

TWIN OAK LANDING SUBDIVISION

Traffic Impact Study

Twin Oak Lane

Knoxville, TN

A Traffic Impact Study for the Proposed Twin Oak Landing Subdivision

Submitted to

Knoxville – Knox County Planning Commission

Revised August 10, 2020
June 29, 2020
FMA Project No. 588.002.1

8-SA-20-C

8-B-20-UR

Submitted By:



TABLE OF CONTENTS

EXECUTIVE SUMMARY 3

1 INTRODUCTION 4

1.1 PROJECT DESCRIPTION 4

1.2 EXISTING SITE CONDITIONS 7

2 EXISTING TRAFFIC VOLUMES 8

3 BACKGROUND GROWTH..... 10

4 TRIP GENERATION AND TRIP DISTRIBUTION 12

TABLE 4-1 TRIP GENERATION SUMMARY

5 PROJECTED CAPACITY AND LEVEL OF SERVICE..... 17

TABLE 5-1 INTERSECTION ANALYSIS LEVEL OF SERVICE (LOS) SUMMARY

6 TURN LANE WARRANT ANALYSIS..... 18

7 CONCLUSIONS AND RECOMMENDATIONS 18

7.1 TAZEVELL PIKE (SR 131) @ TWIN OAK LANE 18

7.2 TWIN OAK LANE..... 19

FIGURES

1 LOCATION MAP 5

2 SITE PLAN..... 6

3 2020 EXISTING PEAK HOUR TRAFFIC..... 9

4 2023 BACKGROUND PEAK HOUR TRAFFIC 11

5 PEAK HOUR TRIP DISTRIBUTION 14

6 Twin Oak Landing Subdivision PEAK HOUR SITE TRIPS 15

7 2023 FULL BUILDOUT PEAK HOUR TRAFFIC..... 16

ATTACHMENTS

1 AERIAL PHOTO

2 TRAFFIC COUNTS

3 ADT TRENDS

4 TRIP GENERATION

5 INTERSECTION WORKSHEETS – EXISTING AM/PM PEAKS

6 INTERSECTION WORKSHEETS – BACKGROUND AM/PM PEAKS

7 INTERSECTION WORKSHEETS – SUBDIVISION FULL BUILDOUT AM/PM PEAKS

8 TURN LANE WARRANT ANALYSIS

Executive Summary

The Owner, Gary Hibben, proposes a residential development (i.e. Twin Oak Landing Subdivision) located on Tazewell Pike (SR 131) at Twin Oak Lane in Corryton, TN, Knox County. The development will consist of 107 single family homes. Construction is proposed to take place this year and this study assumes full build out for the development will occur in 2023.

The main driveway connection will be located at the existing intersection of Twin Oak Lane at Tazewell Pike (SR 131). The proposed driveway connection is a single lane for exiting traffic and a proposed northbound left turn lane on Tazewell Pike (SR 131). The concept plan shows a sidewalk along the internal subdivision roads, Twin Oak Lane and on the west side of Tazewell Pike (SR 131) for the length of the property line.

The following items are recommended in order to maintain or provide an acceptable level-of-service for each of the studied intersections.

Tazewell Pike (SR 131) @ Twin Oak Lane

After the full buildout of the Twin Oak Landing Subdivision the eastbound approach will operate at a LOS B during both the AM and PM peak hours and the northbound left turn will operate at a LOS A during both the AM and PM peak hours.

A northbound left turn lane is warranted at the intersection of Tazewell Pike (SR 131) at Twin Oak Lane after the completion of the subdivision. FMA recommends a 75 foot storage length, a 165 foot bay taper and a minimum 11 foot lane width. The detailed design of the turn lane should be coordinated with the Tennessee Department of Transportation (TDOT) and Knox County Engineering & Public Works.

Twin Oak Lane

The existing width of Twin Oak Lane between the intersection with Tazewell Pike (SR 131) and the proposed project entrance varies from approximately 11.5 feet to 14 feet. The minimum pavement width for a local street is 26 feet per the "Minimum Subdivision Regulations" for Knoxville and Knox County. FMA recommends that the pavement width on Twin Oak Lane be widened to a maximum of 26 feet. The widening of Twin Oak Lane should be coordinated with Knox County Engineering & Public Works.

1 Introduction

1.1 Project Description

This report provides a summary of a traffic impact study that was performed for the proposed Twin Oak Landing Subdivision on Twin Oak Lane. The project site is located west of Tazewell Pike (SR 131) on Twin Oak Lane in Corryton, TN in Knox County. The location of the site is shown in Figure 1.

The proposed Twin Oak Landing Subdivision will be within the Parent Responsibility Zone (PRZ) of Gibbs Elementary School, Gibbs Middle School and Gibbs High School. The PRZ is defined as those who live within one (1) mile from an elementary school or one and one-half (1 ½) miles from a middle school or high school by the shortest route, and are not eligible for transportation service.

The proposed Twin Oak Landing Subdivision will consist of 107 single family lots with the main driveway connection located at the existing intersection of Twin Oak Lane at Tazewell Pike (SR 131). Full buildout is expected to occur within three years, or by the year 2023.

The proposed driveway connection is a single lane for exiting traffic and a proposed northbound left turn lane on Tazewell Pike (SR 131). The concept plan shows a sidewalk along the internal subdivision roads, Twin Oak Lane and on the west side of Tazewell Pike (SR 131) for the length of the property line. The proposed site layout is shown in Figure 2.

The purpose of this study is to evaluate the impacts to the traffic conditions caused by the development of the proposed Twin Oak Landing Subdivision.

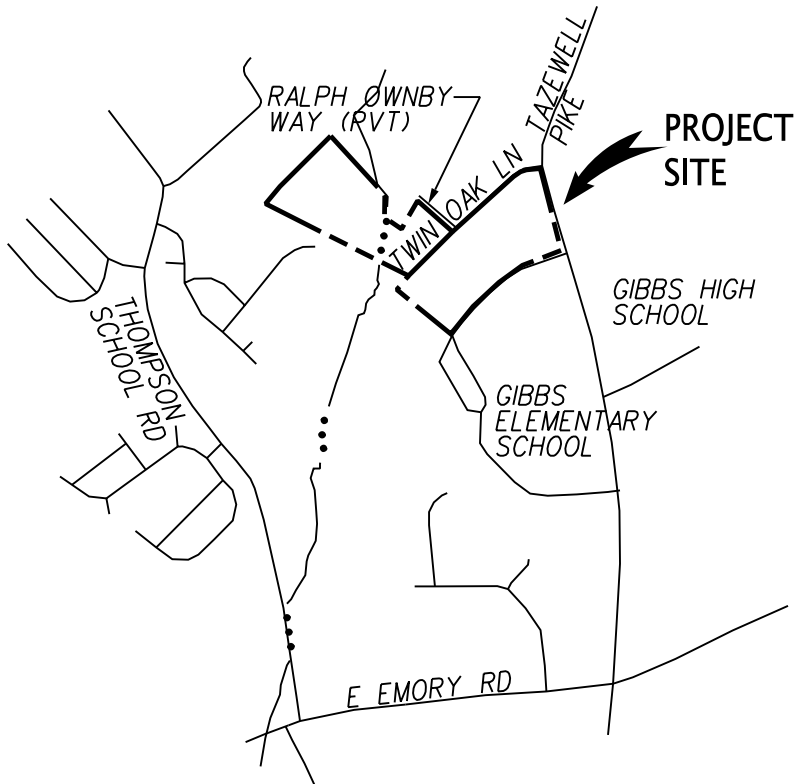


Figure 1: Location Map

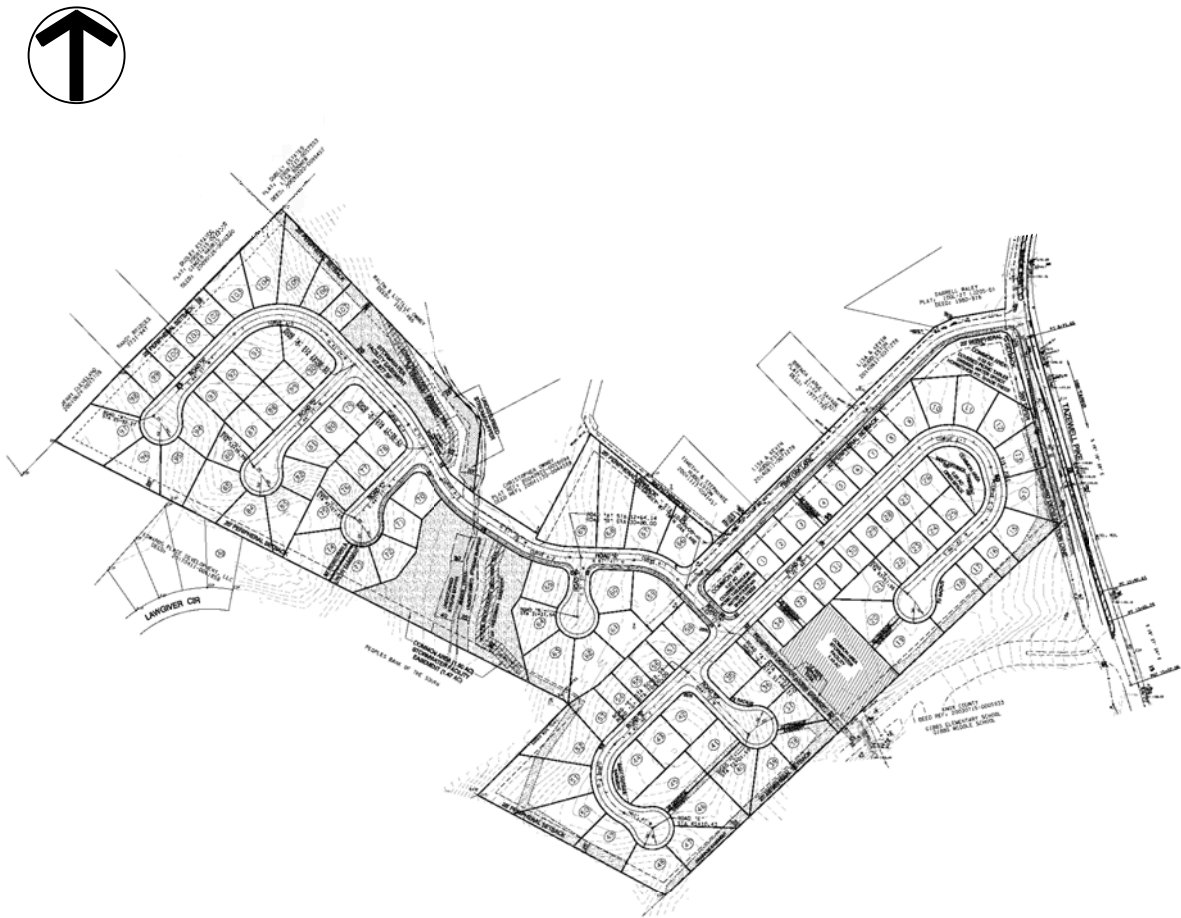


Figure 2: Site Plan

1.2 Existing Site Conditions

Twin Oak Lane is a two-lane road with an approximate width between 11.5 feet to 14 feet. Knoxville-Knox County Planning does not classify Twin Oak Lane; therefore it is considered a local street. There is no posted speed limit on Twin Oak Lane. Twin Oak Lane is a dead end street with an approximate length of 1,575 feet.

