy Vehicles (%)						3		3					3	3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)						7.5		6.9					6.4	4.1		
Critical Headway (sec)						6.86		6.96					6.46	4.16		
Base Follow-Up Headway (sec)						3.5		3.3					2.5	2.2		
Follow-Up Headway (sec)						3.53		3.33					2.53	2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							4							3		
Capacity, c (veh/h)							503							484		
v/c Ratio							0.01							0.01		
95% Queue Length, Q_{95} (veh)							0.0							0.0		
Control Delay (s/veh)							12.2							12.5		
Level of Service (LOS)							B							B		
Approach Delay (s/veh)					12.2								0.1			
Approach LOS					B								A			

HCS Two-Way Stop-Control Report

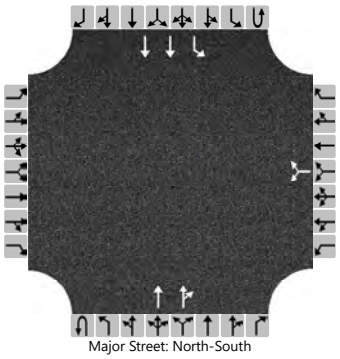
General Information

Analyst	WDR
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	4/10/2024
Analysis Year	2024
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	2024 Existing PM Peak

Site Information

Intersection	Concord Road at 2nd Drive
Jurisdiction	Town of Farragut
East/West Street	2nd Drive
North/South Street	Concord Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

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	0	0		0	1	0	0	0	2	0	0	1	2	0
Configuration							LR				T	TR		L	T	
Volume (veh/h)						5		3			752	3	0	2	956	
Percent Heavy Vehicles (%)						3		3					3	3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)						7.5		6.9						4.1		
Critical Headway (sec)						6.86		6.96						4.16		
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)							9							2		
Capacity, c (veh/h)							332							785		
v/c Ratio							0.03							0.00		
95% Queue Length, Q_{95} (veh)							0.1							0.0		
Control Delay (s/veh)							16.1							9.6		
Level of Service (LOS)							C							A		
Approach Delay (s/veh)						16.1								0.0		
Approach LOS						C								A		

HCS Roundabouts Report

General Information

Analyst	WDR
Agency or Co.	Cannon & Cannon, Inc.
Date Performed	3/28/2024
Analysis Year	2024
Time Analyzed	AM Peak
Project Description	2024 Existing AM Peak

Site Information

Intersection	Northshore Drive at Concor...
E/W Street Name	Northshore Drive
N/S Street Name	Concord Road
Analysis Time Period, hrs	0.25
Peak Hour Factor	0.88
Jurisdiction	Knox County

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0
Lane Assignment			LT				T								L	
Volume (V), veh/h	1	569	512		2		312	345					1	200		138
Percent Heavy Vehicles, %	3	3	3		3		3	3					3	3		3
Flow Rate (v_{PCE}), pc/h	1	666	599		2		365	404					1	234		162
Right-Turn Bypass	None				Non-Yielding				None				Yielding			
Conflicting Lanes	1				1								1			
Pedestrians Crossing, p/h	0				0								0			
Proportion of CAVs	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763						4.9763	4.9763
Follow-Up Headway, s		2.6087			2.6087						2.6087	2.6087

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		1266			367	404					235	162
Entry Volume, veh/h		1229			356	392					228	157
Circulating Flow (v_c), pc/h	237			668			1503			368		
Exiting Flow (v_{ex}), pc/h	835			366			667			0		
Capacity (c_{pce}), pc/h		1084			698						948	950
Capacity (c), veh/h		1052			678						921	922
v/c Ratio (x)		1.17			0.53						0.25	0.17

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		103.1			13.7						6.4	5.6
Lane LOS		F			B	A					A	A
95% Queue, veh		35.2			3.1						1.0	0.6
Approach Delay, s/veh	103.1			6.5						6.1		
Approach LOS	F			A						A		
Intersection Delay, s/veh | LOS	56.7						F					

HCS Roundabouts Report

General Information

Analyst	WDR
Agency or Co.	Cannon & Cannon, Inc.
Date Performed	3/28/2024
Analysis Year	2024
Time Analyzed	PM Peak
Project Description	2024 Existing PM Peak

Site Information

Intersection	Northshore Drive at Concor...
E/W Street Name	Northshore Drive
N/S Street Name	Concord Road
Analysis Time Period, hrs	0.25
Peak Hour Factor	0.95
Jurisdiction	Knox County

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0
Lane Assignment			LT				T								L	
Volume (V), veh/h	1	252	390		12		603	494					1	510		445
Percent Heavy Vehicles, %	3	3	3		3		3	3					3	3		3
Flow Rate (v_{PCE}), pc/h	1	273	423		13		654	536					1	553		482
Right-Turn Bypass	None				Non-Yielding				None				Yielding			
Conflicting Lanes	1				1								1			
Pedestrians Crossing, p/h	0				0								0			
Proportion of CAVs	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763						4.9763	4.9763
Follow-Up Headway, s		2.6087			2.6087						2.6087	2.6087

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		697			667	536					554	482
Entry Volume, veh/h		677			648	520					538	468
Circulating Flow (v_c), pc/h	567			275			1264			668		
Exiting Flow (v_{ex}), pc/h	989			655			274			0		
Capacity (c_{pce}), pc/h		774			1042						698	708
Capacity (c), veh/h		751			1012						678	687
v/c Ratio (x)		0.90			0.64						0.79	0.68

Delay and Level of Service

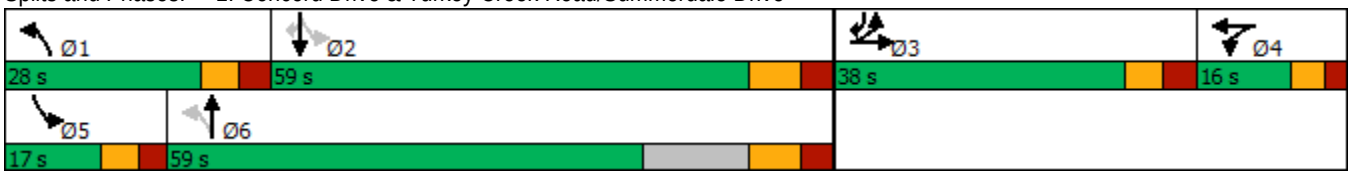
Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		36.3			12.8						26.5	19.1
Lane LOS		E			B	A					D	C
95% Queue, veh		11.9			4.8						7.9	5.4
Approach Delay, s/veh	36.3			7.1						23.0		
Approach LOS	E			A						C		
Intersection Delay, s/veh | LOS	19.7						C					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	548	0	78	9	0	22	35	1008	5	6	367	199
Future Volume (vph)	548	0	78	9	0	22	35	1008	5	6	367	199
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.962			0.904			0.999				0.850
Flt Protected	0.950	0.964			0.986		0.950			0.950		
Satd. Flow (prot)	1681	1641	0	0	1660	0	1770	3536	0	1770	3539	1583
Flt Permitted	0.950	0.964			0.986		0.463			0.121		
Satd. Flow (perm)	1681	1641	0	0	1660	0	862	3536	0	225	3539	1583
Satd. Flow (RTOR)		205			217							226
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Shared Lane Traffic (%)	42%											
Lane Group Flow (vph)	361	351	0	0	35	0	40	1151	0	7	417	226
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	3	3		4	4		1	6		5	2	3
Permitted Phases							6			2		2
Detector Phase	3	3		4	4		1	6		5	2	3
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	6.0		6.0	15.0		6.0	15.0	8.0
Minimum Split (s)	16.0	16.0		12.0	12.0		14.0	24.0		13.0	24.0	16.0
Total Split (s)	38.0	38.0		16.0	16.0		28.0	59.0		17.0	59.0	38.0
Total Split (%)	27.0%	27.0%		11.3%	11.3%		19.9%	41.8%		12.1%	41.8%	27.0%
Yellow Time (s)	4.0	4.0		3.5	3.5		4.0	5.5		4.0	5.5	4.0
All-Red Time (s)	3.5	3.5		2.5	2.5		3.5	3.5		3.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5			6.0		7.5	9.0		7.0	9.0	7.5
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min		None	Min	None
Act Effct Green (s)	30.9	30.9			6.2		46.4	43.5		43.1	37.7	81.5
Actuated g/C Ratio	0.31	0.31			0.06		0.46	0.44		0.43	0.38	0.82
v/c Ratio	0.70	0.54			0.11		0.09	0.75		0.04	0.31	0.17
Control Delay	42.5	17.5			0.8		15.2	28.3		15.0	24.8	1.0
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	42.5	17.5			0.8		15.2	28.3		15.0	24.8	1.0
LOS	D	B			A		B	C		B	C	A
Approach Delay		30.2			0.8			27.9			16.4	
Approach LOS		C			A			C			B	
Queue Length 50th (ft)	229	81			0		15	330		2	116	0
Queue Length 95th (ft)	#445	206			0		32	488		10	155	20
Internal Link Dist (ft)		497			673			435			693	
Turn Bay Length (ft)							70			95		475
Base Capacity (vph)	527	655			365		599	2219		260	1820	1312
Starvation Cap Reductn	0	0			0		0	0		0	0	0
Spillback Cap Reductn	0	0			0		0	0		0	0	0
Storage Cap Reductn	0	0			0		0	0		0	0	0
Reduced v/c Ratio	0.69	0.54			0.10		0.07	0.52		0.03	0.23	0.17

Intersection Summary

Cycle Length: 141
Actuated Cycle Length: 100
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 25.3 Intersection LOS: C
Intersection Capacity Utilization 67.1% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Concord Drive & Turkey Creek Road/Summerdale Drive

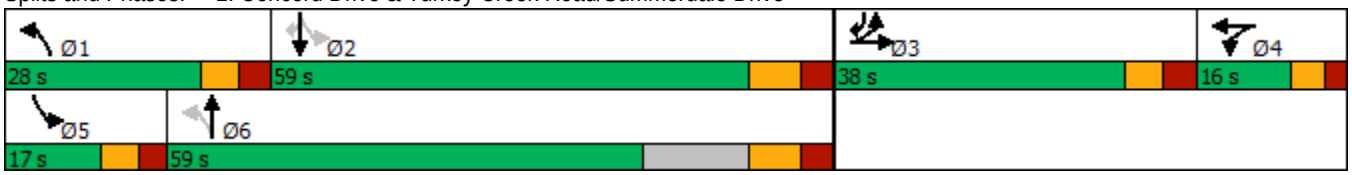


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	269	1	104	4	3	17	134	706	11	9	951	402
Future Volume (vph)	269	1	104	4	3	17	134	706	11	9	951	402
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.913			0.901			0.998				0.850
Flt Protected	0.950	0.980			0.992		0.950			0.950		
Satd. Flow (prot)	1681	1583	0	0	1665	0	1770	3532	0	1770	3539	1583
Flt Permitted	0.950	0.980			0.992		0.135			0.351		
Satd. Flow (perm)	1681	1583	0	0	1665	0	251	3532	0	654	3539	1583
Satd. Flow (RTOR)		44			19			1				447
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)	28%											
Lane Group Flow (vph)	215	201	0	0	26	0	149	796	0	10	1057	447
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	3	3		4	4		1	6		5	2	3
Permitted Phases							6			2		2
Detector Phase	3	3		4	4		1	6		5	2	3
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	6.0		6.0	15.0		6.0	15.0	8.0
Minimum Split (s)	16.0	16.0		12.0	12.0		14.0	24.0		13.0	24.0	16.0
Total Split (s)	38.0	38.0		16.0	16.0		28.0	59.0		17.0	59.0	38.0
Total Split (%)	27.0%	27.0%		11.3%	11.3%		19.9%	41.8%		12.1%	41.8%	27.0%
Yellow Time (s)	4.0	4.0		3.5	3.5		4.0	5.5		4.0	5.5	4.0
All-Red Time (s)	3.5	3.5		2.5	2.5		3.5	3.5		3.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5			6.0		7.5	9.0		7.0	9.0	7.5
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min		None	Min	None
Act Effct Green (s)	21.5	21.5			7.0		62.3	58.6		50.6	42.0	73.1
Actuated g/C Ratio	0.20	0.20			0.07		0.58	0.55		0.48	0.39	0.69
v/c Ratio	0.63	0.57			0.20		0.50	0.41		0.03	0.76	0.36
Control Delay	51.2	39.2			34.0		17.9	17.1		13.4	33.9	1.6
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	51.2	39.2			34.0		17.9	17.1		13.4	33.9	1.6
LOS	D	D			C		B	B		B	C	A
Approach Delay		45.4			34.0			17.2			24.2	
Approach LOS		D			C			B			C	
Queue Length 50th (ft)	155	111			5		49	167		3	342	0
Queue Length 95th (ft)	271	216			37		98	320		13	532	35
Internal Link Dist (ft)		497			673			435			693	
Turn Bay Length (ft)							70			95		475
Base Capacity (vph)	512	513			183		458	2225		447	1769	1343
Starvation Cap Reductn	0	0			0		0	0		0	0	0
Spillback Cap Reductn	0	0			0		0	0		0	0	0
Storage Cap Reductn	0	0			0		0	0		0	0	0
Reduced v/c Ratio	0.42	0.39			0.14		0.33	0.36		0.02	0.60	0.33

Intersection Summary

Cycle Length: 141	
Actuated Cycle Length: 106.5	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 25.1	Intersection LOS: C
Intersection Capacity Utilization 71.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: Concord Drive & Turkey Creek Road/Summerdale Drive



HCS Two-Way Stop-Control Report

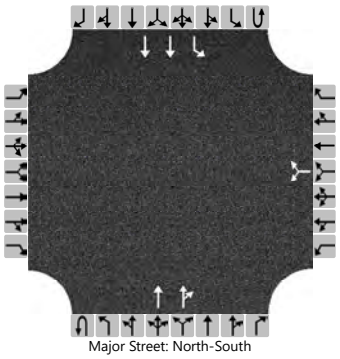
General Information

Analyst	WDR
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	4/16/2024
Analysis Year	2026
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	2026 Background AM Peak

Site Information

Intersection	Concord Road at 2nd Drive
Jurisdiction	Town of Farragut
East/West Street	2nd Drive
North/South Street	Concord Road
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

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	0	0		0	1	0	0	0	2	0	0	1	2	0
Configuration							LR				T	TR		L	T	
Volume (veh/h)						0		4			978	1	1	2	432	
Percent Heavy Vehicles (%)						3		3					3	3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)						7.5		6.9					6.4	4.1		
Critical Headway (sec)						6.86		6.96					6.46	4.16		
Base Follow-Up Headway (sec)						3.5		3.3					2.5	2.2		
Follow-Up Headway (sec)						3.53		3.33					2.53	2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							4							3		
Capacity, c (veh/h)							476							444		
v/c Ratio							0.01							0.01		
95% Queue Length, Q_{95} (veh)							0.0							0.0		
Control Delay (s/veh)							12.6							13.2		
Level of Service (LOS)							B							B		
Approach Delay (s/veh)						12.6							0.1			
Approach LOS						B							A			

HCS Two-Way Stop-Control Report

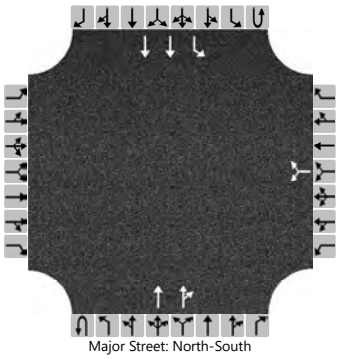
General Information

Analyst	WDR
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	4/16/2024
Analysis Year	2026
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	2026 Background PM Peak

Site Information

Intersection	Concord Road at 2nd Drive
Jurisdiction	Town of Farragut
East/West Street	2nd Drive
North/South Street	Concord Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

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	0	0		0	1	0	0	0	2	0	0	1	2	0
Configuration							LR				T	TR		L	T	
Volume (veh/h)						5		3			806	3	0	2	1024	
Percent Heavy Vehicles (%)						3		3					3	3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)						7.5		6.9						4.1		
Critical Headway (sec)						6.86		6.96						4.16		
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)							9							2		
Capacity, c (veh/h)							309							745		
v/c Ratio							0.03							0.00		
95% Queue Length, Q_{95} (veh)							0.1							0.0		
Control Delay (s/veh)							17.0							9.8		
Level of Service (LOS)							C							A		
Approach Delay (s/veh)						17.0								0.0		
Approach LOS						C								A		

HCS Roundabouts Report

General Information

Analyst	WDR
Agency or Co.	Cannon & Cannon, Inc.
Date Performed	4/16/2024
Analysis Year	2026
Time Analyzed	AM Peak
Project Description	2026 Background AM Peak

Site Information

Intersection	Northshore Drive at Concor...
E/W Street Name	Northshore Drive
N/S Street Name	Concord Road
Analysis Time Period, hrs	0.25
Peak Hour Factor	0.88
Jurisdiction	Knox County

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0
Lane Assignment			LT				T								L	
Volume (V), veh/h	1	610	548		2		334	370					1	214		148
Percent Heavy Vehicles, %	3	3	3		3		3	3					3	3		3
Flow Rate (v_{PCE}), pc/h	1	714	641		2		391	433					1	250		173
Right-Turn Bypass	None				Non-Yielding				None				Yielding			
Conflicting Lanes	1				1								1			
Pedestrians Crossing, p/h	0				0								0			
Proportion of CAVs	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763						4.9763	4.9763
Follow-Up Headway, s		2.6087			2.6087						2.6087	2.6087

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		1356			393	433					251	173
Entry Volume, veh/h		1317			382	420					244	168
Circulating Flow (v_c), pc/h	253			716			1609			394		
Exiting Flow (v_{ex}), pc/h	893			392			715			0		
Capacity (c_{pce}), pc/h		1066			665						923	925
Capacity (c), veh/h		1035			645						896	898
v/c Ratio (x)		1.27			0.59						0.27	0.19

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		145.4			16.3						6.9	5.9
Lane LOS		F			C	A					A	A
95% Queue, veh		45.9			3.9						1.1	0.7
Approach Delay, s/veh	145.4			7.7						6.5		
Approach LOS	F			A						A		
Intersection Delay, s/veh | LOS	79.1						F					

HCS Roundabouts Report

General Information

Analyst	WDR
Agency or Co.	Cannon & Cannon, Inc.
Date Performed	4/16/2024
Analysis Year	2026
Time Analyzed	PM Peak
Project Description	2026 Background PM Peak

Site Information

Intersection	Northshore Drive at Concor...
E/W Street Name	Northshore Drive
N/S Street Name	Concord Road
Analysis Time Period, hrs	0.25
Peak Hour Factor	0.95
Jurisdiction	Knox County

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0
Lane Assignment			LT				T								L	
Volume (V), veh/h	1	270	418		13		646	529					1	546		477
Percent Heavy Vehicles, %	3	3	3		3		3	3					3	3		3
Flow Rate (v_{PCE}), pc/h	1	293	453		14		700	574					1	592		517
Right-Turn Bypass	None				Non-Yielding				None				Yielding			
Conflicting Lanes	1				1								1			
Pedestrians Crossing, p/h	0				0								0			
Proportion of CAVs	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763						4.9763	4.9763
Follow-Up Headway, s		2.6087			2.6087						2.6087	2.6087

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		747			714	574					593	517
Entry Volume, veh/h		725			693	557					576	502
Circulating Flow (v_c), pc/h	607			295			1354			715		
Exiting Flow (v_{ex}), pc/h	1059			701			294			0		
Capacity (c_{pce}), pc/h		743			1021						666	675
Capacity (c), veh/h		721			992						646	655
v/c Ratio (x)		1.01			0.70						0.89	0.77

Delay and Level of Service

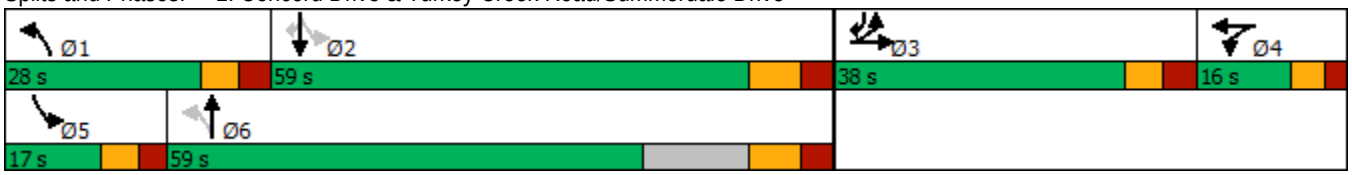
Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		58.7			15.1						38.8	25.0
Lane LOS		F			C	A					E	C
95% Queue, veh		16.7			6.0						10.9	7.1
Approach Delay, s/veh	58.7			8.4						32.3		
Approach LOS	F			A						D		
Intersection Delay, s/veh | LOS	28.8						D					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	548	0	111	14	0	22	67	1035	10	6	395	199
Future Volume (vph)	548	0	111	14	0	22	67	1035	10	6	395	199
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.949			0.918			0.999				0.850
Flt Protected	0.950	0.968			0.981		0.950			0.950		
Satd. Flow (prot)	1681	1626	0	0	1678	0	1770	3536	0	1770	3539	1583
Flt Permitted	0.950	0.968			0.981		0.407			0.112		
Satd. Flow (perm)	1681	1626	0	0	1678	0	758	3536	0	209	3539	1583
Satd. Flow (RTOR)		205			217			1				226
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Shared Lane Traffic (%)	39%											
Lane Group Flow (vph)	380	369	0	0	41	0	76	1187	0	7	449	226
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	3	3		4	4		1	6		5	2	3
Permitted Phases							6			2		2
Detector Phase	3	3		4	4		1	6		5	2	3
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	6.0		6.0	15.0		6.0	15.0	8.0
Minimum Split (s)	16.0	16.0		12.0	12.0		14.0	24.0		13.0	24.0	16.0
Total Split (s)	38.0	38.0		16.0	16.0		28.0	59.0		17.0	59.0	38.0
Total Split (%)	27.0%	27.0%		11.3%	11.3%		19.9%	41.8%		12.1%	41.8%	27.0%
Yellow Time (s)	4.0	4.0		3.5	3.5		4.0	5.5		4.0	5.5	4.0
All-Red Time (s)	3.5	3.5		2.5	2.5		3.5	3.5		3.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5			6.0		7.5	9.0		7.0	9.0	7.5
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min		None	Min	None
Act Effct Green (s)	31.2	31.2			6.1		47.5	44.3		41.1	34.5	76.8
Actuated g/C Ratio	0.30	0.30			0.06		0.46	0.43		0.40	0.33	0.74
v/c Ratio	0.75	0.58			0.14		0.18	0.79		0.04	0.38	0.18
Control Delay	46.7	19.6			0.9		16.6	30.7		15.2	28.9	1.2
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	46.7	19.6			0.9		16.6	30.7		15.2	28.9	1.2
LOS	D	B			A		B	C		B	C	A
Approach Delay		33.3			0.9			29.9			19.6	
Approach LOS		C			A			C			B	
Queue Length 50th (ft)	253	97			0		28	345		2	128	0
Queue Length 95th (ft)	#483	227			0		53	508		10	172	21
Internal Link Dist (ft)		497			673			435			693	
Turn Bay Length (ft)							70			95		475
Base Capacity (vph)	505	632			361		555	2126		242	1743	1231
Starvation Cap Reductn	0	0			0		0	0		0	0	0
Spillback Cap Reductn	0	0			0		0	0		0	0	0
Storage Cap Reductn	0	0			0		0	0		0	0	0
Reduced v/c Ratio	0.75	0.58			0.11		0.14	0.56		0.03	0.26	0.18

Intersection Summary

Cycle Length: 141
Actuated Cycle Length: 103.7
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 27.8 Intersection LOS: C
Intersection Capacity Utilization 78.7% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Concord Drive & Turkey Creek Road/Summerdale Drive