Tazewell Pike (SR 131) is a two-lane road at the intersection with Twin Oak Lane. Knoxville-Knox County Planning classifies Tazewell Pike (SR 131) as a Minor Arterial per the Major Road Plan with an 88 foot right-of-way. The posted speed limit on Tazewell Pike (SR 131) is 45 mph.

Along Tazewell Pike (SR 131) there are existing sidewalks on the west side of the road in front of Gibbs Elementary School that begin approximately 1,200 feet south of the intersection with Twin Oak Lane and continue south through the intersection at E Emory Road. There are no existing sidewalks on Twin Oak Lane.

An aerial photo of the existing intersection is included in Attachment 1.

2 Existing Traffic Volumes

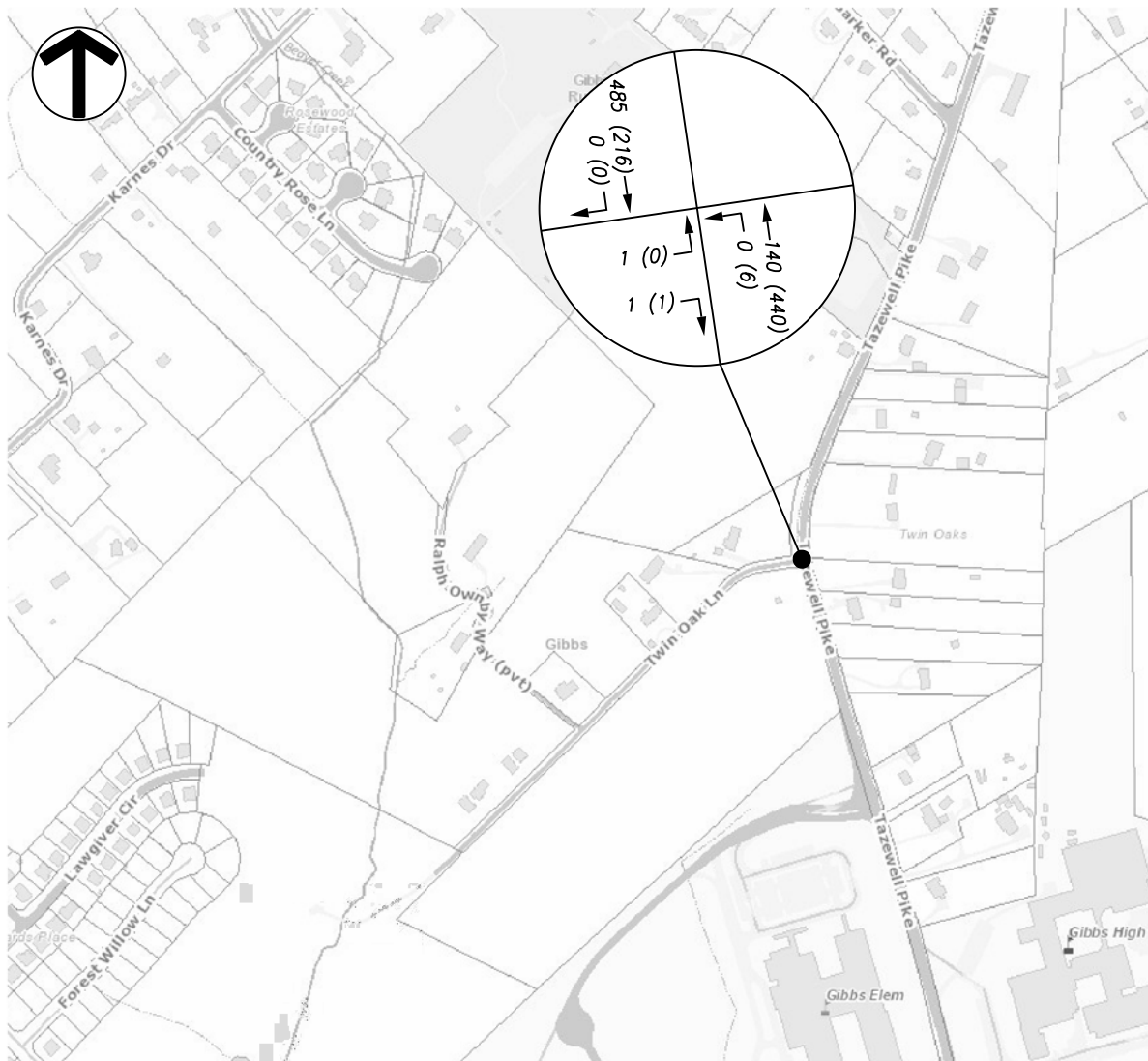
Due to the altered traffic patterns from COVID-19 FMA did not collect any new turning movement counts for the Twin Oak Landing Subdivision traffic impact study. A worksheet was included in Attachment 2 outlining the step-by-step calculations and assumptions that were used in determining the traffic counts at the intersection of Tazewell Pike (SR 131) at Twin Oak Lane.

FMA conducted a six-hour turning movement count at the intersection of Tazewell Pike (SR 131) and Twin Oak Lane on Wednesday March 22, 2017. The AM peak hour occurred between 7:00 am and 8:00 am and the PM peak hour occurred between 5:00 pm and 6:00 pm. The count data collected is included in Attachment 2.

In order to calculate existing traffic conditions entering/exiting Twin Oak Lane FMA estimated a growth rate from the 2017 count to the projected existing 2020 traffic conditions. The growth rate was determined by analyzing nearby traffic counts provided by the Tennessee Department of Transportation (TDOT) in the vicinity of the proposed development. For the purpose of this study, an annual growth rate of 2% was assumed. The ADT trend line growth charts are included in Attachment 3.

In addition to the 2017 turning movement count a more recent traffic count was conducted on February 4, 2020 at the intersection of Tazewell Pike (SR 131) and the Gibbs Elementary School driveway. FMA used the more recent count data to determine the northbound and southbound thru movement at the existing intersection of Tazewell Pike (SR 131) at Twin Oak Lane. The AM peak hour occurred between 7:00 a.m. and 8:00 a.m. with an AM peak hour volume of 135 vehicles traveling northbound and 482 vehicles traveling southbound. The PM peak hour occurred between 5:00 p.m. and 6:00 p.m. with a PM peak hour volume of 440 vehicles travelling northbound and 216 vehicles traveling southbound. The Gibbs Elementary turning movement count is included in Attachment 2.

Figure 3 shows the existing volumes for the year 2020 at the intersection of Tazewell Pike (SR 131) at Twin Oak Lane.



LEGEND:

← 5 (16)

TURNING MOVEMENT VOLUME AM (PM)

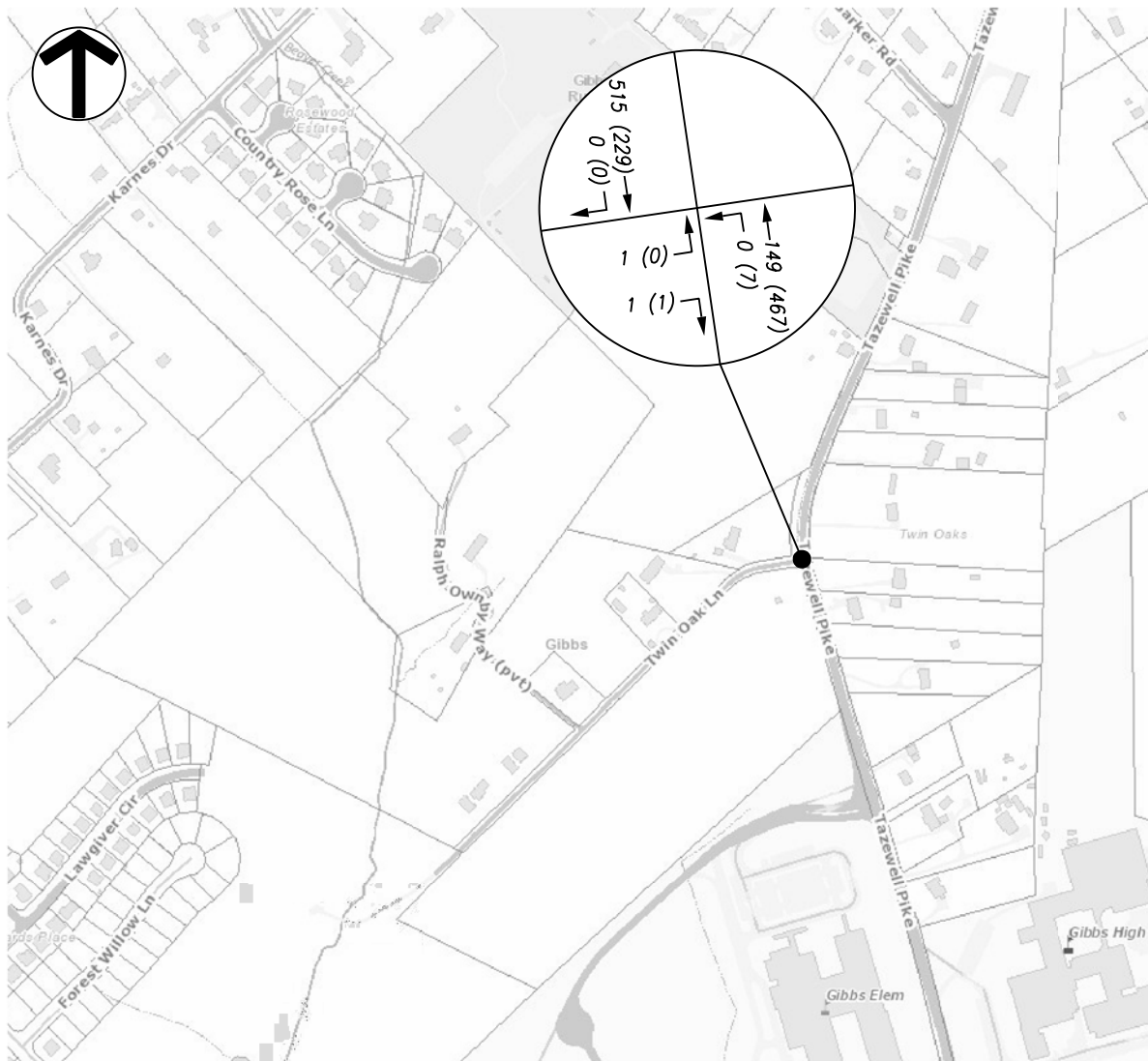
Figure 3: 2020 Existing Peak Hour Traffic

3 Background Growth

The Tennessee Department of Transportation (TDOT) maintains a count station in the vicinity of the proposed development. TDOT count station ID: 000006 is located on Tazewell Pike (SR 131) north of Harbison Cross Roads and south of Twin Oak Lane. The annual growth rate for this station is approximately 0.64% and the 2018 ADT was 8,153 vehicles per day.