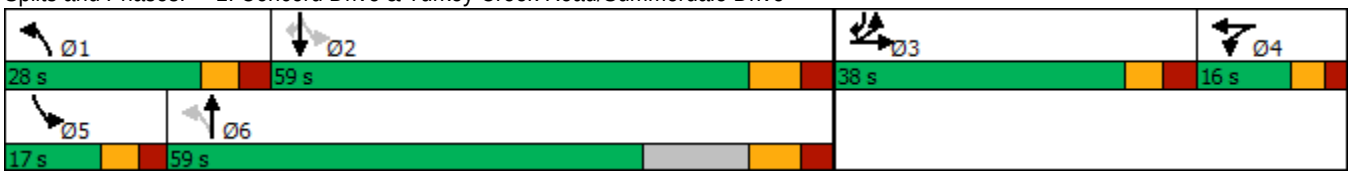


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	269	1	121	7	3	17	150	720	14	9	965	402
Future Volume (vph)	269	1	121	7	3	17	150	720	14	9	965	402
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.904			0.914			0.997				0.850
Flt Protected	0.950	0.982			0.987		0.950			0.950		
Satd. Flow (prot)	1681	1571	0	0	1680	0	1770	3529	0	1770	3539	1583
Flt Permitted	0.950	0.982			0.987		0.127			0.344		
Satd. Flow (perm)	1681	1571	0	0	1680	0	237	3529	0	641	3539	1583
Satd. Flow (RTOR)		57			19			2				447
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)	25%											
Lane Group Flow (vph)	224	210	0	0	30	0	167	816	0	10	1072	447
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	3	3		4	4		1	6		5	2	3
Permitted Phases							6			2		2
Detector Phase	3	3		4	4		1	6		5	2	3
Switch Phase												
Minimum Initial (s)	8.0	8.0		6.0	6.0		6.0	15.0		6.0	15.0	8.0
Minimum Split (s)	16.0	16.0		12.0	12.0		14.0	24.0		13.0	24.0	16.0
Total Split (s)	38.0	38.0		16.0	16.0		28.0	59.0		17.0	59.0	38.0
Total Split (%)	27.0%	27.0%		11.3%	11.3%		19.9%	41.8%		12.1%	41.8%	27.0%
Yellow Time (s)	4.0	4.0		3.5	3.5		4.0	5.5		4.0	5.5	4.0
All-Red Time (s)	3.5	3.5		2.5	2.5		3.5	3.5		3.0	3.5	3.5
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5			6.0		7.5	9.0		7.0	9.0	7.5
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min		None	Min	None
Act Effct Green (s)	22.4	22.4			7.2		64.5	60.8		51.6	43.0	75.0
Actuated g/C Ratio	0.20	0.20			0.07		0.59	0.55		0.47	0.39	0.68
v/c Ratio	0.65	0.58			0.24		0.55	0.42		0.03	0.77	0.37
Control Delay	53.2	37.9			37.6		19.9	17.3		13.9	35.9	1.7
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	53.2	37.9			37.6		19.9	17.3		13.9	35.9	1.7
LOS	D	D			D		B	B		B	D	A
Approach Delay		45.8			37.6			17.8			25.7	
Approach LOS		D			D			B			C	
Queue Length 50th (ft)	171	114			8		58	181		3	370	0
Queue Length 95th (ft)	289	220			44		115	330		12	560	38
Internal Link Dist (ft)		497			673			435			693	
Turn Bay Length (ft)							70			95		475
Base Capacity (vph)	497	505			180		444	2205		435	1717	1327
Starvation Cap Reductn	0	0			0		0	0		0	0	0
Spillback Cap Reductn	0	0			0		0	0		0	0	0
Storage Cap Reductn	0	0			0		0	0		0	0	0
Reduced v/c Ratio	0.45	0.42			0.17		0.38	0.37		0.02	0.62	0.34

Intersection Summary

Cycle Length: 141	
Actuated Cycle Length: 109.8	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 26.1	Intersection LOS: C
Intersection Capacity Utilization 72.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: Concord Drive & Turkey Creek Road/Summerdale Drive



HCS Two-Way Stop-Control Report

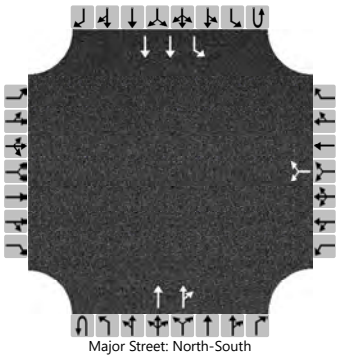
General Information

Analyst	WDR
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	5/20/2024
Analysis Year	2026
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	2026 Combined AM Peak

Site Information

Intersection	Concord Road at 2nd Drive
Jurisdiction	Town of Farragut
East/West Street	2nd Drive
North/South Street	Concord Road
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

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	0	0		0	1	0	0	0	2	0	0	1	2	0
Configuration							LR				T	TR		L	T	
Volume (veh/h)						95		55			925	92	1	130	375	
Percent Heavy Vehicles (%)						3		3					3	3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)						7.5		6.9					6.4	4.1		
Critical Headway (sec)						6.86		6.96					6.46	4.16		
Base Follow-Up Headway (sec)						3.5		3.3					2.5	2.2		
Follow-Up Headway (sec)						3.53		3.33					2.53	2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							169							147		
Capacity, c (veh/h)							238							594		
v/c Ratio							0.71							0.25		
95% Queue Length, Q_{95} (veh)							4.7							1.0		
Control Delay (s/veh)							49.9							13.0		
Level of Service (LOS)							E							B		
Approach Delay (s/veh)					49.9								3.4			
Approach LOS					E								A			

HCS Two-Way Stop-Control Report

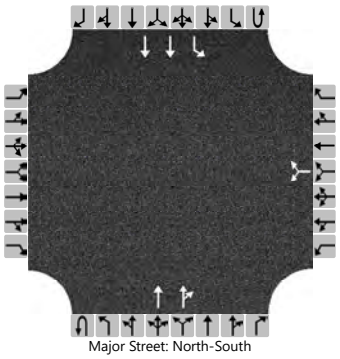
General Information

Analyst	WDR
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	5/20/2024
Analysis Year	2026
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	2026 Combined PM Peak

Site Information

Intersection	Concord Road at 2nd Drive
Jurisdiction	Town of Farragut
East/West Street	2nd Drive
North/South Street	Concord Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

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	0	0		0	1	0	0	0	2	0	0	1	2	0
Configuration							LR				T	TR		L	T	
Volume (veh/h)						111		28			775	55	0	128	935	
Percent Heavy Vehicles (%)						3		3					3	3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)						7.5		6.9						4.1		
Critical Headway (sec)						6.86		6.96						4.16		
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)							154							142		
Capacity, c (veh/h)							213							730		
v/c Ratio							0.72							0.19		
95% Queue Length, Q_{95} (veh)							4.8							0.7		
Control Delay (s/veh)							56.6							11.1		
Level of Service (LOS)							F							B		
Approach Delay (s/veh)						56.6								1.3		
Approach LOS						F								A		

HCS Two-Way Stop-Control Report

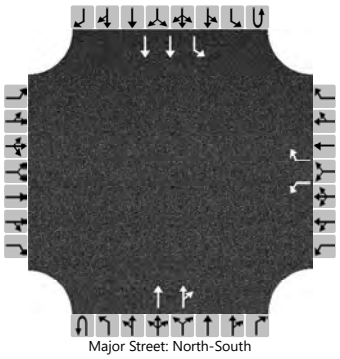
General Information

Analyst	WDR
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	5/20/2024
Analysis Year	2026
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	2026 Combined AM Peak Exclusive Left and Right

Site Information

Intersection	Concord Road at 2nd Drive
Jurisdiction	Town of Farragut
East/West Street	2nd Drive
North/South Street	Concord Road
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

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	0	0		1	0	1	0	0	2	0	0	1	2	0
Configuration						L		R			T	TR		L	T	
Volume (veh/h)						95		55			925	92	1	130	375	
Percent Heavy Vehicles (%)						3		3					3	3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)						7.5		6.9					6.4	4.1		
Critical Headway (sec)						6.86		6.96					6.46	4.16		
Base Follow-Up Headway (sec)						3.5		3.3					2.5	2.2		
Follow-Up Headway (sec)						3.53		3.33					2.53	2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						107		62						147		
Capacity, c (veh/h)						186		461						594		
v/c Ratio						0.57		0.13						0.25		
95% Queue Length, Q_{95} (veh)						3.1		0.5						1.0		
Control Delay (s/veh)						47.5		14.0						13.0		
Level of Service (LOS)						E		B						B		
Approach Delay (s/veh)						35.2							3.4			
Approach LOS						E							A			

HCS Two-Way Stop-Control Report

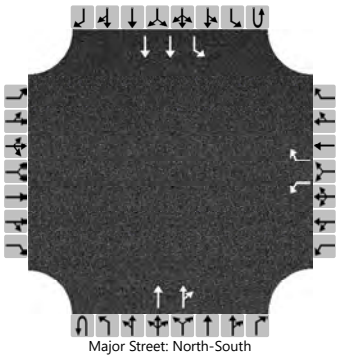
General Information

Analyst	WDR
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	5/20/2024
Analysis Year	2026
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	2026 Combined PM Peak Exclusive Left and Right

Site Information

Intersection	Concord Road at 2nd Drive
Jurisdiction	Town of Farragut
East/West Street	2nd Drive
North/South Street	Concord Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

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	0	0		1	0	1	0	0	2	0	0	1	2	0
Configuration						L		R			T	TR		L	T	
Volume (veh/h)						111		28			775	55	0	128	935	
Percent Heavy Vehicles (%)						3		3					3	3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)						7.5		6.9						4.1		
Critical Headway (sec)						6.86		6.96						4.16		
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)						123		31						142		
Capacity, c (veh/h)						185		545						730		
v/c Ratio						0.67		0.06						0.19		
95% Queue Length, Q_{95} (veh)						4.0		0.2						0.7		
Control Delay (s/veh)						56.7		12.0						11.1		
Level of Service (LOS)						F		B						B		
Approach Delay (s/veh)						47.7								1.3		
Approach LOS						E								A		

HCS Two-Way Stop-Control Report

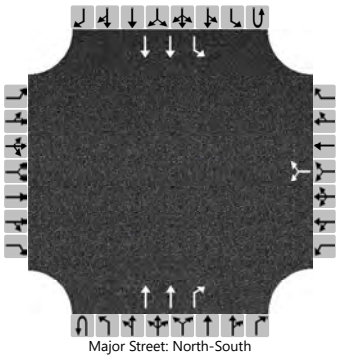
General Information

Analyst	WDR
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	5/20/2024
Analysis Year	2026
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	2026 Combined AM Peak Northbound Right

Site Information

Intersection	Concord Road at 2nd Drive
Jurisdiction	Town of Farragut
East/West Street	2nd Drive
North/South Street	Concord Road
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

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	0	0		0	1	0	0	0	2	1	0	1	2	0
Configuration							LR				T	R		L	T	
Volume (veh/h)						95		55			925	92	1	130	375	
Percent Heavy Vehicles (%)						3		3					3	3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized										No						
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)						7.5		6.9					6.4	4.1		
Critical Headway (sec)						6.86		6.96					6.46	4.16		
Base Follow-Up Headway (sec)						3.5		3.3					2.5	2.2		
Follow-Up Headway (sec)						3.53		3.33					2.53	2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							169							147		
Capacity, c (veh/h)							251							596		
v/c Ratio							0.67							0.25		
95% Queue Length, Q_{95} (veh)							4.3							1.0		
Control Delay (s/veh)							44.3							13.0		
Level of Service (LOS)							E							B		
Approach Delay (s/veh)						44.3							3.4			
Approach LOS						E							A			

HCS Two-Way Stop-Control Report

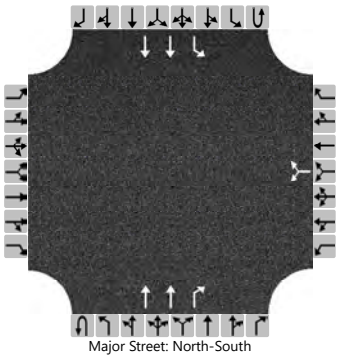
General Information

Analyst	WDR
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	5/20/2024
Analysis Year	2026
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	2026 Combined PM Peak Northbound Right

Site Information

Intersection	Concord Road at 2nd Drive
Jurisdiction	Town of Farragut
East/West Street	2nd Drive
North/South Street	Concord Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

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	0	0		0	1	0	0	0	2	1	0	1	2	0
Configuration							LR				T	R		L	T	
Volume (veh/h)						111		28			775	55	0	128	935	
Percent Heavy Vehicles (%)						3		3					3	3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized											No					
Median Type | Storage						Left Only					1					

Critical and Follow-up Headways

Base Critical Headway (sec)						7.5		6.9						4.1		
Critical Headway (sec)						6.86		6.96						4.16		
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)							154							142		
Capacity, c (veh/h)							218							730		
v/c Ratio							0.71							0.19		
95% Queue Length, Q_{95} (veh)							4.6							0.7		
Control Delay (s/veh)							53.6							11.1		
Level of Service (LOS)							F							B		
Approach Delay (s/veh)						53.6								1.3		
Approach LOS						F								A		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	95	55	925	92	131	375
Future Volume (vph)	95	55	925	92	131	375
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.950		0.986			
Flt Protected	0.969				0.950	
Satd. Flow (prot)	1715	0	3490	0	1770	3539
Flt Permitted	0.969				0.146	
Satd. Flow (perm)	1715	0	3490	0	272	3539
Satd. Flow (RTOR)	50		19			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	163	0	1105	0	142	408
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases					6	
Detector Phase	8		2		1	6
Switch Phase						
Minimum Initial (s)	8.0		15.0		5.0	15.0
Minimum Split (s)	23.5		23.5		10.5	23.5
Total Split (s)	23.5		25.9		10.6	36.5
Total Split (%)	39.2%		43.2%		17.7%	60.8%
Yellow Time (s)	3.5		3.5		3.5	3.5
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	5.5		5.5		5.5	5.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		C-Max		None	C-Max
Act Effct Green (s)	10.1		32.1		41.6	42.7
Actuated g/C Ratio	0.17		0.54		0.69	0.71
v/c Ratio	0.50		0.59		0.38	0.16
Control Delay	20.7		16.3		7.6	4.4
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	20.7		16.3		7.6	4.4
LOS	C		B		A	A
Approach Delay	20.7		16.3			5.2
Approach LOS	C		B			A
Queue Length 50th (ft)	38		156		15	24
Queue Length 95th (ft)	79		#317		41	49
Internal Link Dist (ft)	739		696			696
Turn Bay Length (ft)					65	
Base Capacity (vph)	549		1876		371	2519
Starvation Cap Reductn	0		0		0	0
Spillback Cap Reductn	0		0		0	0
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.30		0.59		0.38	0.16

Intersection Summary

Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 13.3	Intersection LOS: B
Intersection Capacity Utilization 58.1%	ICU Level of Service B
Analysis Period (min) 15	

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

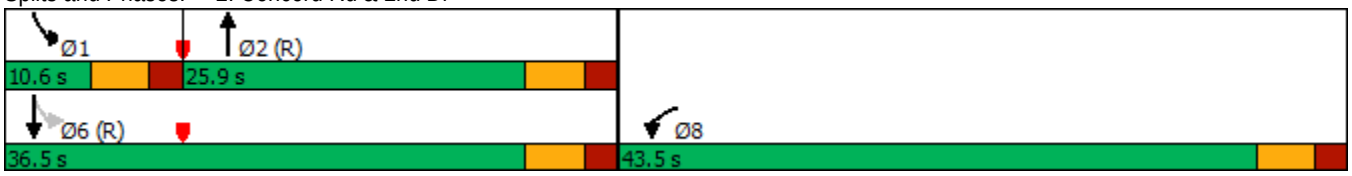
Splits and Phases: 2: Concord Rd & 2nd Dr

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	111	28	775	55	128	935
Future Volume (vph)	111	28	775	55	128	935
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.973		0.990			
Flt Protected	0.961				0.950	
Satd. Flow (prot)	1742	0	3504	0	1770	3539
Flt Permitted	0.961				0.232	
Satd. Flow (perm)	1742	0	3504	0	432	3539
Satd. Flow (RTOR)	21		9			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	151	0	902	0	139	1016
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases					6	
Detector Phase	8		2		1	6
Switch Phase						
Minimum Initial (s)	8.0		15.0		5.0	15.0
Minimum Split (s)	43.5		23.5		10.5	23.5
Total Split (s)	43.5		25.9		10.6	36.5
Total Split (%)	54.4%		32.4%		13.3%	45.6%
Yellow Time (s)	3.5		3.5		3.5	3.5
All-Red Time (s)	2.0		2.0		2.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	5.5		5.5		5.5	5.5
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None		C-Max		None	C-Max
Act Effct Green (s)	11.8		43.6		57.2	57.2
Actuated g/C Ratio	0.15		0.54		0.72	0.72
v/c Ratio	0.55		0.47		0.31	0.40
Control Delay	34.2		13.0		6.0	5.5
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	34.2		13.0		6.0	5.5
LOS	C		B		A	A
Approach Delay	34.2		13.0			5.6
Approach LOS	C		B			A
Queue Length 50th (ft)	61		130		17	85
Queue Length 95th (ft)	110		222		42	148
Internal Link Dist (ft)	739		696			696
Turn Bay Length (ft)					65	
Base Capacity (vph)	838		1913		444	2531
Starvation Cap Reductn	0		0		0	0
Spillback Cap Reductn	0		0		0	0
Storage Cap Reductn	0		0		0	0
Reduced v/c Ratio	0.18		0.47		0.31	0.40

Intersection Summary

Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.55	
Intersection Signal Delay: 10.5	Intersection LOS: B
Intersection Capacity Utilization 51.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Concord Rd & 2nd Dr



HCS Roundabouts Report

General Information

Analyst	WDR
Agency or Co.	Cannon & Cannon, Inc.
Date Performed	4/16/2024
Analysis Year	2026
Time Analyzed	AM Peak
Project Description	2026 Combined AM Peak

Site Information

Intersection	Northshore Drive at Concor...
E/W Street Name	Northshore Drive
N/S Street Name	Concord Road
Analysis Time Period, hrs	0.25
Peak Hour Factor	0.88
Jurisdiction	Knox County

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0
Lane Assignment			LT				T								L	
Volume (V), veh/h	1	626	548		2		334	392					1	236		164
Percent Heavy Vehicles, %	3	3	3		3		3	3					3	3		3
Flow Rate (v_{PCE}), pc/h	1	733	641		2		391	459					1	276		192
Right-Turn Bypass	None				Non-Yielding				None				Yielding			
Conflicting Lanes	1				1								1			
Pedestrians Crossing, p/h	0				0								0			
Proportion of CAVs	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763						4.9763	4.9763
Follow-Up Headway, s		2.6087			2.6087						2.6087	2.6087

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		1375			393	459					277	192
Entry Volume, veh/h		1335			382	446					269	186
Circulating Flow (v_c), pc/h	279			735			1654			394		
Exiting Flow (v_{ex}), pc/h	919			392			734			0		
Capacity (c_{pce}), pc/h		1038			652						923	925
Capacity (c), veh/h		1008			633						896	898
v/c Ratio (x)		1.32			0.60						0.30	0.21

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		167.9			16.9						7.2	6.1
Lane LOS		F			C	A					A	A
95% Queue, veh		50.7			4.0						1.3	0.8
Approach Delay, s/veh	167.9			7.8						6.8		
Approach LOS	F			A						A		
Intersection Delay, s/veh | LOS	89.3						F					

HCS Roundabouts Report

General Information

Analyst	WDR
Agency or Co.	Cannon & Cannon, Inc.
Date Performed	4/16/2024
Analysis Year	2026
Time Analyzed	PM Peak
Project Description	2026 Combined PM Peak

Site Information

Intersection	Northshore Drive at Concor...
E/W Street Name	Northshore Drive
N/S Street Name	Concord Road
Analysis Time Period, hrs	0.25
Peak Hour Factor	0.95
Jurisdiction	Knox County

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0
Lane Assignment			LT				T								L	
Volume (V), veh/h	1	279	418		13		646	541					1	557		485
Percent Heavy Vehicles, %	3	3	3		3		3	3					3	3		3
Flow Rate (v_{PCE}), pc/h	1	302	453		14		700	587					1	604		526
Right-Turn Bypass	None				Non-Yielding				None				Yielding			
Conflicting Lanes	1				1								1			
Pedestrians Crossing, p/h	0				0								0			
Proportion of CAVs	0															

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway, s		4.9763			4.9763						4.9763	4.9763
Follow-Up Headway, s		2.6087			2.6087						2.6087	2.6087

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		756			714	587					605	526
Entry Volume, veh/h		734			693	570					587	511
Circulating Flow (v_c), pc/h	619			304			1375			715		
Exiting Flow (v_{ex}), pc/h	1071			701			303			0		
Capacity (c_{pce}), pc/h		734			1012						666	675
Capacity (c), veh/h		713			983						646	655
v/c Ratio (x)		1.03			0.71						0.91	0.78

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		65.7			15.5						41.6	26.0
Lane LOS		F			C	A					E	D
95% Queue, veh		18.0			6.1						11.6	7.5
Approach Delay, s/veh	65.7			8.5						34.3		
Approach LOS	F			A						D		
Intersection Delay, s/veh | LOS	31.2						D					

HCS Two-Way Stop-Control Report

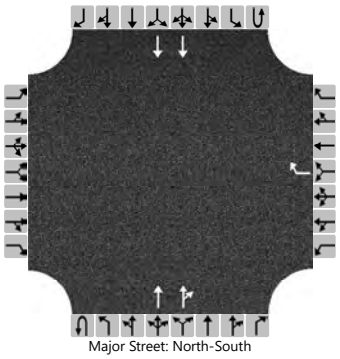
General Information

Analyst	WDR
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	5/20/2024
Analysis Year	2026
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	2026 Combined AM Peak

Site Information

Intersection	Concord Road at Site Access
Jurisdiction	Town of Farragut
East/West Street	Site Access
North/South Street	Concord Road
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

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	0	0		0	0	1	0	0	2	0	0	0	2	0
Configuration								R			T	TR			T	
Volume (veh/h)								152			895	85			506	
Percent Heavy Vehicles (%)								3								
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)								6.9								
Critical Headway (sec)								6.96								
Base Follow-Up Headway (sec)								3.3								
Follow-Up Headway (sec)								3.33								

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)								171								
Capacity, c (veh/h)								476								
v/c Ratio								0.36								
95% Queue Length, Q_{95} (veh)								1.6								
Control Delay (s/veh)								16.7								
Level of Service (LOS)								C								
Approach Delay (s/veh)						16.7										
Approach LOS						C										

HCS Two-Way Stop-Control Report

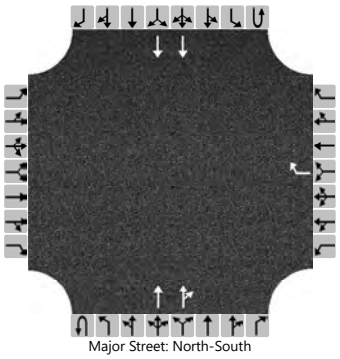
General Information

Analyst	WDR
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	5/20/2024
Analysis Year	2026
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	2026 Combined PM Peak

Site Information

Intersection	Concord Road at Site Access
Jurisdiction	Town of Farragut
East/West Street	Site Access
North/South Street	Concord Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

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	0	0		0	0	1	0	0	2	0	0	0	2	0
Configuration								R			T	TR			T	
Volume (veh/h)								82			762	41			1063	
Percent Heavy Vehicles (%)								3								
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)								6.9								
Critical Headway (sec)								6.96								
Base Follow-Up Headway (sec)								3.3								
Follow-Up Headway (sec)								3.33								

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)								91								
Capacity, c (veh/h)								557								
v/c Ratio								0.16								
95% Queue Length, Q_{95} (veh)								0.6								
Control Delay (s/veh)								12.7								
Level of Service (LOS)								B								
Approach Delay (s/veh)						12.7										
Approach LOS						B										

HCS Two-Way Stop-Control Report

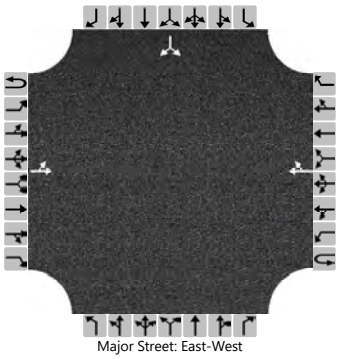
General Information

Analyst	WDR
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	5/20/2024
Analysis Year	2026
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	2026 Combined AM Peak