For the purpose of this study, an annual growth rate of 2.0% was assumed for the intersection of Tazewell Pike (SR 131) at Twin Oak Lane until full occupancy is reached in 2023. Attachment 3 shows the trend line growth charts for the TDOT count station.

Figure 4 demonstrates the projected background peak hour volumes at the intersection of Tazewell Pike (SR 131) at Twin Oak Lane after applying the background growth rate to the existing conditions.



LEGEND:

← 5 (16)

TURNING MOVEMENT VOLUME AM (PM)

Figure 4: 2023 Background Peak Hour Traffic

4 Trip Generation and Trip Distribution

The Twin Oak Landing Subdivision proposes 107 single family lots. Single-Family Detached Housing or Land Use 210 was used to calculate site trips for the subdivision using the fitted curve equations from the *Trip Generation, 10th Edition*, published by the Institute of Transportation Engineers. The land use worksheets are included in Attachment 4.

The total trips generated by the full buildout of the Twin Oak Landing Subdivision was estimated to be 1,107 daily trips. The estimated trips are 81 trips during the AM peak hour and 108 trips during the PM peak hour. A trip generation summary is shown in Table 4-1.

**Table 4-1
Twin Oak Landing Subdivision
Trip Generation Summary**

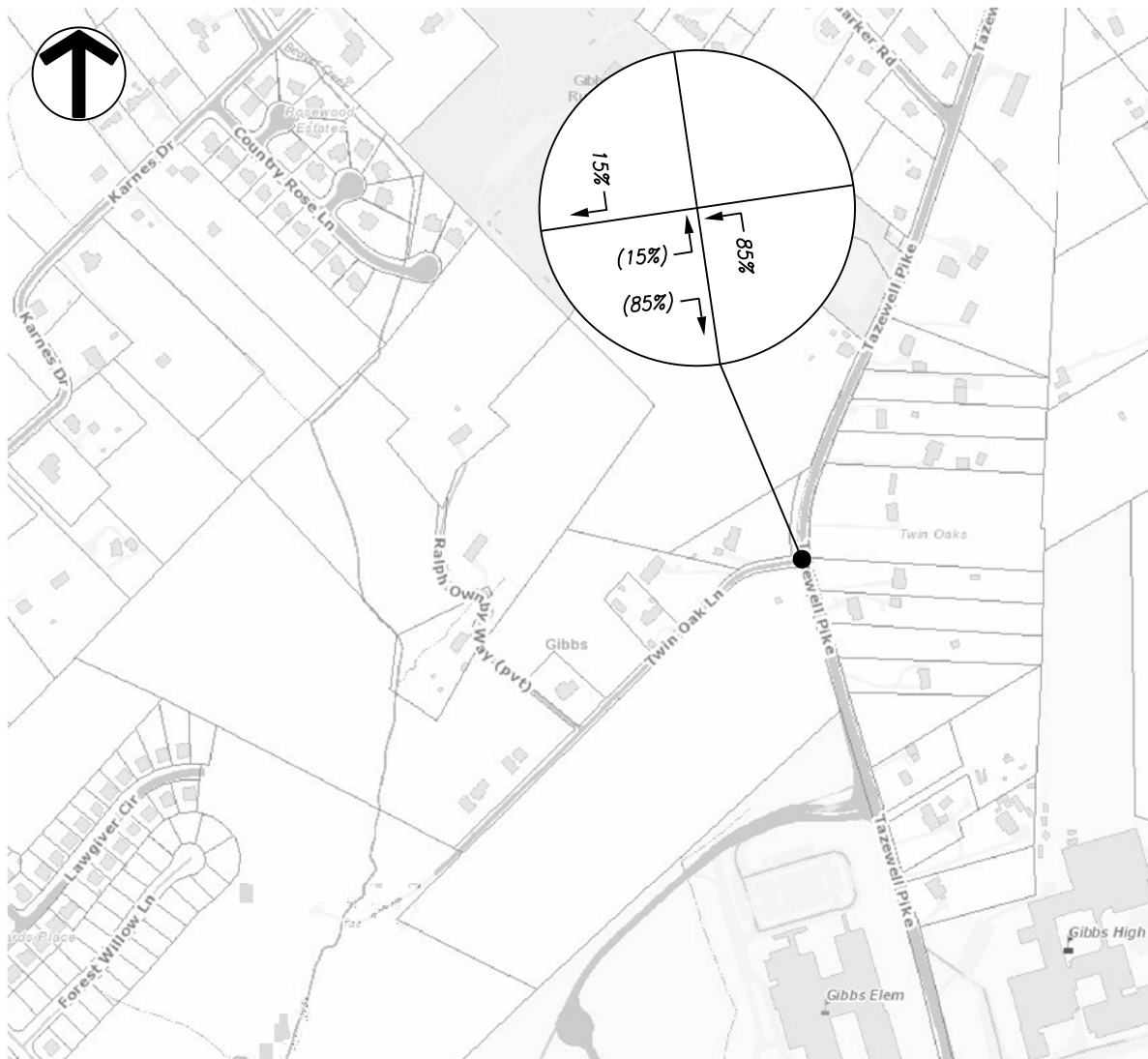
Land Use	Density	Daily Trips	AM Peak Hour		PM Peak Hour	
			Enter	Exit	Enter	Exit
Single-Family Detached Housing (Land Use 210)	107 lots	1107	20	61	68	40

The directional distribution of the traffic generated by the proposed Twin Oak Landing Subdivision was determined using the traffic data collected for the existing conditions. The typical weekday traffic pattern is for traffic to flow heavier in one direction in the morning peak period and then for the traffic to be heavier in the opposite direction during the evening peak period. Tazewell Pike (SR 131) at the intersection with Twin Oak Lane has an existing trip distribution of 20% northbound and 80% southbound during the AM peak hour and 65% northbound and 35% southbound during the PM peak hour.

Because of the low number of existing trips on Twin Oak Lane a trip distribution at the intersection of Twin Oak Lane and Tazewell Pike (SR 131) was assumed for both the AM and PM peak hour of 85% entering northbound traffic and 15% entering southbound traffic and 85% exiting Southbound traffic and 15% exiting northbound traffic. The trip distribution for the Twin Oak Landing Subdivision is shown in Figure 5.

**Twin Oak Landing Subdivision
Traffic Impact Study
August 10, 2020**

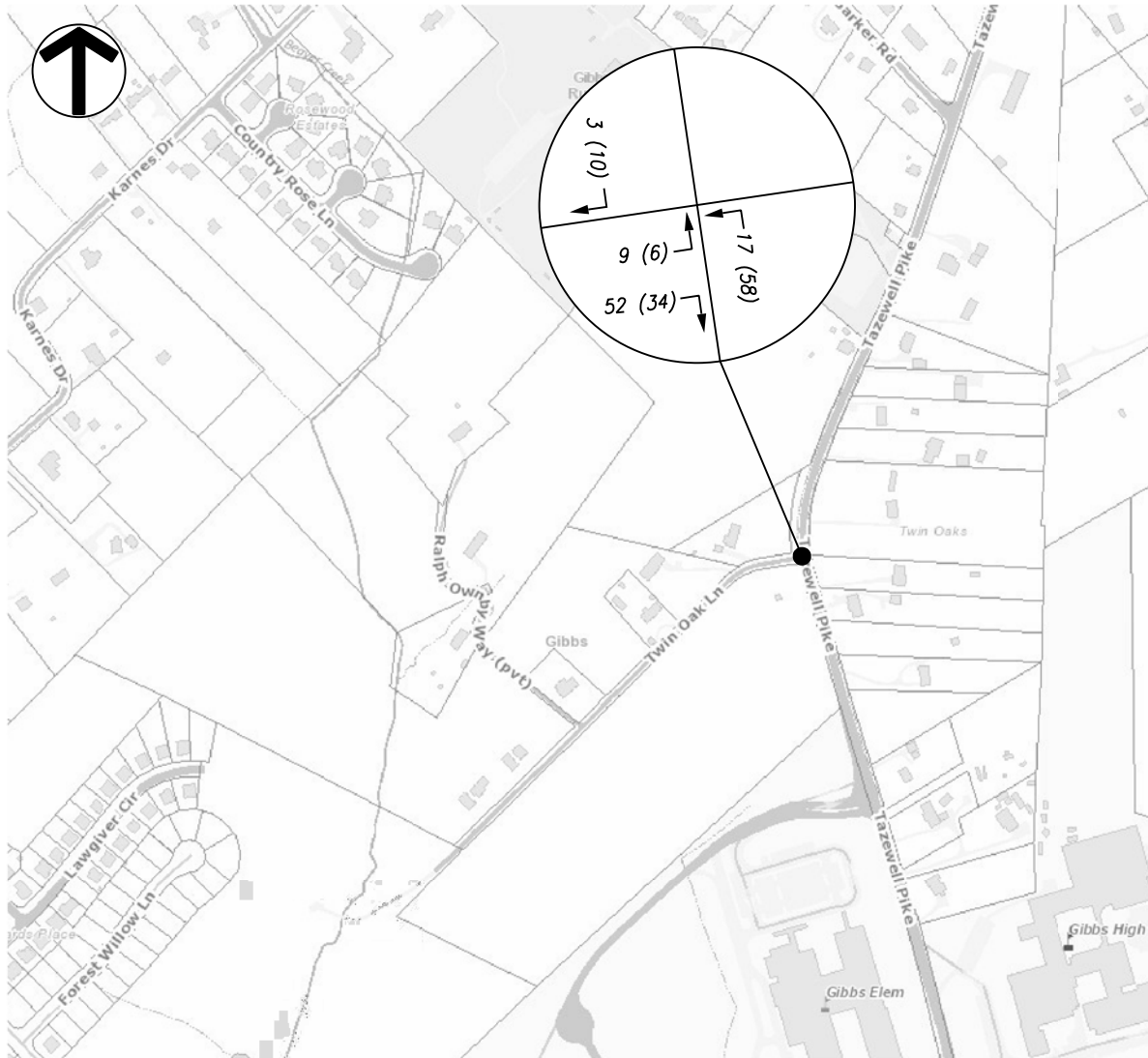
Figure 6 shows the peak hour site trips generated by the Twin Oak Landing Subdivision and Figure 7 shows the projected full buildout peak hour traffic after the completion of the Twin Oak Landing Subdivision.