Site Information

Intersection	2nd Drive at Site Access
Jurisdiction	Knox County
East/West Street	2nd Drive
North/South Street	Site Access
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

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)		219	4				4	0						0		146
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage	Left Only								1							

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)		246													164	
Capacity, c (veh/h)		1610													1076	
v/c Ratio		0.15													0.15	
95% Queue Length, Q_{95} (veh)		0.5													0.5	
Control Delay (s/veh)		7.6	1.2												8.9	
Level of Service (LOS)		A	A												A	
Approach Delay (s/veh)	7.5												8.9			
Approach LOS	A												A			

HCS Two-Way Stop-Control Report

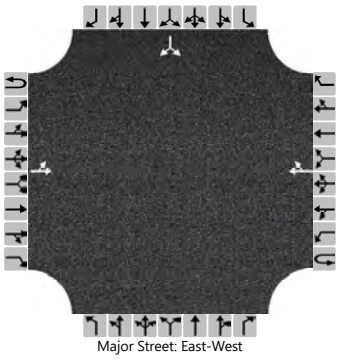
General Information

Analyst	WDR
Agency/Co.	Cannon & Cannon, Inc.
Date Performed	5/20/2024
Analysis Year	2026
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	2026 Combined PM Peak

Site Information

Intersection	2nd Drive at Site Access
Jurisdiction	Knox County
East/West Street	2nd Drive
North/South Street	Site Access
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

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	5				8	0						0		131
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)		198													146	
Capacity, c (veh/h)		1605													1070	
v/c Ratio		0.12													0.14	
95% Queue Length, Q_{95} (veh)		0.4													0.5	
Control Delay (s/veh)		7.6	0.9												8.9	
Level of Service (LOS)		A	A												A	
Approach Delay (s/veh)		7.4												8.9		
Approach LOS		A												A		

APPENDIX D – TURN LANE WARRANT EVALUATIONS

TABLE 4A KNOX COUNTY LEFT-TURN LANE VOLUME THRESHOLDS FOR 2-LANE ROADWAYS WITH A PREVAILING SPEED OF 0 TO 35 MPH	Project No: 01634-0010 Project Name: EZ Stop Concord Notes: 2nd Drive at Site Access

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

OPPOSING	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
VOLUME	100 - 149	150 - 199	200 - 249	250 - 299	300 - 349	350 - 399
100 - 149	300	235	185	145	120	100
150 - 199	245	200	160	130	110	90
200 - 249	205	170	140	115	100	80
250 - 299	175	150	125	105	90	70
300 - 349	155	135	110	95	80	65
350 - 399	135	120	100	85	70	60
400 - 449	120	105	90	75	65	55
450 - 499	105	90	80	70	60	50
500 - 549	95	80	70	65	55	50
550 - 599	85	70	65	60	50	45
600 - 649	75	65	60	55	45	40
650 - 699	70	60	55	50	40	35
700 - 749	65	55	50	45	35	30
750 or More	60	50	45	40	35	30

OPPOSING	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
VOLUME	350 - 399	400 - 449	450 - 499	500 - 549	550 - 599	= / > 600
100 - 149	100	80	70	60	55	50
150 - 199	90	75	65	55	50	45
200 - 249	80	72	60	55	50	45
250 - 299	70	65	55	50	45	40
300 - 349	65	60	50	50	45	40
350 - 399	60	55	50	45	40	40
400 - 449	55	50	45	45	40	35
450 - 499	50	45	45	40	35	35
500 - 549	50	45	40	40	35	35
550 - 599	45	40	40	35	35	35
600 - 649	40	35	35	35	35	30
650 - 699	35	35	35	30	30	30
700 - 749	30	30	30	30	30	30
750 or More	30	30	30	30	30	30

* 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)
2nd at Site Driveway	AM Peak	4	4	219	**>300**	No
2nd at Site Driveway	PM Peak	8	5	178	**>300**	No

Source: Knox County Department of Engineering and Public Works "Access Control and Driveway Design Policy"

TABLE 4B KNOX COUNTY RIGHT-TURN LANE VOLUME THRESHOLDS FOR 2-LANE ROADWAYS WITH A PREVAILING SPEED OF 0 TO 35 MPH	Project No: 01634-0010 Project Name: EZ Stop Concord Notes: 2nd Drive at Site Access

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	< 100	100 - 199	200 - 249	250 - 299	300 - 349	350 - 399
Fewer Than 25						
25 - 49						
50 - 99						
100 - 149						
150 - 199						
200 - 249						
250 - 299						Yes
300 - 349					Yes	Yes
350 - 399				Yes	Yes	Yes
400 - 449			Yes	Yes	Yes	Yes
450 - 499			Yes	Yes	Yes	Yes
500 - 549		Yes	Yes	Yes	Yes	Yes
550 - 599		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
50 - 99					Yes	Yes
100 - 149				Yes	Yes	Yes
150 - 199			Yes	Yes	Yes	Yes
200 - 249		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)
2nd Dr at Site Driveway	AM Peak	4	0	No
2nd Dr at Site Driveway	PM Peak	8	0	No

Source: Knox County Department of Engineering and Public Works "Access Control and Driveway Design Policy"

Concord Road at 2nd Drive
2024 Existing AM Peak
Right-Turn Warrant
Right-Turn Lane NOT Warranted

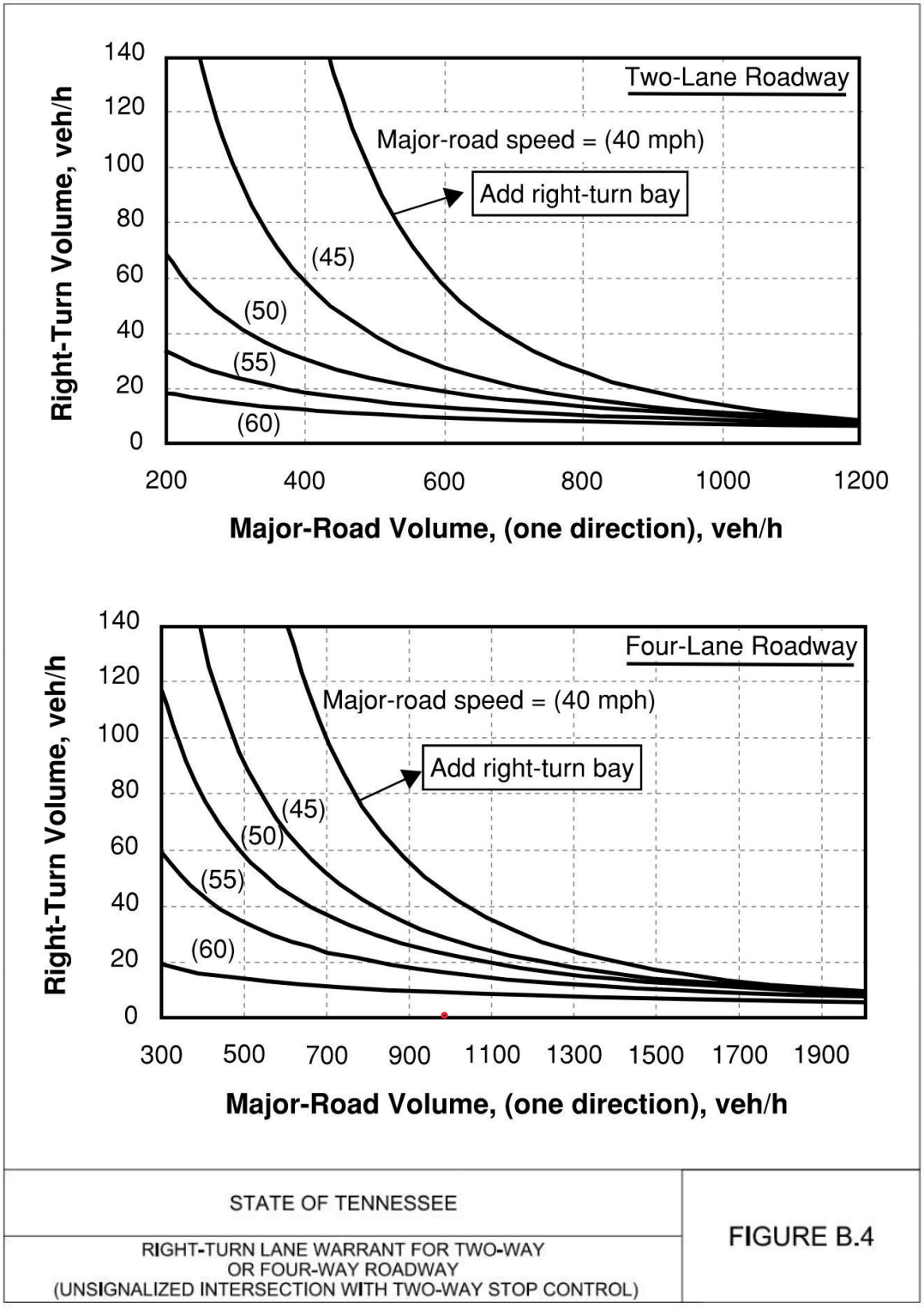


Figure B.4: Right-Turn Lane Warrant for Two-Way or Four-Way Roadway (Unsignalized Intersection with Two-Way Stop Control)

Right-Turn Volume: 1
Major Road Volume: 914

Concord Road at 2nd Drive
2024 Existing PM Peak
Right-Turn Warrant
Right-Turn Lane NOT Warranted

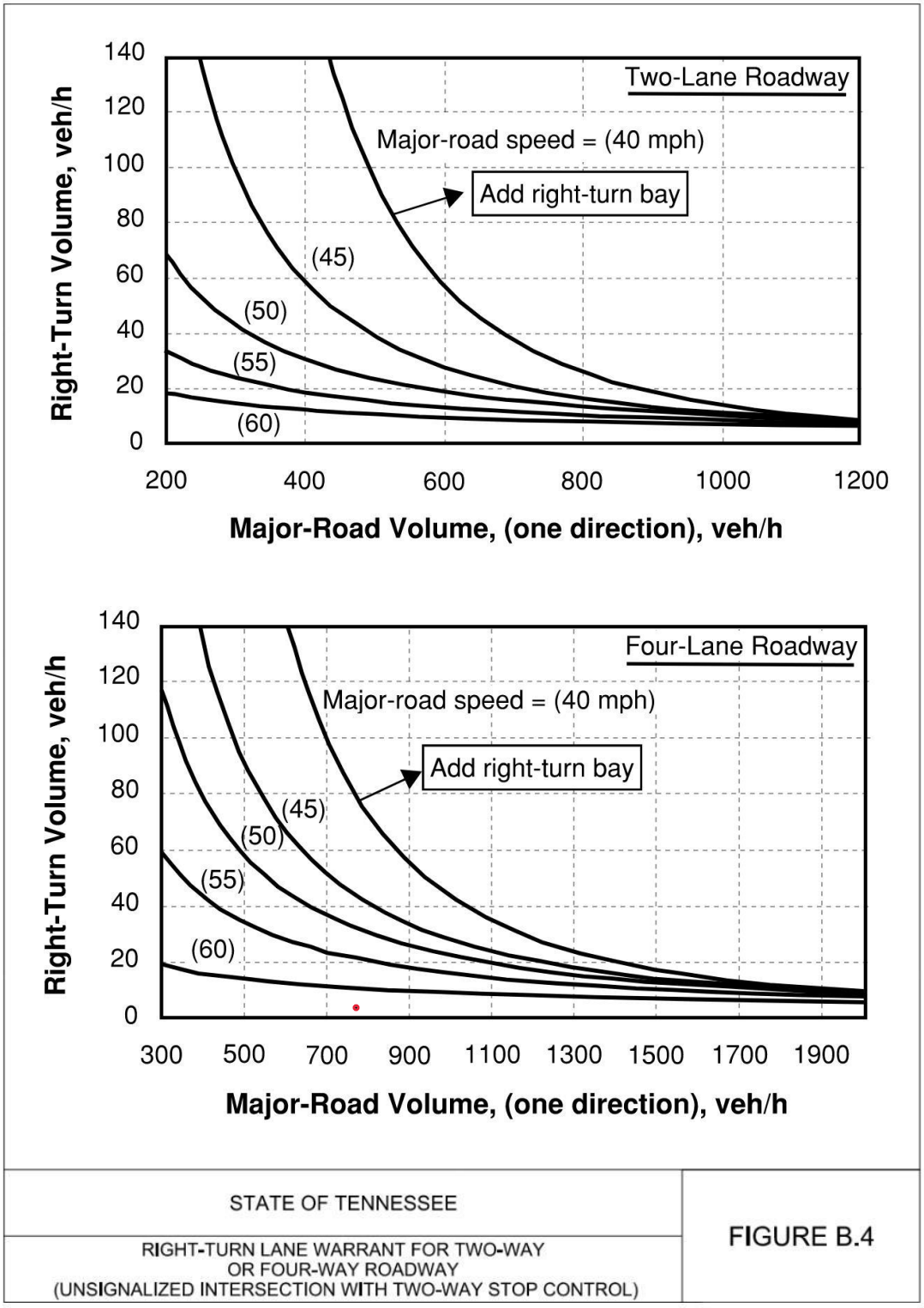


Figure B.4: Right-Turn Lane Warrant for Two-Way or Four-Way Roadway (Unsignalized Intersection with Two-Way Stop Control)