LEGEND:

← 50% (50%) TRIP DISTRIBUTION ENTERING (EXITING)

Figure 5: Peak Hour Trip Distribution

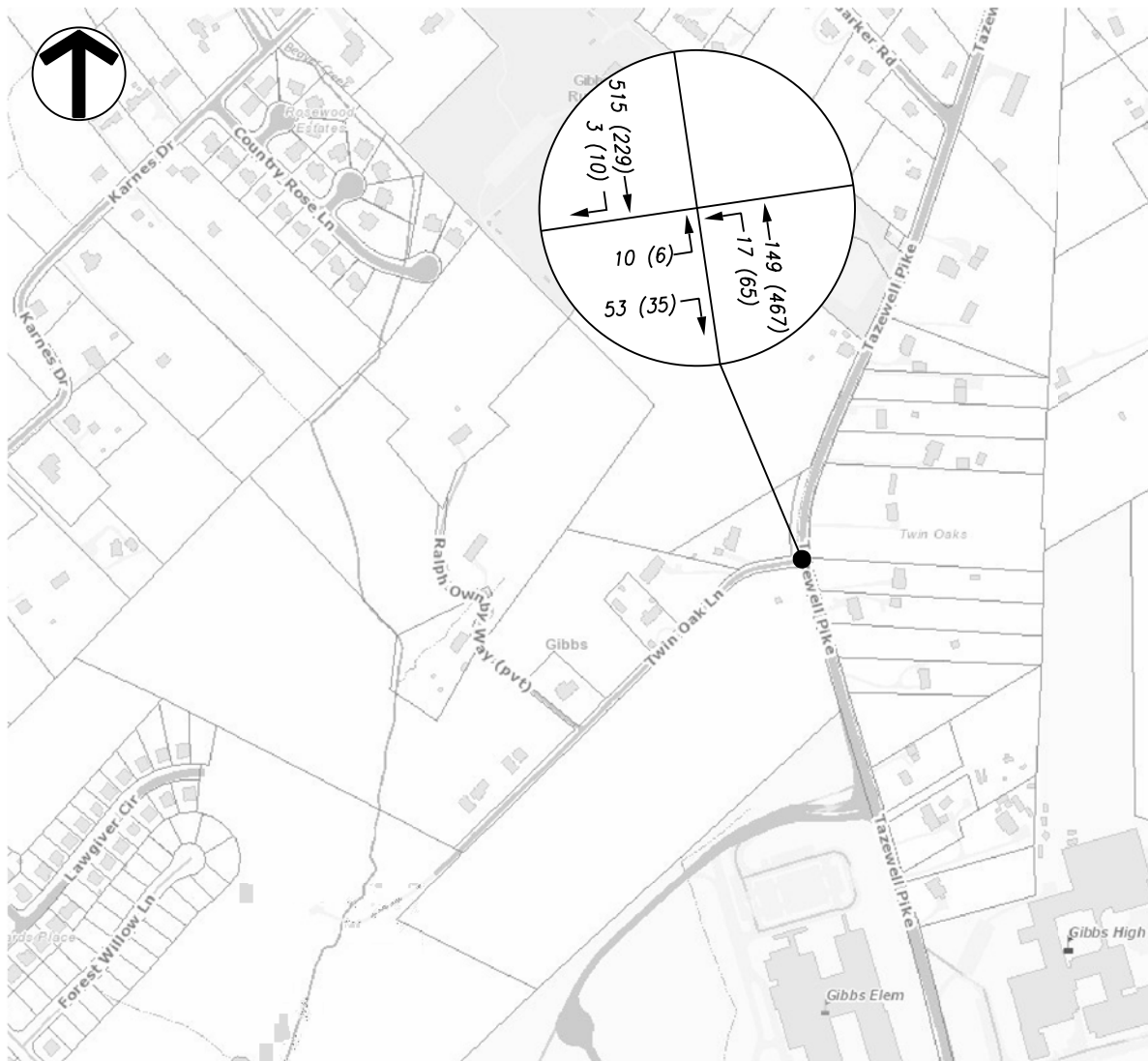


LEGEND:

← 5 (16)

TURNING MOVEMENT VOLUME AM (PM)

Figure 6: Twin Oak Landing Subdivision Peak Hour Site Trips



LEGEND:

← 5 (16)

TURNING MOVEMENT VOLUME AM (PM)

Figure 7: 2023 Full Buildout Peak Hour Traffic

5 Projected Capacity and Level of Service

The existing intersection of Tazewell Pike (SR 131) at Twin Oak Lane is a two-way stop controlled intersection.

Unsignalized intersection capacity analyses were performed for the AM and PM peak hours to evaluate the existing, background and full buildout traffic conditions at the intersection of Tazewell Pike (SR 131) and Twin Oak Lane. The existing, background and full buildout HCS7 worksheets are included in attachments 5, 6 and 7.

The results from the analyses are expressed with a term “level of service” (LOS), which is based on the amount of delay experienced at the intersection. The LOS index ranges from LOS A, indicating excellent traffic conditions with minimal delay, to LOS F indicating very congested conditions with excessive delay. LOS D generally is considered the minimum acceptable condition in urban areas. Table 5-1 shows the results of the capacity analyses.

**Table 5-1
Intersection Analysis
Level of Service (LOS Summary)**

Delay (sec)/LOS		
Tazewell Pike (SR 131) @ Twin Oak Lane (Existing 2020)		
AM Peak	EB Approach	12.6 / B
	NB Left Turn	8.5 / A
PM Peak	EB Approach	9.5 / A
	NB Left Turn	7.7 / A
Tazewell Pike (SR 131) @ Twin Oak Lane (Background 2023)		
AM Peak	EB Approach	13.0 / B
	NB Left Turn	8.6 / A
PM Peak	EB Approach	9.6 / A
	NB Left Turn	7.8 / A
Tazewell Pike (SR 131) @ Twin Oak Lane (Full Buildout 2023)		
AM Peak	EB Approach	13.5 / B
	NB Left Turn	8.6 / A
PM Peak	EB Approach	11.3 / B
	NB Left Turn	7.9 / A

6 Turn Lane Warrant Analysis

The intersection of Tazewell Pike (SR 131) and Twin Oak Lane was evaluated to determine if a northbound left turn lane or a southbound right turn on Tazewell Pike (SR 131) is warranted. The Knox County Department of Engineering and Public Works handbook, "Access Control and Driveway Design Policy," was used to analyze the information.

At the intersection of Tazewell Pike (SR 131) and Twin Oak Lane a southbound right turn lane on Tazewell Pike (SR 131) is not warranted and a northbound left turn lane on Tazewell Pike (SR 131) is warranted during the PM peak after the full buildout of the Twin Oak Landing Subdivision. The turn lane warrant worksheets and analysis are included in Attachment 7.

7 Conclusions and Recommendations

7.1 Tazewell Pike (SR 131) @ Twin Oak Lane

The existing, background and full buildout conditions at the two-way stop controlled intersection of Tazewell Pike (SR 131) at Twin Oak Lane were analyzed using the Highway Capacity Software (HCS7).

Both the existing and background traffic conditions for the eastbound approach operate at a LOS B during the AM peak hour and a LOS A during the PM Peak hour and the northbound left turn operates at a LOS A during both the AM and PM peak hours.

After the full buildout of the Twin Oak Landing Subdivision the eastbound approach will operate at a LOS B during both the AM and PM peak hours and the northbound left turn will operate at a LOS A during both the AM and PM peak hours.

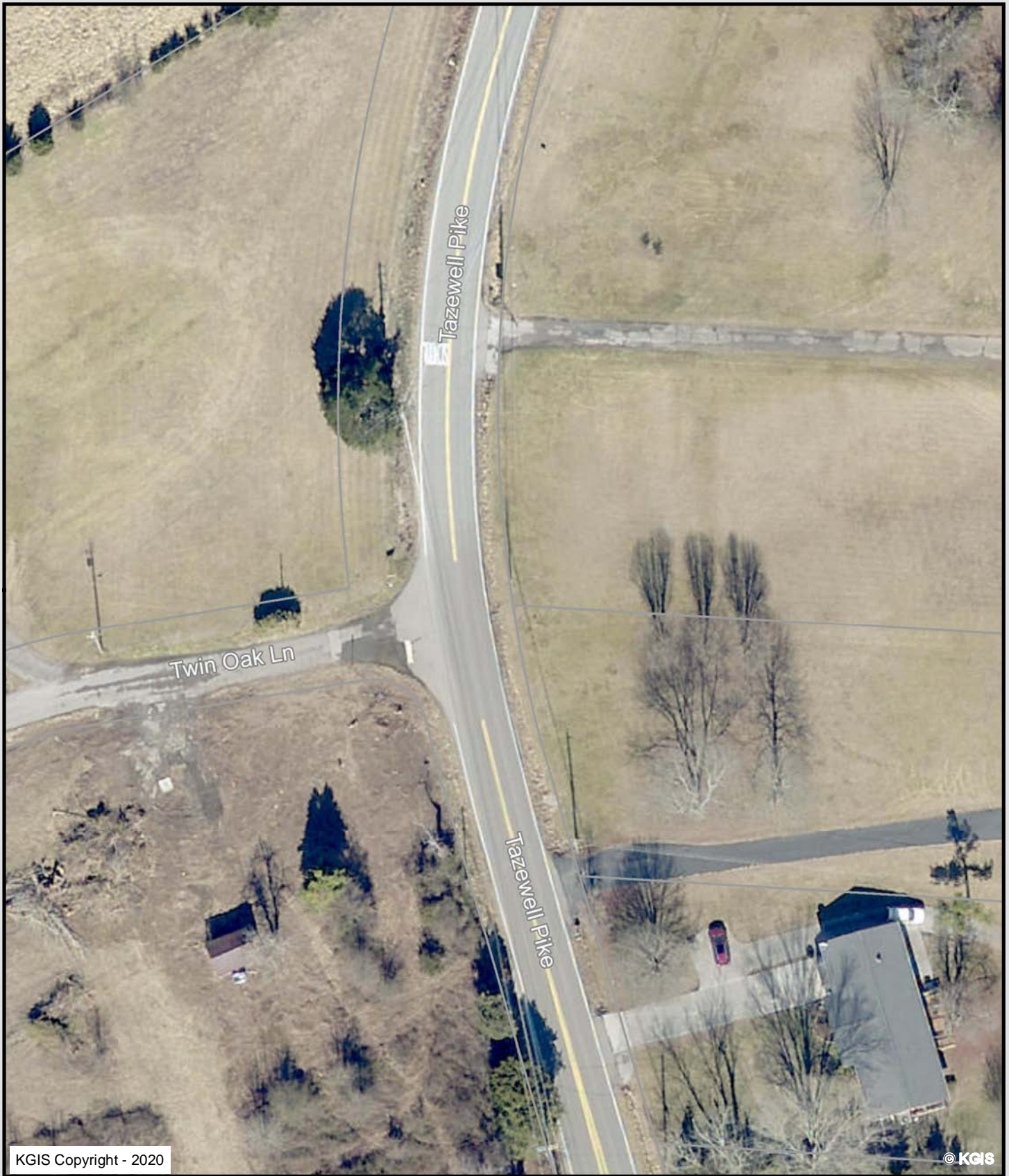
A northbound left turn lane is warranted at the intersection of Tazewell Pike (SR 131) at Twin Oak Lane after the completion of the subdivision. FMA recommends a 75 foot storage length, a 165 foot bay taper and a minimum 11 foot lane width. The detailed design of the turn lane should be coordinated with the Tennessee Department of Transportation (TDOT) and Knox County Engineering & Public Works.