Right-Turn Volume: 3
Major Road Volume: 755

Concord Road at 2nd Drive
2026 Background AM Peak
Right-Turn Warrant
Right-Turn Lane NOT Warranted

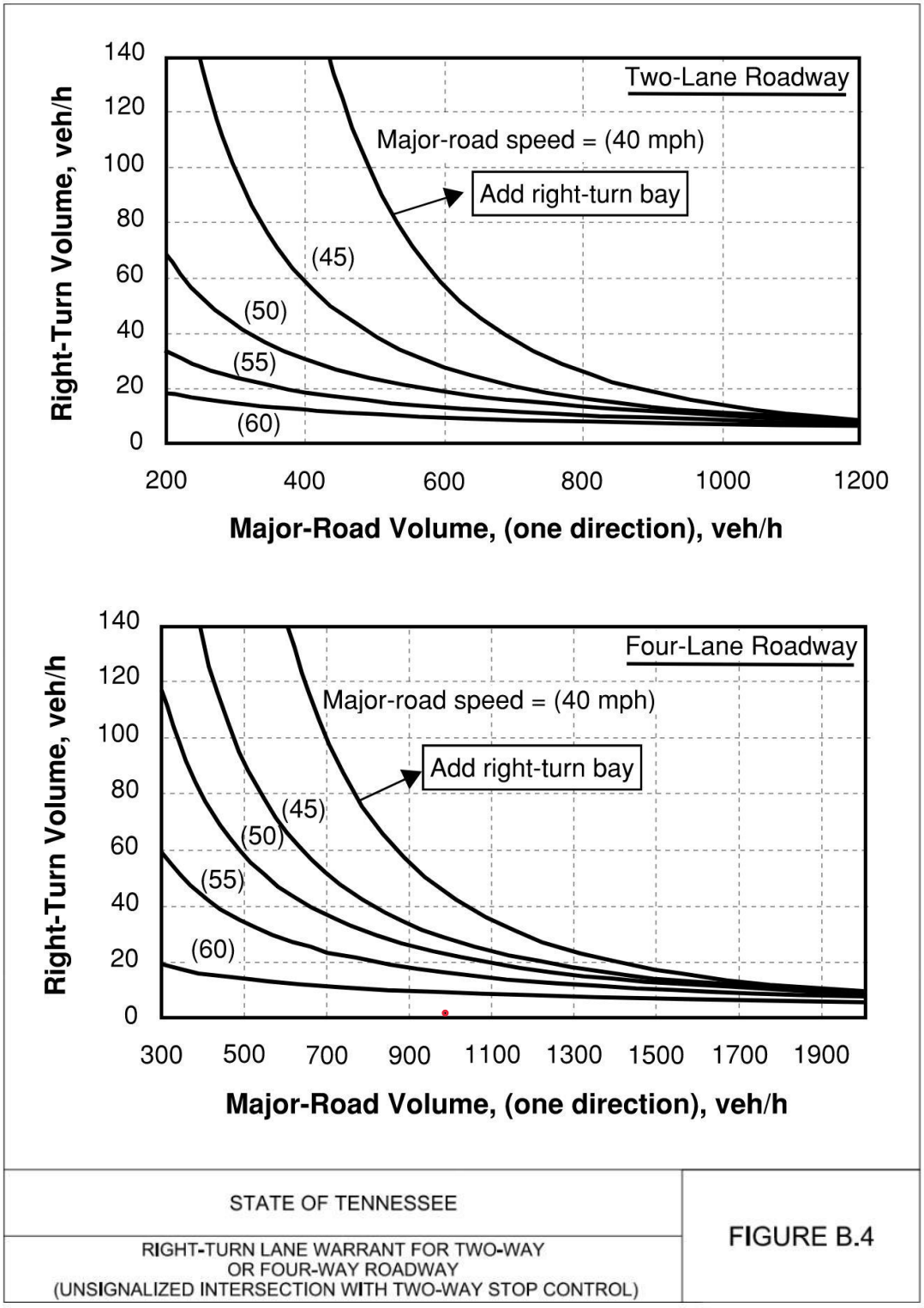


Figure B.4: Right-Turn Lane Warrant for Two-Way or Four-Way Roadway (Unsignalized Intersection with Two-Way Stop Control)

Right-Turn Volume: 1
Major Road Volume: 979

Concord Road at 2nd Drive
2026 Background PM Peak
Right-Turn Warrant
Right-Turn Lane NOT Warranted

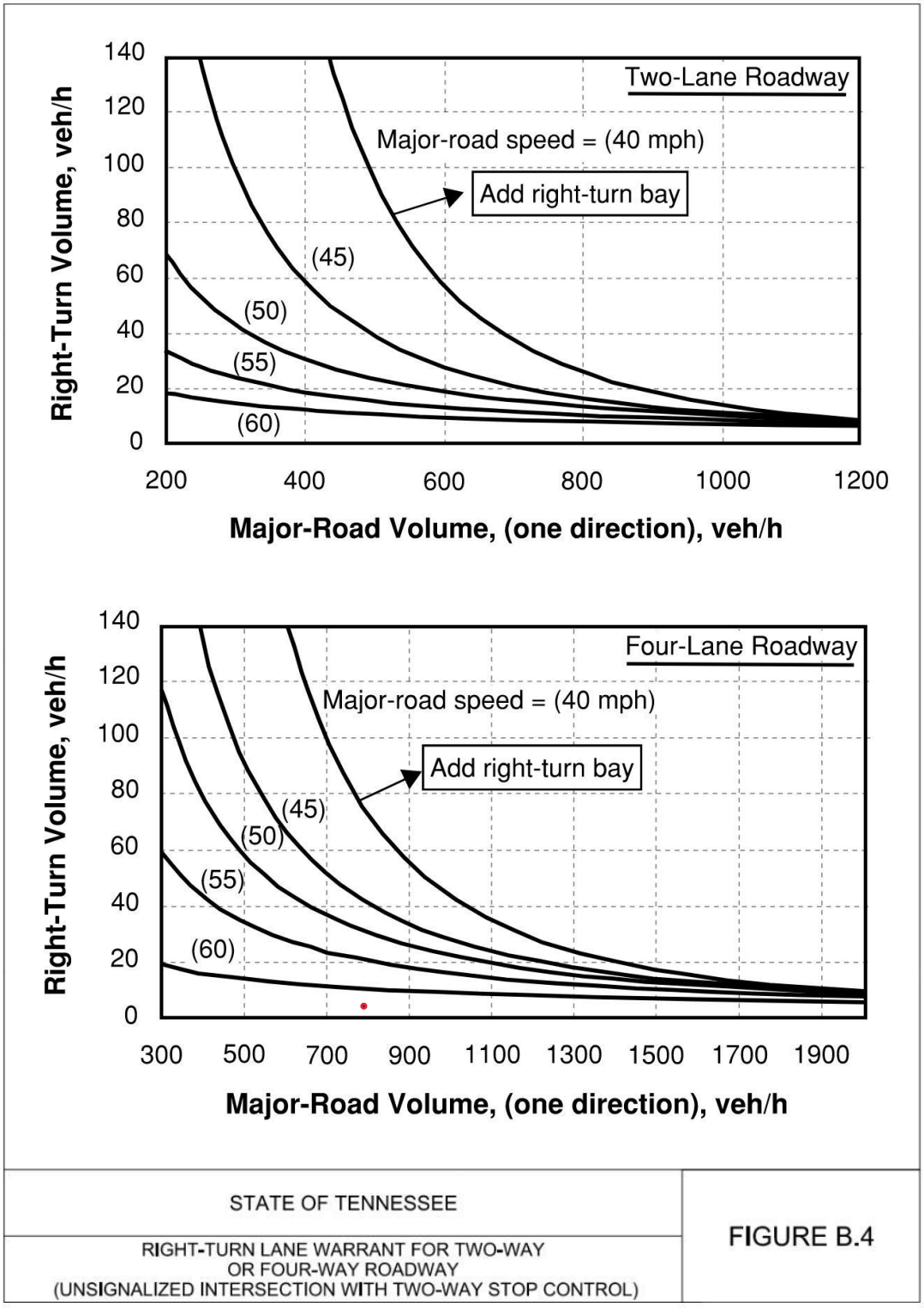


Figure B.4: Right-Turn Lane Warrant for Two-Way or Four-Way Roadway (Unsignalized Intersection with Two-Way Stop Control)

Right-Turn Volume: 3
Major Road Volume: 809

Concord Road at 2nd Drive
2026 Combined AM Peak
Right-Turn Warrant
Right-Turn Lane Warranted

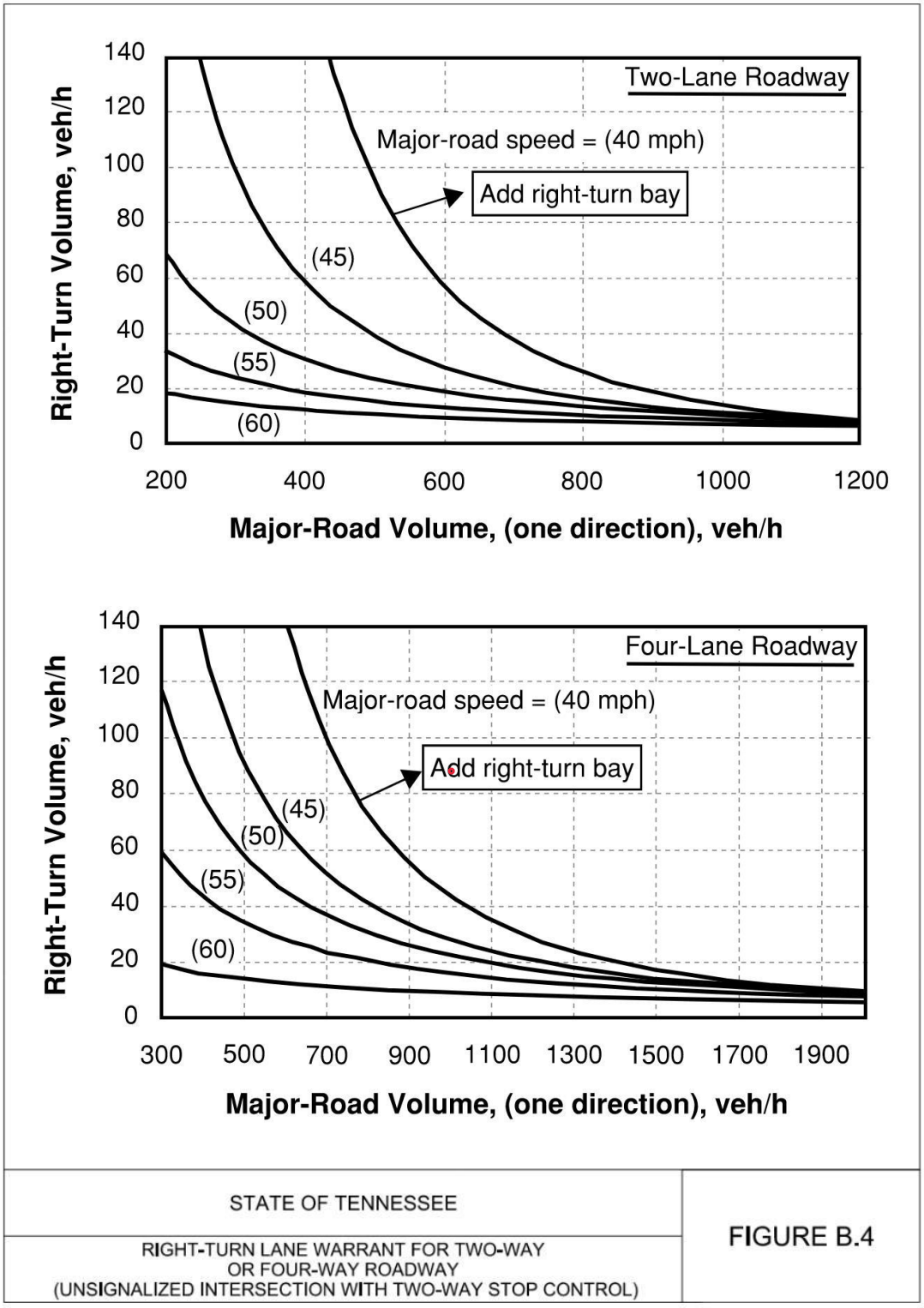


Figure B.4: Right-Turn Lane Warrant for Two-Way or Four-Way Roadway (Unsignalized Intersection with Two-Way Stop Control)