A southbound right turn lane is not warranted at the intersection of Tazewell Pike (SR 131) at Twin Oak Lane after the completion of the subdivision.

7.2 Twin Oak Lane

The existing width of Twin Oak Lane between the intersection with Tazewell Pike (SR 131) and the proposed project entrance varies from approximately 11.5 feet to 14 feet. The minimum pavement width for a local street is 26 feet per the “Minimum Subdivision Regulations” for Knoxville and Knox County. FMA recommends that the pavement width on Twin Oak Lane be widened to a maximum of 26 feet. The widening of Twin Oak Lane should be coordinated with Knox County Engineering & Public Works.

Attachment 1
Aerial Photo

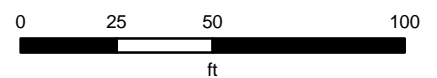


Twin Oak Lane

Knoxville - Knox County - KUB Geographic Information System



Printed: 6/26/2020 at 4:25:45 PM



KGIS makes no representation or warranty as to the accuracy of his map and its information nor to its fitness for use. Any user of this map product accepts the same AS IS ,WITH ALL FAULTS, and assumes all responsibility for the use thereof, and futher covenants and agrees to hold KGIS harmless from any and all damage, loss, or liability arising from any use of this map product.

Attachment 2

Traffic Counts

Project: Twin Oak Landing Subdivision

Intersection: Tazewell Pike at Twin Oak Lane

Date Conducted: 03/22/2017

	Tazewell Pike Northbound			Tazewell Pike Southbound			Twin Oak Lane Eastbound			
Start	Left	Thru	Total	Thru	Right	Total	Left	Right	Total	Int. Total
7:00 AM	0	26	26	118	0	118	0	0	0	144
7:15 AM	0	27	27	119	0	119	0	1	1	147
7:30 AM	0	62	62	151	0	151	1	0	1	214
7:45 AM	0	58	58	196	0	196	0	0	0	254
Total	0	173	173	584	0	584	1	1	2	759
8:00 AM	0	45	45	88	0	88	0	0	0	133
8:15 AM	0	46	46	97	0	97	0	0	0	143
8:30 AM	0	28	28	81	0	81	0	0	0	109
8:45 AM	0	30	30	64	0	64	0	1	1	95
Total	0	149	149	330	0	330	0	1	1	480
2:00 PM	0	58	58	52	0	52	0	0	0	110
2:15 PM	0	54	54	60	0	60	0	1	1	115
2:30 PM	1	50	51	65	0	65	0	0	0	116
2:45 PM	0	79	79	45	0	45	0	0	0	124
Total	1	241	242	222	0	222	0	1	1	465
3:00 PM	1	88	89	44	0	44	0	0	0	133
3:15 PM	0	89	89	48	0	48	0	0	0	137
3:30 PM	0	165	165	50	0	50	0	0	0	215
3:45 PM	0	99	99	53	0	53	0	0	0	152
Total	1	441	442	195	0	195	0	0	0	637
4:00 PM	1	103	104	52	0	52	0	1	1	157
4:15 PM	0	85	85	50	0	50	0	0	0	135
4:30 PM	1	84	85	52	0	52	0	0	0	137
4:45 PM	1	116	117	56	0	56	0	1	1	174
Total	3	388	391	210	0	210	0	2	2	603
5:00 PM	0	110	110	40	0	40	0	1	1	151
5:15 PM	2	91	93	54	0	54	0	0	0	147
5:30 PM	1	119	120	67	0	67	0	0	0	187
5:45 PM	3	114	117	65	0	65	0	0	0	182
Total	6	434	440	226	0	226	0	1	1	667
Grand Total	11	1826	1837	1767	0	1767	1	6	7	3611
Approach %	0.6	99.4		100.0	0.0		14.3	85.7		
Total %	0.3	50.6	50.9	48.9	0.0	48.9	0.0	0.2	0.2	

Project: Twin Oak Landing Subdivision
Intersection: Tazewell Pike at Twin Oak Lane
Date Conducted: 3/22/2017

AM Peak Hour	7:00 AM - 8:00 AM	759
PM Peak Hour	5:00 PM - 6:00 PM	667

	Tazewell Pike Northbound			Tazewell Pike Southbound			Twin Oak Lane Eastbound			
Start	Left	Thru	Total	Thru	Right	Total	Left	Right	Total	Int. Total
Peak Hour Analysis from 7:00 AM to 9:00 AM										
AM Peak Hour begins at 7:30 AM										
7:00 AM	0	26	26	118	0	118	0	0	0	144
7:15 AM	0	27	27	119	0	119	0	1	1	147
7:30 AM	0	62	62	151	0	151	1	0	1	214
7:45 AM	0	58	58	196	0	196	0	0	0	254
Total Volume	0	173	173	584	0	584	1	1	2	759
Future (2% over 3 yrs)	0	184		620	0		1	1		805
Future (2% over 6 yrs)	0	195		658	0		1	1		855
PHF	-	0.70		0.74	-		0.25	0.25		0.75
Peak Hour Analysis from 3:00 PM to 6:00 PM										
PM Peak Hour begins at 5:00 PM										
5:00 PM	0	110	110	40	0	40	0	1	1	151
5:15 PM	2	91	93	54	0	54	0	0	0	147
5:30 PM	1	119	120	67	0	67	0	0	0	187
5:45 PM	3	114	117	65	0	65	0	0	0	182
Total Volume	6	434	440	226	0	226	0	1	1	667
Future (2% over 3 yrs)	6	461		240	0		0	1		708
Future (2% over 6 yrs)	7	489		255	0		0	1		751
PHF	0.50	0.91		0.84	-		-	0.25		0.89

Location: SR 131/Tazewell Pike & Gibbs Elementary School Dwy
City: Corryton

Day: Tuesday
Date: 02/04/2020

Groups Printed - Cars, PU, Vans - Heavy Trucks

	SR 131/Tazewell Pike Northbound						SR 131/Tazewell Pike Southbound						Gibbs Elementary School Dwy Eastbound						Gibbs Elementary School Dwy Westbound								
Start Time	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Left	Thru	Rgt	Uturn	Peds	App. Total	Int. Total		
7:00 AM	75	7	0	0	0	82	0	93	24	0	0	117	6	0	84	0	0	90	0	0	0	0	0	0	289		
7:15 AM	103	15	0	0	0	118	0	85	63	0	0	148	6	0	120	0	0	126	0	0	0	0	0	0	392		
7:30 AM	106	23	0	0	0	129	0	70	70	0	0	140	29	0	124	1	0	154	0	0	0	0	0	0	423		
7:45 AM	25	39	0	0	0	64	0	69	11	0	0	80	15	0	57	0	0	72	0	0	0	0	0	0	216		
Total	309	84	0	0	0	393	0	317	168	0	0	485	56	0	385	1	0	442	0	0	0	0	0	0	1320		
8:00 AM	16	27	0	0	0	43	0	83	14	0	0	97	6	0	41	0	0	47	0	0	0	0	0	0	187		
8:15 AM	9	37	0	0	0	46	0	84	8	0	0	92	6	0	10	0	0	16	0	0	0	0	0	0	154		
8:30 AM	2	28	0	0	0	30	0	60	2	0	0	62	2	0	2	0	0	4	0	0	0	0	0	0	96		
8:45 AM	4	14	0	0	0	18	0	61	0	0	0	61	0	0	1	0	0	1	0	0	0	0	0	0	80		
Total	31	106	0	0	0	137	0	288	24	0	0	312	14	0	54	0	0	68	0	0	0	0	0	0	517		
BREAK																											
2:00 PM	40	52	0	0	0	92	0	42	5	0	0	47	2	0	12	0	0	14	0	0	0	0	0	0	153		
2:15 PM	33	49	0	0	0	82	0	51	5	0	0	56	1	0	6	0	0	7	0	0	0	0	0	0	145		
2:30 PM	19	54	0	0	0	73	0	38	4	0	0	42	2	0	12	0	0	14	0	0	0	0	0	0	129		
2:45 PM	42	59	0	0	0	101	0	43	21	0	0	64	10	0	87	1	0	98	0	0	0	0	0	0	263		
Total	134	214	0	0	0	348	0	174	35	0	0	209	15	0	117	1	0	133	0	0	0	0	0	0	690		
3:00 PM	27	66	0	0	0	93	0	39	13	0	0	52	16	0	84	0	0	100	0	0	0	0	0	0	245		
3:15 PM	10	54	0	1	0	65	0	44	1	0	0	45	5	0	38	0	0	43	0	0	0	0	0	0	153		
3:30 PM	52	142	0	0	0	194	0	49	7	0	0	56	12	0	47	0	1	59	0	0	0	0	0	0	309		
3:45 PM	12	111	0	0	0	123	0	43	2	0	0	45	11	0	28	0	0	39	0	0	0	0	0	0	207		
Total	101	373	0	1	0	475	0	175	23	0	0	198	44	0	197	0	1	241	0	0	0	0	0	0	914		
4:00 PM	12	80	0	0	0	92	0	52	2	0	0	54	1	0	13	0	0	14	0	0	0	0	0	0	160		
4:15 PM	24	93	0	0	0	117	0	51	4	0	0	55	5	0	10	0	0	15	0	0	0	0	0	0	187		
4:30 PM	14	87	0	0	0	101	0	47	2	0	0	49	2	0	11	0	0	13	0	0	0	0	0	0	163		
4:45 PM	21	92	0	0	0	113	0	45	7	0	0	52	1	0	11	0	0	12	0	0	0	0	0	0	177		
Total	71	352	0	0	0	423	0	195	15	0	0	210	9	0	45	0	0	54	0	0	0	0	0	0	687		
5:00 PM	39	83	0	0	0	122	0	42	7	0	0	49	3	0	10	0	0	13	0	0	0	0	0	0	184		
5:15 PM	31	128	0	0	0	159	0	53	7	0	0	60	3	0	19	0	0	22	0	0	0	0	0	0	241		
5:30 PM	42	111	0	0	0	153	0	41	7	0	0	48	5	0	38	0	0	43	0	0	0	0	0	0	244		
5:45 PM	23	101	0	0	0	124	0	51	8	0	0	59	6	0	38	0	0	44	0	0	0	0	0	0	227		
Total	135	423	0	0	0	558	0	187	29	0	0	216	17	0	105	0	0	122	0	0	0	0	0	0	896		
Grand Total	781	1552	0	1	0	2334	0	1336	294	0	0	1630	155	0	903	2	1	1060	0	0	0	0	0	0	5024		
Apprch %	33.5	66.5	0.0	0.0	0.0		0.0	82.0	18.0	0.0	0.0		14.6	0.0	85.2	0.2	0.1		0.0	0.0	0.0	0.0	0.0	0.0			
Total %	15.5	30.9	0.0	0.0	0.0	46.5	0.0	26.6	5.9	0.0	0.0	32.4	3.1	0.0	18.0	0.0	0.0	21.1	0.0	0.0	0.0	0.0	0.0	0.0			
Cars, PU, Vans	732	1534	0	0		2266	0	1314	292	0		1606	150	0	853	2		1005	0	0	0	0	0	0	4877		
% Cars, PU, Vans	93.7	98.8	0.0	0.0		97.1	0.0	98.4	99.3	0.0		98.5	16.8	0.0	94.5	100.0		94.8	0.0	0.0	0.0	0.0	0.0	0.0	97.1		
Heavy Trucks	49	18	0	1		68	0	22	2	0		24	5	0	50	0		55	0	0	0	0	0	0	147		
%Heavy Trucks	6.3	1.2	0.0	100.0		2.9	0.0	1.6	0.7	0.0		1.5	3.2	0.0	5.5	0.0		5.2	0.0	0.0	0.0	0.0	0.0	0.0	2.9		