Right-Turn Volume: 92
Major Road Volume: 1017

Concord Road at 2nd Drive
2026 Combined PM Peak
Right-Turn Warrant
Right-Turn Lane NOT Warranted

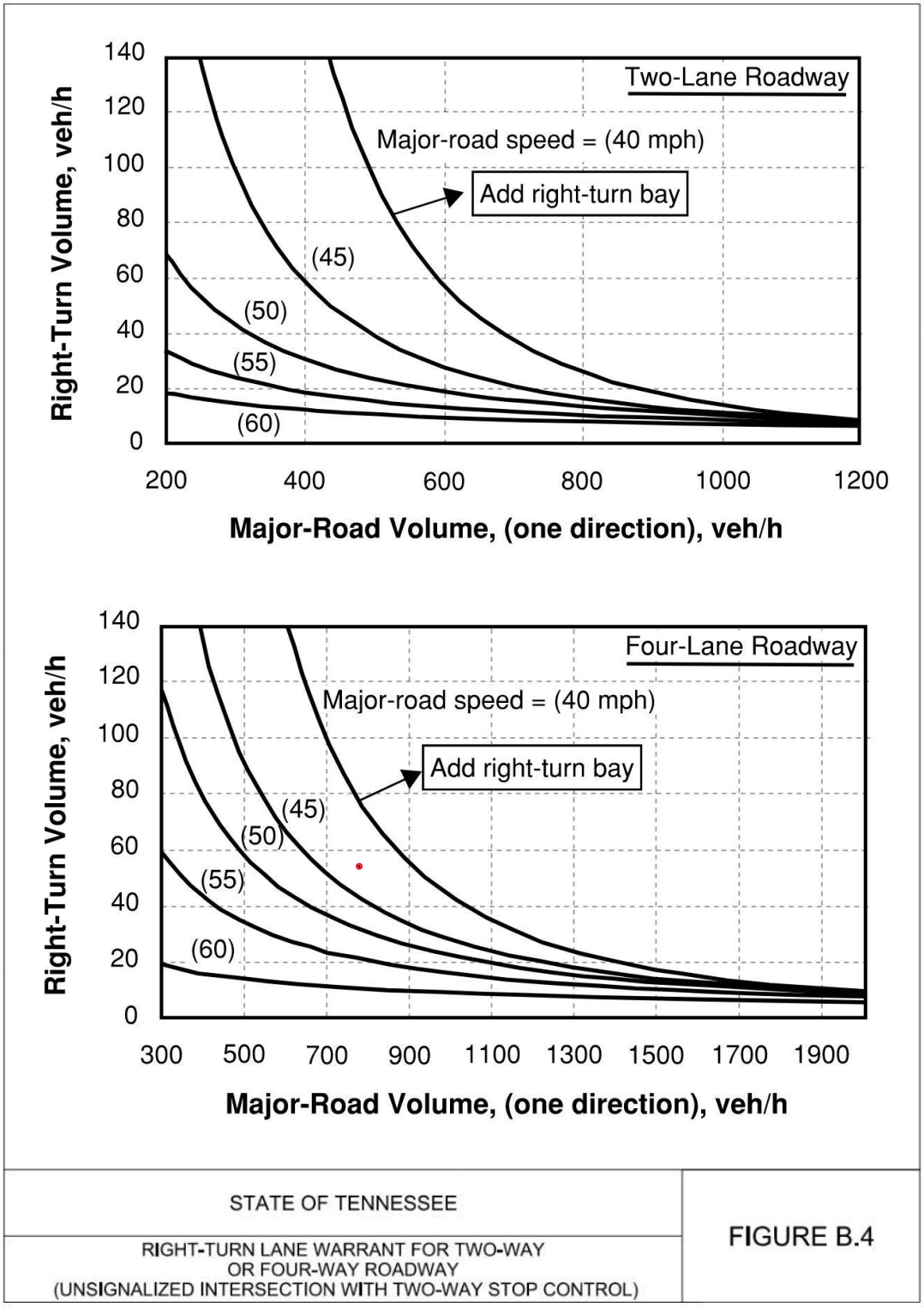


Figure B.4: Right-Turn Lane Warrant for Two-Way or Four-Way Roadway (Unsignalized Intersection with Two-Way Stop Control)

Right-Turn Volume: 55
Major Road Volume: 830

Concord Road at Site Driveway
2026 Combined AM Peak
Right-Turn Warrant
Right-Turn Lane Warranted

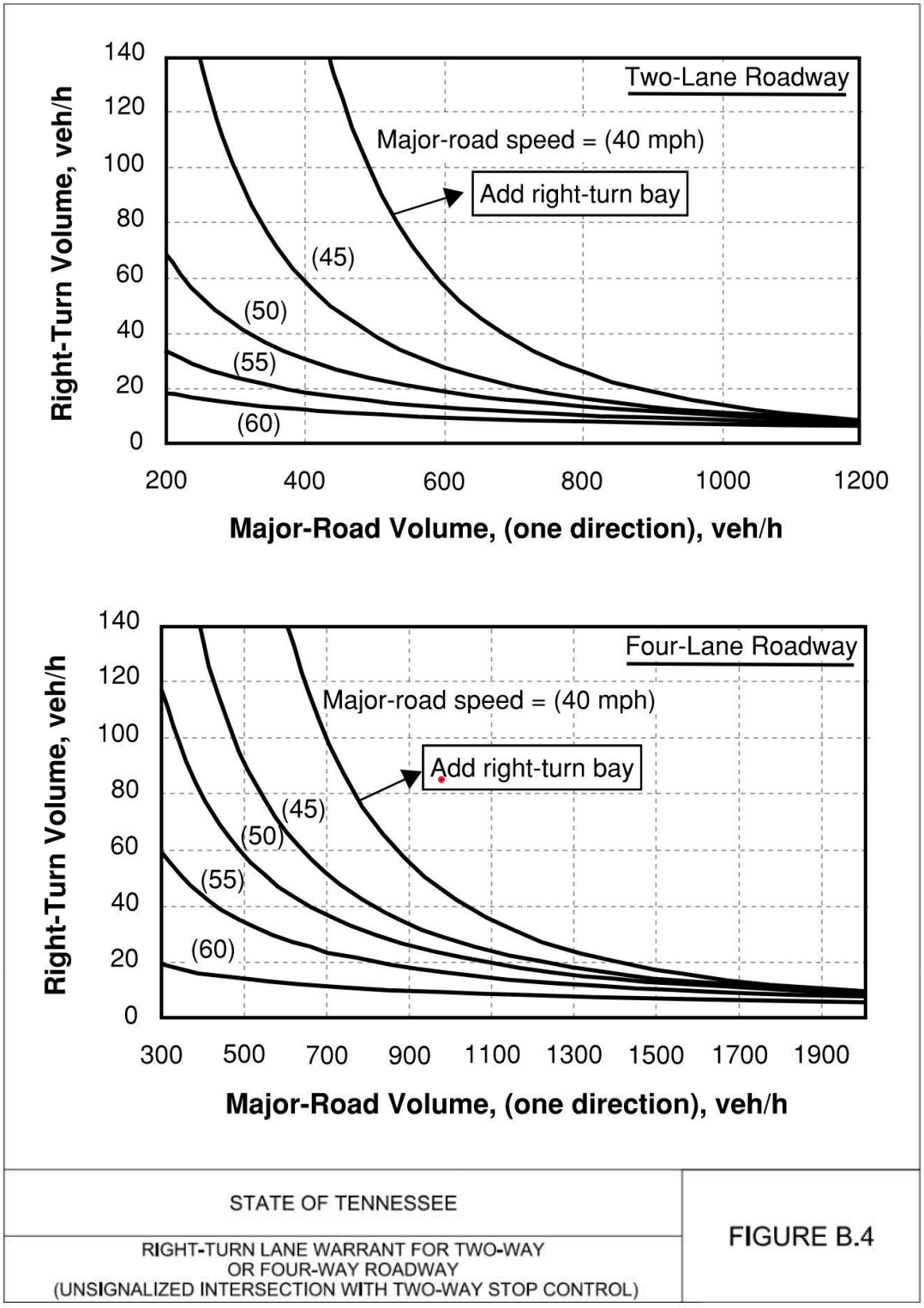


Figure B.4: Right-Turn Lane Warrant for Two-Way or Four-Way Roadway (Unsignalized Intersection with Two-Way Stop Control)

Right-Turn Volume: 85
Major Road Volume: 980

Concord Road at Site Driveway
2026 Combined PM Peak
Right-Turn Warrant
Right-Turn Lane NOT Warranted

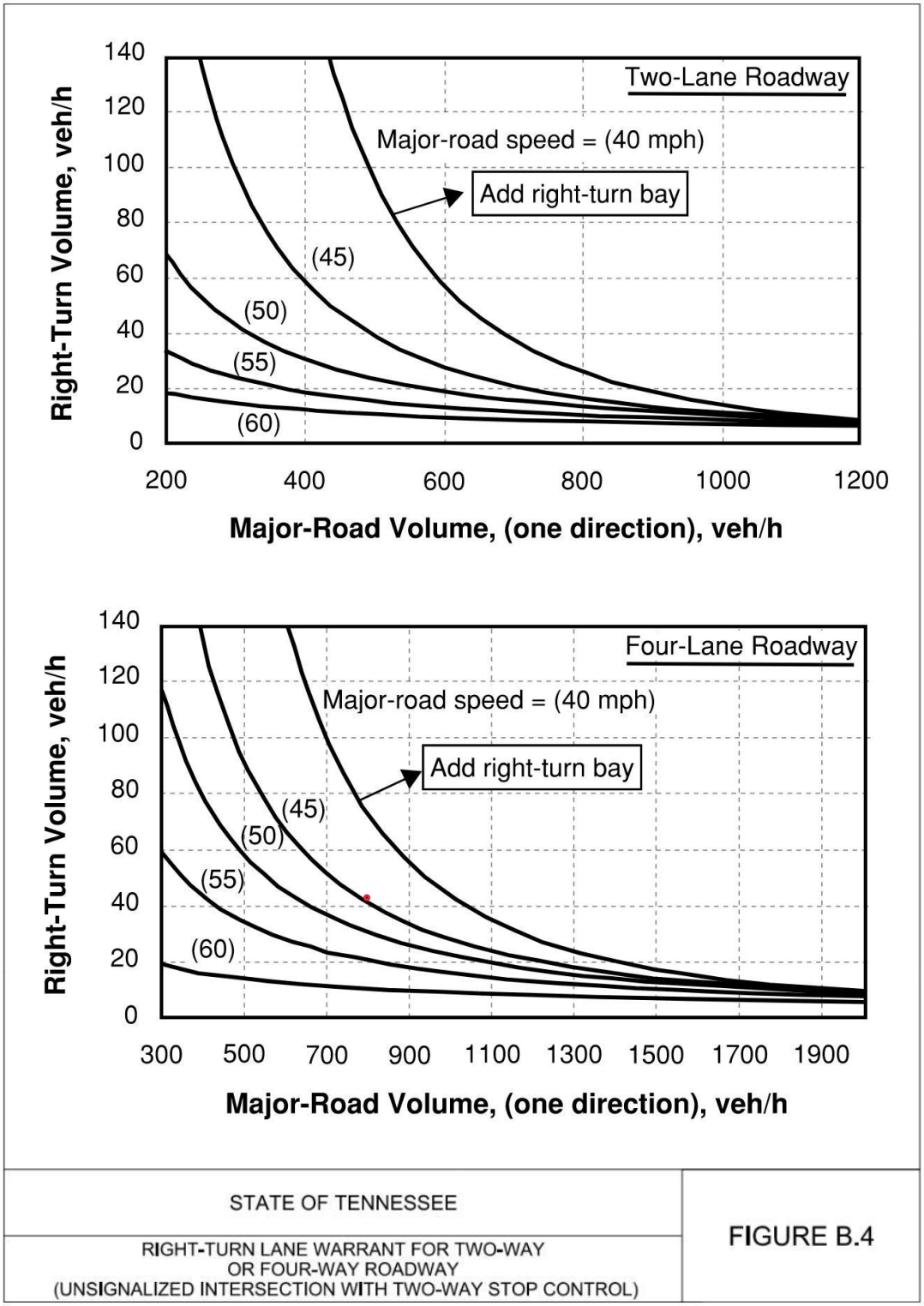


Figure B.4: Right-Turn Lane Warrant for Two-Way or Four-Way Roadway (Unsignalized Intersection with Two-Way Stop Control)