Location: SR 131/Tazewell Pike & Gibbs Elementary School I
City: Corryton

PEAK HOURS

Day: Tuesday
Date: 02/04/2020

AM

RW	SR 131/Tazewell Pike Northbound					SR 131/Tazewell Pike Southbound					Gibbs Elementary School Dwy Eastbound					Gibbs Elementary School Dwy Westbound					Int. Total
	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	
Peak Hour Analysis from 07:00 AM to 09:00 AM																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
7:00 AM	75	7	0	0	82	0	93	24	0	117	6	0	84	0	90	0	0	0	0	0	289
7:15 AM	103	15	0	0	118	0	85	63	0	148	6	0	120	0	126	0	0	0	0	0	392
7:30 AM	106	23	0	0	129	0	70	70	0	140	29	0	124	1	154	0	0	0	0	0	423
7:45 AM	25	39	0	0	64	0	69	11	0	80	15	0	57	0	72	0	0	0	0	0	216
Total Volume	309	84	0	0	393	0	317	168	0	485	56	0	385	1	442	0	0	0	0	0	1320
% App. Total	78.6	21.4	0.0	0.0	100	0.0	65.4	34.6	0.0	100	12.7	0.0	87.1	0.2	100	0.0	0.0	0.0	0.0	0.0	0
PHF	0.762					0.819					0.718										0.780
Cars, PU, Vans	294	82	0	0	376	0	315	167	0	482	53	0	372	1	426	0	0	0	0	0	1284
% Cars, PU, Vans	95.1	97.6	0.0	0.0	95.7	0.0	99.4	99.4	0.0	99.4	94.6	0.0	96.6	100.0	96.4	0.0	0.0	0.0	0.0	0.0	97.3
Heavy Trucks	15	2	0	0	17	0	2	1	0	3	3	0	13	0	16	0	0	0	0	0	36
% Heavy Trucks	4.9	2.4	0.0	0.0	4.3	0.0	0.6	0.6	0.0	0.6	5.4	0.0	3.4	0.0	3.6	0.0	0.0	0.0	0.0	0.0	2.7

PM

	SR 131/Tazewell Pike Northbound					SR 131/Tazewell Pike Southbound					Gibbs Elementary School Dwy Eastbound					Gibbs Elementary School Dwy Westbound					
Start Time	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Int. Total
Peak Hour Analysis from 02:00 PM to 06:00 PM																					
Peak Hour for Entire Intersection Begins at 02:45 PM																					
2:45 PM	42	59	0	0	101	0	43	21	0	64	10	0	87	1	98	0	0	0	0	0	263
3:00 PM	27	66	0	0	93	0	39	13	0	52	16	0	84	0	100	0	0	0	0	0	245
3:15 PM	10	54	0	1	65	0	44	1	0	45	5	0	38	0	43	0	0	0	0	0	153
3:30 PM	52	142	0	0	194	0	49	7	0	56	12	0	47	0	59	0	0	0	0	0	309
Total Volume	131	321	0	1	453	0	175	42	0	217	43	0	256	1	300	0	0	0	0	0	970
% App. Total	28.9	70.9	0.0	0.2	100	0.0	80.6	19.4	0.0	100	14.3	0.0	85.3	0.3	100	0.0	0.0	0.0	0.0	0.0	
PHF	0.584					0.848					0.750										0.785
Cars, PU, Vans	113	316	0	0	429	0	167	42	0	209	43	0	242	1	286	0	0	0	0	0	924
% Cars, PU, Vans	86.3	98.4	0.0	0.0	94.7	0.0	95.4	100.0	0.0	96.3	100.0	0.0	94.5	100.0	95.3	0.0	0.0	0.0	0.0	0.0	95.3
Heavy Trucks	18	5	0	1	24	0	8	0	0	8	0	0	14	0	14	0	0	0	0	0	46
% Heavy Trucks	13.7	1.6	0.0	100.0	5.3	0.0	4.6	0.0	0.0	3.7	0.0	0.0	5.5	0.0	4.7	0.0	0.0	0.0	0.0	0.0	4.7

Detailed Calculations for Determining Count Data due to COVID-19

Project: Twin Oak Landing Subdivision

Date Conducted: 07/23/2020

Intersection: Tazewell Pike at Twin Oak Lane

Original Turning Movement Count Date: March 22, 2017

Assumed a 2% Growth Rate for Traffic Entering / Exiting Twin Oak Lane

(reference Attachment 3 ADT trend line growth charts)

Projected Turning Movement Count for Twin Oak Lane for 2020 Existing Peak Hour Traffic

Start	Tazewell Pike Northbound		Tazewell Pike Southbound		Twin Oak Lane Eastbound	
	Left	Thru	Thru	Right	Left	Right
AM Peak Hour						
Existing AM Peak - March 2017	0	-	-	0	1	1
Existing AM Peak - 2020 (2% over 3 yrs)	0	-	-	0	1	1
PM Peak Hour						
Existing PM Peak - March 2017	6	-	-	0	0	1
Existing PM Peak - 2020 (2% over 3 yrs)	6	-	-	0	0	1

Figure 3: 2020 Existing Peak Hour Traffic - Includes the Twin Oak Lane Eastbound Left and Right Turns, Tazewell Pike Northbound Left Turns and Southbound Right Turns

Intersection: Tazewell Pike at Gibbs Elementary School Driveway

Original Turning Movement Count Date: February 4, 2020

Start	Tazewell Pike Northbound		Tazewell Pike Southbound		Elementary Driveway Eastbound	
	Left	Thru	Thru	Right	Left	Right
AM Peak Hour						
Existing AM Peak - February 2020	-	84	317	168	56	-
PM Peak Hour						
Existing PM Peak - February 2020	-	423	187	29	17	-

Calculated the Northbound and Southbound Thru Movements

(Count Data provided by Knox County Engineering and included in Attachment 2)

Northbound Thru Movement = NB Thru + EB Left

AM Peak (7:00 a.m. to 8:00 a.m.) = 84 veh + 56 veh = 140 veh

PM Peak (5:00 p.m. to 6:00 p.m.) = 423 veh + 17 veh = 440 veh

Southbound Thru Movement = SB Thru + SB Right

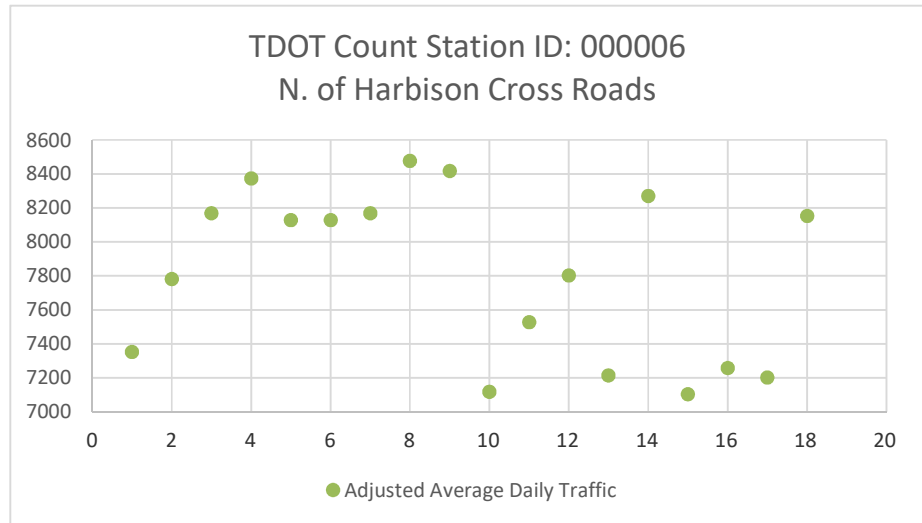
AM Peak (7:00 a.m. to 8:00 a.m.) = 317 veh + 168 veh = 485 veh

PM Peak (5:00 p.m. to 6:00 p.m.) = 187 veh + 29 veh = 216 veh

Figure 3: 2020 Existing Peak Hour Traffic - Includes the Tazewell Pike Northbound and Southbound Thru Movements

Attachment 3 ADT Trends

	Year	Adjusted Average Daily Traffic
1	2001	7353
2	2002	7781
3	2003	8169
4	2004	8373
5	2005	8129
6	2006	8129
7	2007	8169
8	2008	8477
9	2009	8417
10	2010	7117
11	2011	7527
12	2012	7802
13	2013	7215
14	2014	8271
15	2015	7103
16	2016	7258
17	2017	7202
18	2018	8153



Most Recent Trend Line Growth

Year	ADT
2001	7353
2018	8153

Annual Percent Growth	0.64%
------------------------------	--------------

Attachment 4

Trip Generation

Project: Twin Oak Landing Subdivision

Date Conducted: 6/25/2020

Single-Family Detached Housing (LUC 210)

107 Single Family Lots

Average Daily Traffic

$$\ln(T) = 0.92\ln(X) + 2.71$$

$$\ln(T) = 0.92\ln(107) + 2.71$$

$$T = 1107$$

Peak Hour of Adjacent Street Traffic

One Hour Between 7 and 9 a.m.

$$T = 0.71(X) + 4.80$$

$$T = 0.71(107) + 4.80$$

$$T = 81$$

Peak Hour of Adjacent Street Traffic

One Hour Between 4 and 6 p.m.

$$\ln(T) = 0.96\ln(X) + 0.20$$

$$\ln(T) = 0.96\ln(107) + 0.20$$

$$T = 108$$

Time Period	Total Trips	Percent		Number	
		Enter	Exit	Enter	Exit
Weekday (24 hours)	1107	50%	50%	554	554
AM Peak Hour	81	25%	75%	20	61
PM Peak Hour	108	63%	37%	68	40

Single-Family Detached Housing (210)

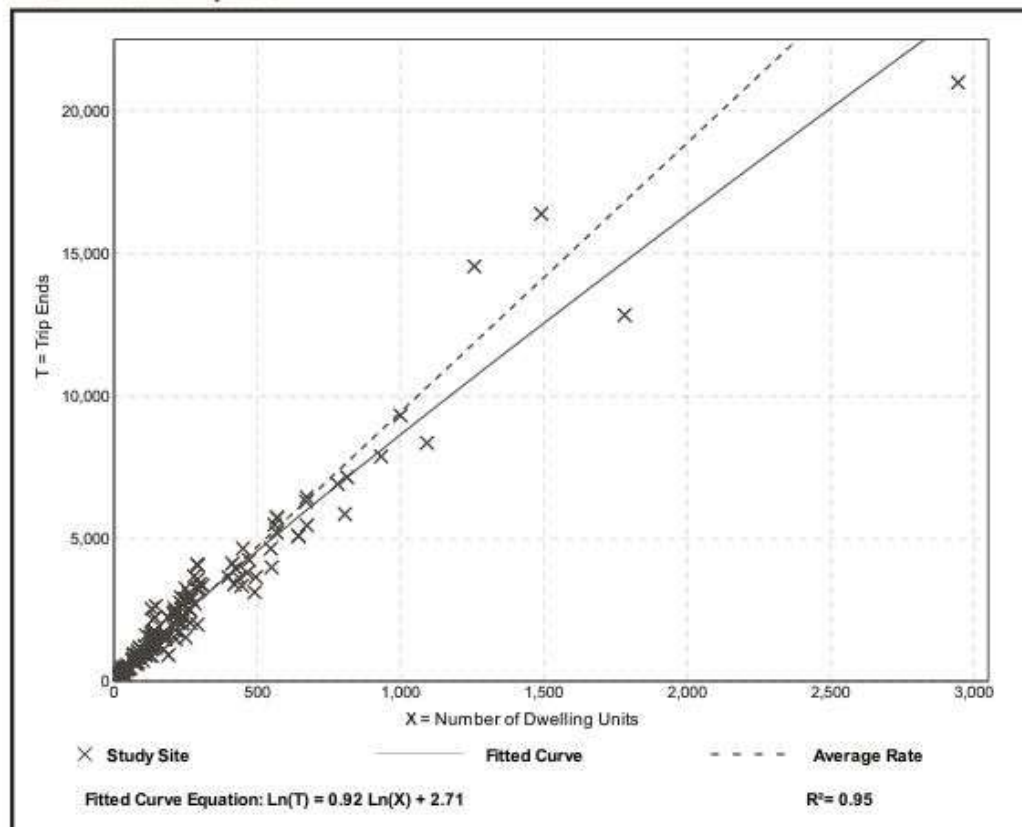
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

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

Vehicle Trip Generation per Dwelling Unit

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

Data Plot and Equation



Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

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

Setting/Location: General Urban/Suburban

Number of Studies: 173

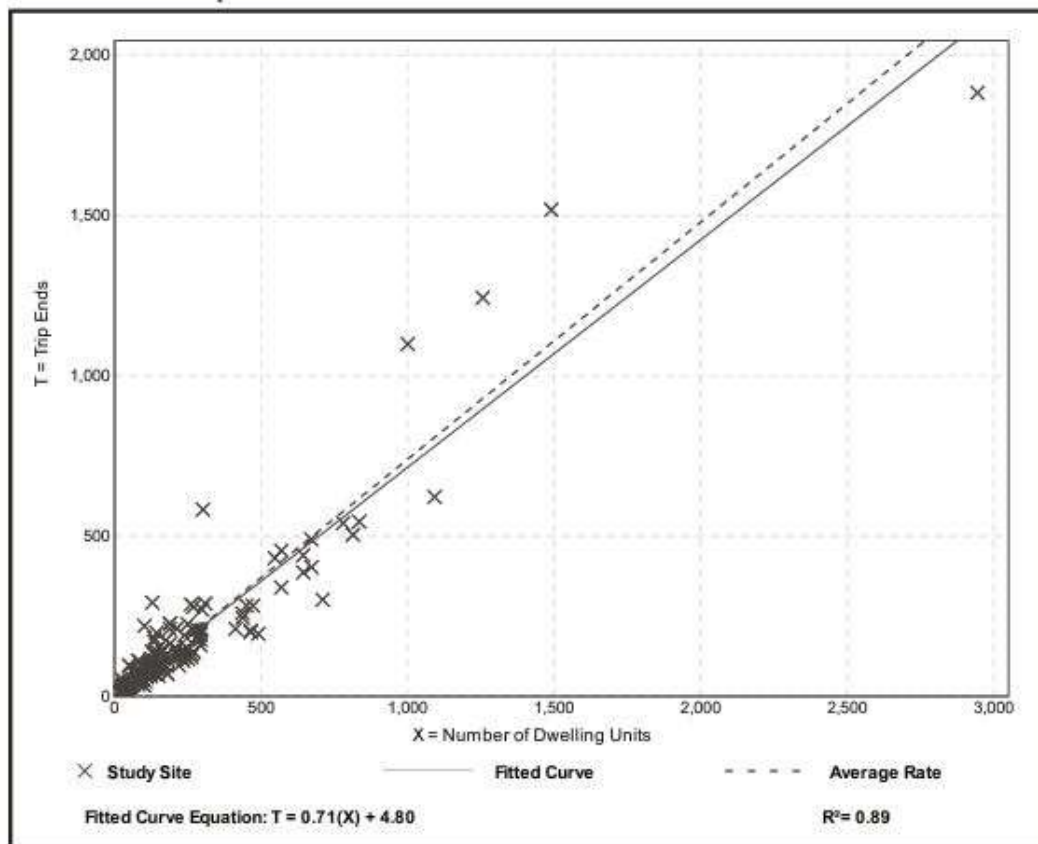
Avg. Num. of Dwelling Units: 219

Directional Distribution: 25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

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

Data Plot and Equation



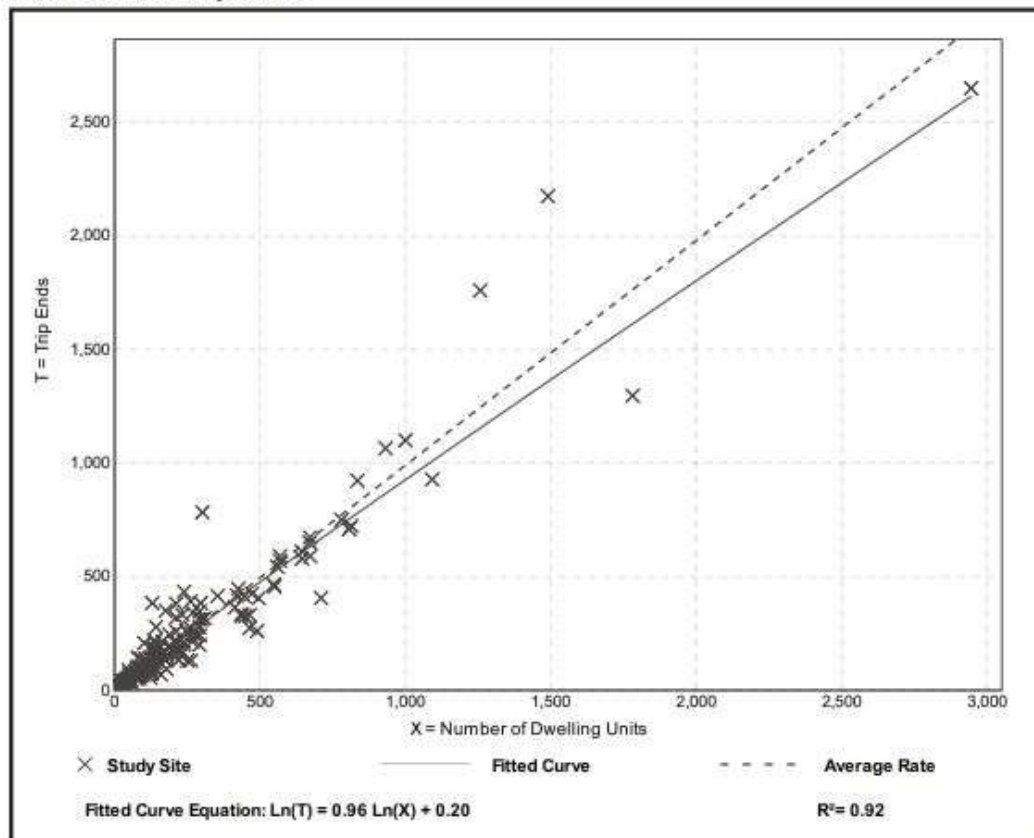
Single-Family Detached Housing (210)

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

Vehicle Trip Generation per Dwelling Unit

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

Data Plot and Equation



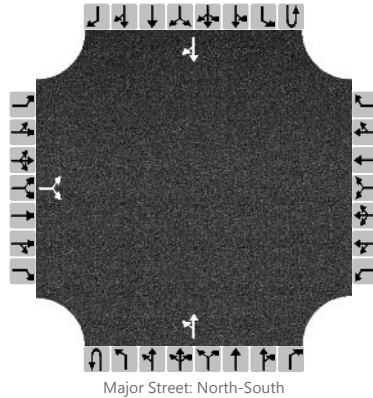
Attachment 5
Intersection Worksheets – Existing AM/PM Peaks

HCS7 Two-Way Stop-Control Report

General Information

Analyst	Addie Kirkham	Intersection	Tazewell Pike at Twin Oak
Agency/Co.	FMA	Jurisdiction	Knox County
Date Performed	8/10/2020	East/West Street	Twin Oak Lane
Analysis Year	2020	North/South Street	Tazewell Pike
Time Analyzed	Existing AM Peak	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	588.002.1 - Twin Oak Landing		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		1		1						0	140				485	0
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

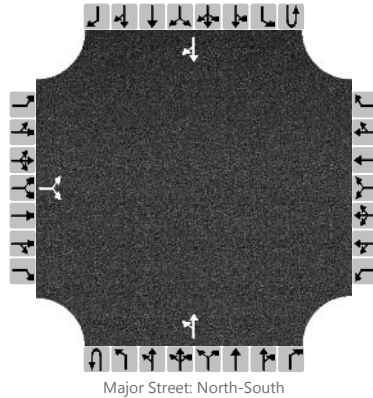
Flow Rate, v (veh/h)			2							0						
Capacity, c (veh/h)			475							1039						
v/c Ratio			0.00							0.00						
95% Queue Length, Q ₉₅ (veh)			0.0							0.0						
Control Delay (s/veh)			12.6							8.5						
Level of Service, LOS			B							A						
Approach Delay (s/veh)	12.6								0.0							
Approach LOS	B															

HCS7 Two-Way Stop-Control Report

General Information

Analyst	Addie Kirkham	Intersection	Tazewell Pike at Twin Oak
Agency/Co.	FMA	Jurisdiction	Knox County
Date Performed	8/10/2020	East/West Street	Twin Oak Lane
Analysis Year	2020	North/South Street	Tazewell Pike
Time Analyzed	Existing PM Peak	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	588.002.1 - Twin Oak Landing		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		0		1						6	440				216	0
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			1							7						
Capacity, c (veh/h)			804							1331						
v/c Ratio			0.00							0.01						
95% Queue Length, Q ₉₅ (veh)			0.0							0.0						
Control Delay (s/veh)			9.5							7.7						
Level of Service, LOS			A							A						
Approach Delay (s/veh)	9.5								0.2							
Approach LOS	A															