Right-Turn Volume: 41
Major Road Volume: 803

APPENDIX E – SIGNAL WARRANT EVALUATIONS

TRAFFIC SIGNAL WARRANT ANALYSIS - VOLUME WARRANTS

Intersection : Concord Road at 2nd Drive
City or County : Knox County
State : Tennessee
Date of Count: 2024 Existing
Day of Week of Count: Average Weekday

Are warranting volumes to be adjusted for speeds or built up area? . . . . . Yes
Adjustment factor for day of week and month of year of count 1.00
Number of Lanes: Major Street . . 2 Minor Street . . . 1

Time	Major Street Actual Volume			Major Street Adjusted Total Volum,	Minor Street Actual Volume –	Minor Street Adjusted Total Volum,
Beginning	App #1	App #2	Total			
6:00 am	0	0	0	0	0	0
7:00	773	290	1063	1063	7	7
8:00	747	432	1179	1179	4	4
9:00 am	0	0	0	0	0	0
10:00	0	0	0	0	0	0
11:00	0	0	0	0	0	0
12:00 noon	0	0	0	0	0	0
1:00	0	0	0	0	0	0
2:00	0	0	0	0	0	0
3:00 pm	0	0	0	0	0	0
4:00	641	850	1491	1491	6	6
5:00	752	958	1710	1710	8	8
6:00 pm	0	0	0	0	0	0
7:00	0	0	0	0	0	0
8:00	0	0	0	0	0	0

Note: , No adjustment made
– Where more than one minor approach exists use the higher approach volume
. Number of hours shown is the minimum meeting the MUTCD requirements. Additional hours outside of the count period may meet the MUTCD specified volume levels.

Warrant #1A (8 Hr. - Min. Vol.) Percent of Warrant		Warrant #1B (8 Hr. - Interruption) Percent of Warrant		Combination (Warrants 1A & 1B) Percent of Warrant		Warrant #2 (Four Hour Vols.)		Warrant #3 (Peak Hour Vols.)	
Major	Minor	Major	Minor	Major	Minor	Warrant Volume	Percent of Warrant	Warrant Volume	Percent of Warrant
0	0	0	0	0	0	0	*****	0	*****
253	7	169	13	211	8	60	12	100	7
281	4	187	8	234	5	60	7	80	5
0	0	0	0	0	0	0	*****	0	*****
0	0	0	0	0	0	0	*****	0	*****
0	0	0	0	0	0	0	*****	0	*****
0	0	0	0	0	0	0	*****	0	*****
0	0	0	0	0	0	0	*****	0	*****
0	0	0	0	0	0	0	*****	0	*****
0	0	0	0	0	0	0	*****	0	*****
355	6	237	11	296	7	60	10	80	8
407	8	271	15	339	10	60	13	80	10
0	0	0	0	0	0	0	*****	0	*****
0	0	0	0	0	0	0	*****	0	*****
0	0	0	0	0	0	0	*****	0	*****
Warranting Volumes 420	105	Warranting Volumes 630	53	Warranting Volumes 504	84	Warranting Volumes From MUTCD Fig. 4-8		Warranting Volumes From MUTCD Fig. 4-6	
Total Hours Meeting Warrant = 0 . Warrant Met No		Total Hours Meeting Warrant = 0 . Warrant Met No		Total Hours Meeting Warrant = 0 . Warrant Met No		Total Hours Meeting Warrant = 0 . Warrant Met No		Total Hours Meeting Warrant = 0 . Warrant Met No	

***** Major Street volume is so low that no Minor Street warrant exists

Comments: (include any information which may be useful to the reviewer)

Analysis Prepared by: CANNON AND CANNON, INC.
William Ring, E.I.
Date: 04/25/24
Time: 14:29

Developed by: T. Darcy Sullivan, P.E. VC/R1
Distributed by: Tennessee Transportation Assistance Program (TTAP)

TRAFFIC SIGNAL WARRANT ANALYSIS - VOLUME WARRANTS

Intersection : Concord Road at 2nd Drive
City or County : Knox County
State : Tennessee
Date of Count: 2026 Background
Day of Week of Count: Average Weekday

Are warranting volumes to be adjusted for speeds or built up area? . . . . . Yes
Adjustment factor for day of week and month of year of count 1.00
Number of Lanes: Major Street . . 2 Minor Street . . . 1

Time	Major Street Actual Volume			Major Street Adjusted Total Volum,	Minor Street Actual Volume –	Minor Street Adjusted Total Volum,
Beginning	App #1	App #2	Total			
6:00 am	0	0	0	0	0	0
7:00	828	311	1139	1139	7	7
8:00	800	463	1263	1263	4	4
9:00 am	0	0	0	0	0	0
10:00	0	0	0	0	0	0
11:00	0	0	0	0	0	0
12:00 noon	0	0	0	0	0	0
1:00	0	0	0	0	0	0
2:00	0	0	0	0	0	0
3:00 pm	0	0	0	0	0	0
4:00	687	911	1598	1598	6	6
5:00	806	1026	1832	1832	9	9
6:00 pm	0	0	0	0	0	0
7:00	0	0	0	0	0	0
8:00	0	0	0	0	0	0

Note: , No adjustment made
– Where more than one minor approach exists use the higher approach volume
. Number of hours shown is the minimum meeting the MUTCD requirements. Additional hours outside of the count period may meet the MUTCD specified volume levels.

Warrant #1A (8 Hr. - Min. Vol.) Percent of Warrant Major	Minor
0	0
271	7
301	4
0	0
0	0
0	0
0	0
0	0
0	0
0	0
380	6
436	9
0	0
0	0
0	0
Warranting Volumes 420	105
Total Hours Meeting Warrant = 0 .	
Warrant Met No	

Warrant #1B (8 Hr. - Interruption) Percent of Warrant Major	Minor
0	0
181	13
200	8
0	0
0	0
0	0
0	0
0	0
0	0
0	0
254	11
291	17
0	0
0	0
0	0
Warranting Volumes 630	53
Total Hours Meeting Warrant = 0 .	
Warrant Met No	

Combination (Warrants 1A & 1B) Percent of Warrant Major	Minor
0	0
226	8
251	5
0	0
0	0
0	0
0	0
0	0
0	0
0	0
317	7
363	11
0	0
0	0
0	0
Warranting Volumes 504	84
Total Hours Meeting Warrant = 0 .	
Warrant Met No	

Warrant #2 (Four Hour Vols.) Warrant Volume	Percent of Warrant
0	*****
60	12
60	7
0	*****
0	*****
0	*****
0	*****
0	*****
0	*****
60	10
60	15
0	*****
0	*****
0	*****
Warranting Volumes From MUTCD Fig. 4-8	
Total Hours Meeting Warrant = 0 .	
Warrant Met No	

Warrant #3 (Peak Hour Vols.) Warrant Volume	Percent of Warrant
0	*****
90	8
80	5
0	*****
0	*****
0	*****
0	*****
0	*****
0	*****
80	8
80	11
0	*****
0	*****
0	*****
Warranting Volumes From MUTCD Fig. 4-6	
Total Hours Meeting Warrant = 0 .	
Warrant Met No	

***** Major Street volume is so low that no Minor Street warrant exists

Comments: (include any information which may be useful to the reviewer)

Analysis Prepared by: CANNON AND CANNON, INC.
William Ring, E.I.
Date: 04/25/24
Time: 14:28

Developed by: T. Darcy Sullivan, P.E. VC/R1
Distributed by: Tennessee Transportation Assistance Program (TTAP)

TRAFFIC SIGNAL WARRANT ANALYSIS - VOLUME WARRANTS

Intersection : Concord Road at 2nd Drive
City or County : Knox County Date of Count: 2026 Combined
State : Tennessee Day of Week of Count: Average Weekday

Are warranting volumes to be adjusted for speeds or built up area? . . . . . Yes
Adjustment factor for day of week and month of year of count 1.00
Number of Lanes: Major Street . . 2 Minor Street . . . 1

Time	Major Street Actual Volume			Major Street Adjusted Total Volum,	Minor Street Actual Volume –	Minor Street Adjusted Total Volum,
Beginning	App #1	App #2	Total			
6:00 am	0	0	0	0	0	0
7:00	506	1017	1523	1523	150	150
8:00	0	0	0	0	0	0
9:00 am	0	0	0	0	0	0
10:00	0	0	0	0	0	0
11:00	0	0	0	0	0	0
12:00 noon	0	0	0	0	0	0
1:00	0	0	0	0	0	0
2:00	0	0	0	0	0	0
3:00 pm	0	0	0	0	0	0
4:00	0	0	0	0	0	0
5:00	0	0	0	0	0	0
6:00 pm	1063	830	1893	1893	139	139
7:00	0	0	0	0	0	0
8:00	0	0	0	0	0	0

Note: , No adjustment made
– Where more than one minor approach exists use the higher approach volume
. Number of hours shown is the minimum meeting the MUTCD requirements. Additional hours outside of the count period may meet the MUTCD specified volume levels.

Warrant #1A (8 Hr. - Min. Vol.) Percent of Warrant Major	Minor
0	0
363	143
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
451	132
0	0
0	0
Warranting Volumes 420	105
Total Hours Meeting Warrant = 2 .	
Warrant Met No	

Warrant #1B (8 Hr. - Interruption) Percent of Warrant Major	Minor
0	0
242	283
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
300	262
0	0
0	0
Warranting Volumes 630	53
Total Hours Meeting Warrant = 2 .	
Warrant Met No	

Combination (Warrants 1A & 1B) Percent of Warrant Major	Minor
0	0
302	179
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
376	165
0	0
0	0
Warranting Volumes 504	84
Total Hours Meeting Warrant = 2 .	
Warrant Met No	

Warrant #2 (Four Hour Vols.) Warrant Volume	Percent of Warrant
0	*****
60	250
0	*****
0	*****
0	*****
0	*****
0	*****
0	*****
0	*****
0	*****
0	*****
0	*****
60	232
0	*****
0	*****
Warranting Volumes From MUTCD Fig. 4-8	
Total Hours Meeting Warrant = 2 .	
Warrant Met No	

Warrant #3 (Peak Hour Vols.) Warrant Volume	Percent of Warrant
0	*****
80	188
0	*****
0	*****
0	*****
0	*****
0	*****
0	*****
0	*****
0	*****
0	*****
0	*****
80	174
0	*****
0	*****
Warranting Volumes From MUTCD Fig. 4-6	
Total Hours Meeting Warrant = 2 .	
Warrant Met Yes	

***** Major Street volume is so low that no Minor Street warrant exists

Comments: (include any information which may be useful to the reviewer)

Analysis Prepared by: CANNON AND CANNON, INC.
William Ring, E.I.
Date: 05/20/24
Time: 16:17

Developed by: T. Darcy Sullivan, P.E. VC/R1
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