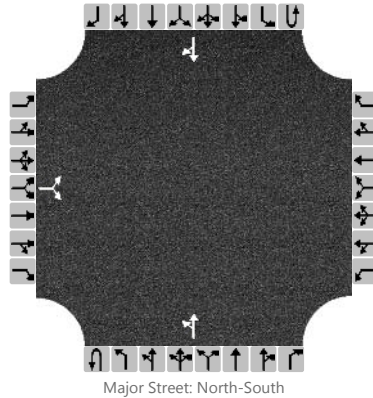
Attachment 6
Intersection Worksheets – Background AM/PM Peaks

HCS7 Two-Way Stop-Control Report

General Information

Analyst	Addie Kirkham	Intersection	Tazewell Pike at Twin Oak
Agency/Co.	FMA	Jurisdiction	Knox County
Date Performed	8/10/2020	East/West Street	Twin Oak Lane
Analysis Year	2023	North/South Street	Tazewell Pike
Time Analyzed	Background AM Peak	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	588.002.1 - Twin Oak Landing		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		1		1						0	149				515	0
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

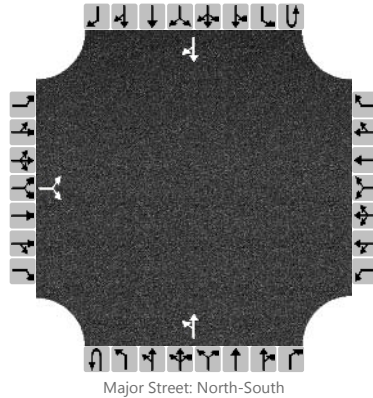
Flow Rate, v (veh/h)			2							0						
Capacity, c (veh/h)			451							1010						
v/c Ratio			0.00							0.00						
95% Queue Length, Q ₉₅ (veh)			0.0							0.0						
Control Delay (s/veh)			13.0							8.6						
Level of Service, LOS			B							A						
Approach Delay (s/veh)	13.0								0.0							
Approach LOS	B															

HCS7 Two-Way Stop-Control Report

General Information

Analyst	Addie Kirkham	Intersection	Tazewell Pike at Twin Oak
Agency/Co.	FMA	Jurisdiction	Knox County
Date Performed	8/10/2020	East/West Street	Twin Oak Lane
Analysis Year	2023	North/South Street	Tazewell Pike
Time Analyzed	Background PM Peak	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	588.002.1 - Twin Oak Landing		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		0		1						7	467				229	0
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			1							8						
Capacity, c (veh/h)			789							1316						
v/c Ratio			0.00							0.01						
95% Queue Length, Q ₉₅ (veh)			0.0							0.0						
Control Delay (s/veh)			9.6							7.8						
Level of Service, LOS			A							A						
Approach Delay (s/veh)	9.6								0.2							
Approach LOS	A															

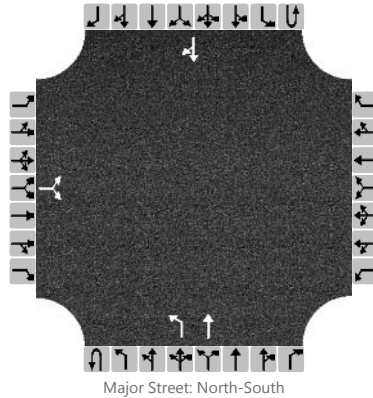
Attachment 7
Intersection Worksheets – Full Buildout AM/PM Peaks

HCS7 Two-Way Stop-Control Report

General Information

Analyst	Addie Kirkham	Intersection	Tazewell Pike at Twin Oak
Agency/Co.	FMA	Jurisdiction	Knox County
Date Performed	8/10/2020	East/West Street	Twin Oak Lane
Analysis Year	2023	North/South Street	Tazewell Pike
Time Analyzed	Full Buildout AM Peak	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	588.002.1 - Twin Oak Landing		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume, V (veh/h)		10		53						17	149				515	3
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

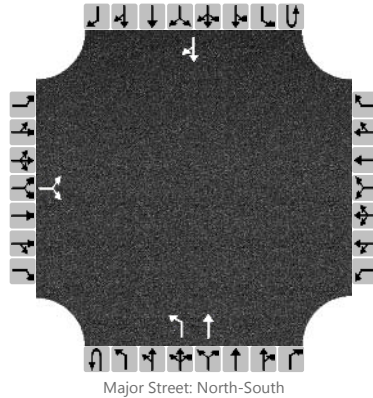
Flow Rate, v (veh/h)			69							18						
Capacity, c (veh/h)			492							1008						
v/c Ratio			0.14							0.02						
95% Queue Length, Q ₉₅ (veh)			0.5							0.1						
Control Delay (s/veh)			13.5							8.6						
Level of Service, LOS			B							A						
Approach Delay (s/veh)	13.5								0.9							
Approach LOS	B															

HCS7 Two-Way Stop-Control Report

General Information

Analyst	Addie Kirkham	Intersection	Tazewell Pike at Twin Oak
Agency/Co.	FMA	Jurisdiction	Knox County
Date Performed	8/10/2020	East/West Street	Twin Oak Lane
Analysis Year	2023	North/South Street	Tazewell Pike
Time Analyzed	Full Buildout PM Peak	Peak Hour Factor	0.92
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	588.002.1 - Twin Oak Landing		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	1	1	0	0	0	1	0
Configuration			LR							L	T					TR
Volume, V (veh/h)		6		35						65	467				229	10
Percent Heavy Vehicles (%)		2		2						2						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.42		6.22						4.12						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.52		3.32						2.22						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			45							71						
Capacity, c (veh/h)			620							1304						
v/c Ratio			0.07							0.05						
95% Queue Length, Q ₉₅ (veh)			0.2							0.2						
Control Delay (s/veh)			11.3							7.9						
Level of Service, LOS			B							A						
Approach Delay (s/veh)	11.3								1.0							
Approach LOS	B															

Attachment 8

Turn Lane Warrant Analysis

Project: Twin Oak Landing Subdivision

**Tazewell Pike
at Twin Oak Lane**

VOLUMES - SUBDIVISION FULL BUILDOUT

LEFT TURN	Opposing	Thru	LT	LT MAX	Warrant Met
AM	518	149	17	70	NO
PM	239	467	65	40	YES

**Tazewell Pike
at Twin Oak Lane**

VOLUMES - SUBDIVISION FULL BUILDOUT

RIGHT TURN	Thru	RT	RT MAX	Warrant Met
AM	515	3	49	NO
PM	229	10	349	NO

TABLE 5A

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

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

OPPOSING VOLUME	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
	100 - 149	150 - 199	200 - 249	250 - 299	300 - 349	350 - 399
100 - 149	250	180	140	110	80	70
150 - 199	200	140	105	90	70	60
200 - 249	160	115	85	75	65	55
250 - 299	130	100	75	65	60	50
300 - 349	110	90	70	60	55	45
350 - 399	100	80	65	55	50	40
400 - 449	90	70	60	50	45	35
450 - 499	80	65	55	45	40	30
500 - 549	70	AM Peak 17 LT		45	35	25
550 - 599	65	55	40	35	30	25
600 - 649	60	45	35	30	25	25
650 - 699	55	35	35	30	25	20
700 - 749	50	35	30	25	20	20
750 or More	45	35	25	25	20	20

OPPOSING VOLUME	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 599	= / > 600
100 - 149	70	60	50	45	40	35
150 - 199	60	55	45	40	35	30
200 - 249	55	50	PM Peak 65 LT		30	30
250 - 299	50	45	35	30	30	30
300 - 349	45	40	35	30	25	25
350 - 399	40	35	30	25	25	20
400 - 449	35	30	30	25	20	20
450 - 499	30	25	25	20	20	20
500 - 549	25	25	20	20	20	15
550 - 599	25	20	20	20	20	15
600 - 649	25	20	20	20	20	15
650 - 699	20	20	20	20	20	15
700 - 749	20	20	20	15	15	15
750 or More	20	20	20	15	15	15

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

TABLE 5B

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

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	<100	100 - 199	200 - 249	250 - 299	300 - 349	350 - 399
Fewer Than 25 25 - 49 50 - 99		PM Peak 10 RT 10				
100 - 149 150 - 199						
200 - 249 250 - 299					Yes	Yes Yes
300 - 349 350 - 399			Yes	Yes Yes	Yes Yes	Yes Yes
400 - 449 450 - 499		Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
500 - 549 550 - 599	Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 600	+ / > 600
Fewer Than 25 25 - 49 50 - 99			AM Peak 3 RT 3		Yes Yes	Yes Yes
100 - 149 150 - 199		Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
200 - 249 250 - 299	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
300 - 349 350 - 399	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
400 - 449 450 - 499	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
500 - 549 550 - 599	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

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



Date: August 10, 2020

Project Name: Twin Oak Subdivision

To: Knoxville-Knox County Planning

Subject: TIS Review for Twin Oak Subdivision (8-SA-20-C / 8-B-20-UR)

Dear Knoxville-Knox County Planning staff,

The following comment response document is submitted to address comments dated July 21, 2020:

- 1. Reviewer Comment:** Page 3, (see attached markup)
 - a. First line, last word – change “Lane” to “Landing”.
 - b. Add description of the proposed widening of Twin Oak Lane to 26 feet as noted on page 19 of the study.

Response: Revised “Lane” to “Landing and added a description on the widening of Twin Oak Lane to page 3.

- 2. Reviewer Comment:** Page 8, please provide a worksheet outlining the step-by-step calculations and assumptions that were employed for the existing traffic volumes. The Planning review team needs to be able to follow how the existing counts were configured due to the pandemic. Please add such a worksheet to the Appendix.

Response: A worksheet was included in Attachment 2 outlining the step-by-step calculations and assumptions that were used in determining the traffic counts at the intersection of Tazewell Pike (SR 131) at Twin Oak Lane.

Additional Comments from Knoxville-Knox County Planning dated 8/6/2020.

- 1. Reviewer Comment:** Please look at the capacity analysis sheet for the AM Peak at Tazewell Pike & Gibbs Elementary driveway. It looks like the “Total Volume” numbers should have been used instead of the “Cars, PU, Vans” numbers. This is minor but still needs to be updated.

Response: Revised to show the total volume for the AM Peak hour and updated the figures and HCS7 reports.

- 2. Reviewer Comment:** Where is the 2023 Background Peak Hour Traffic chart?

Response: I removed the "2023 Background Peak Hour Traffic" from the detailed calculations since it was already covered under Section 3 Background Growth.

3. **Reviewer Comment:** In the attachment, is it "Southbound Thru Movement = SB Thru + SB Left" OR "Southbound Thru Movement = SB Thru + SB Right"?

Response: Revised to "Southbound Thru Movement = SB Thru + SB Right"

Sincerely,



Addie Kirkham, P.E.