final report

December 27, 2022

Traffic Impact Study

Farm Credit Mid-America
12501 Lakefront Place
Louisville, KY

Prepared for

Louisville Metro Planning Commission

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INTRODUCTION

The development plan for the Farm Credit office building in Louisville, KY shows an office expansion of 138,000 square feet. **Figure 1** displays a map of the site. The site is currently occupied with 177,000 square feet of office. The building expansion is on an existing surface parking lot. Access to the development will be from the existing access on Lakefront Place and Sycamore Station Place. The purpose of this study is to examine the traffic impacts of the development upon the adjacent highway system. For this study, the impact area was defined to be the intersections of Tucker Station Road with Lakefront Place and Sycamore Station Place.

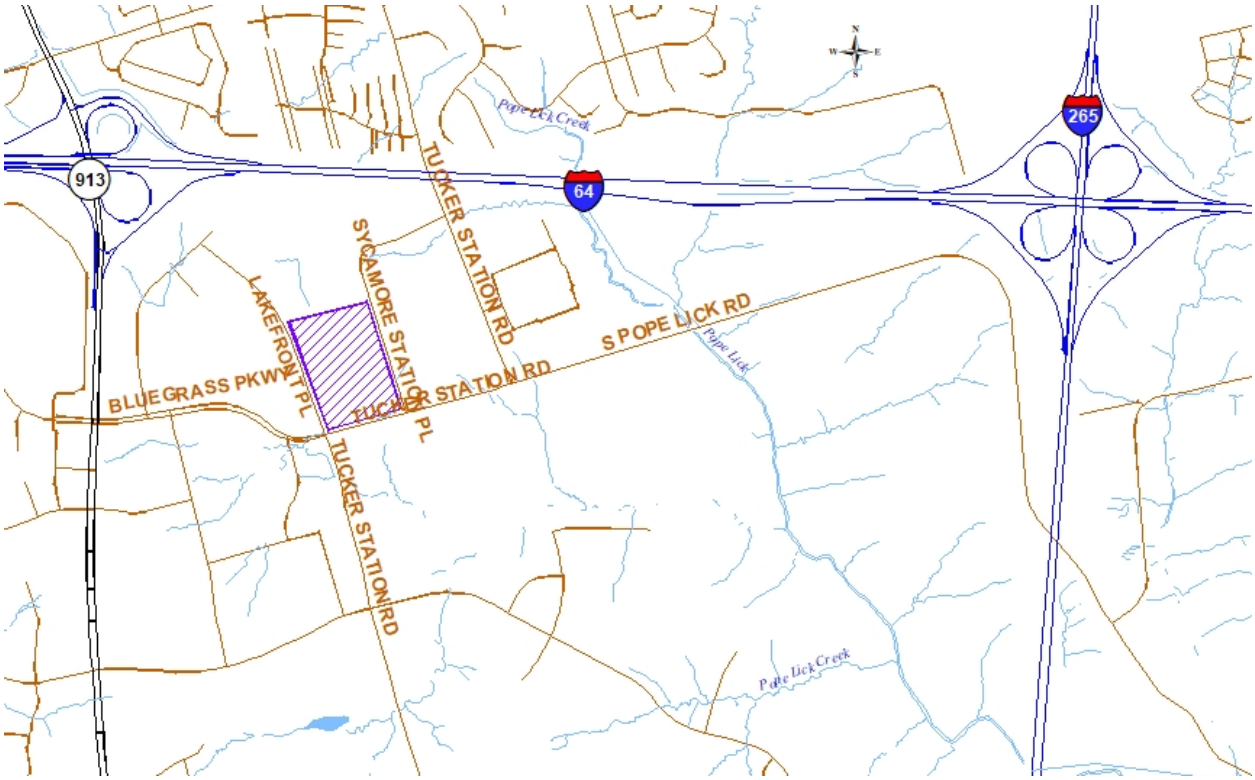


Figure 1. Site Map

EXISTING CONDITIONS

Tucker Station Road is a Metro maintained road with an estimated 2022 ADT of 8,300 vehicles per day between Lakefront Place and Sycamore Station Place as estimated from the turning movement count. The road is a two-lane road with twelve-foot lanes, a two-way left turn lane with curb and gutter. The speed limit is 35 mph. There are sidewalks on the north side. The intersections with Lakefront Place and Sycamore Station Place are controlled with a stop sign. At both intersections there are left turn lanes on Tucker Station Road. There is a right turn lane on eastbound Bluegrass Parkway, northbound Tucker Station Road, and southbound Sycamore Station Place.

Peak hour traffic counts for the intersections were obtained on Thursday, November 3, 2022. The a.m. peak hour occurred between 7:30 and 8:30 and the p.m. peak hour occurred between 4:30 and 5:30. **Figure 2** illustrates the existing a.m. and p.m. peak hour traffic volumes.

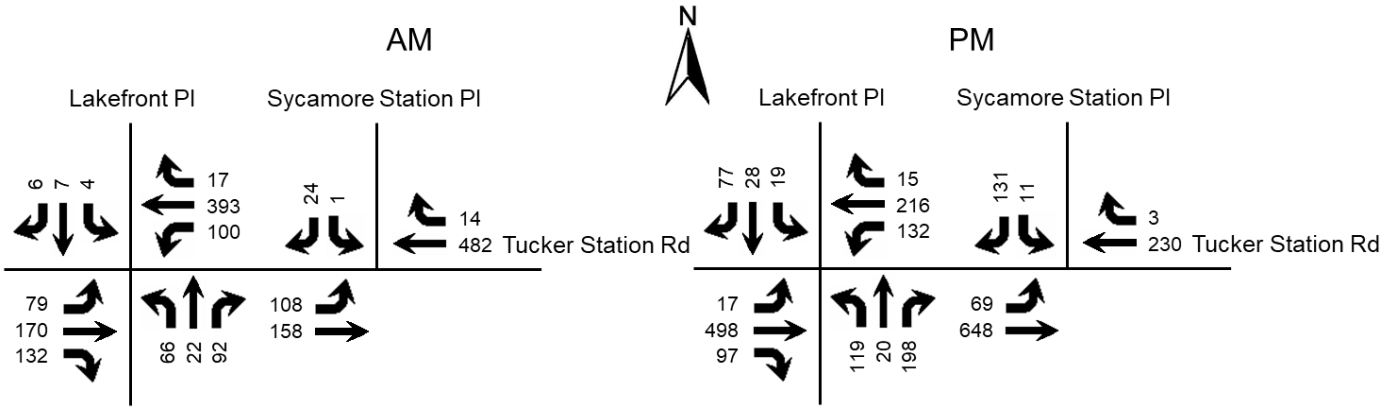


Figure 2. Existing Peak Hour Volumes

FUTURE CONDITIONS

The project completion date is 2024. An annual growth rate of 1.0 percent was applied to the volumes. **Figure 3** displays the 2024 No Build peak hour volumes.

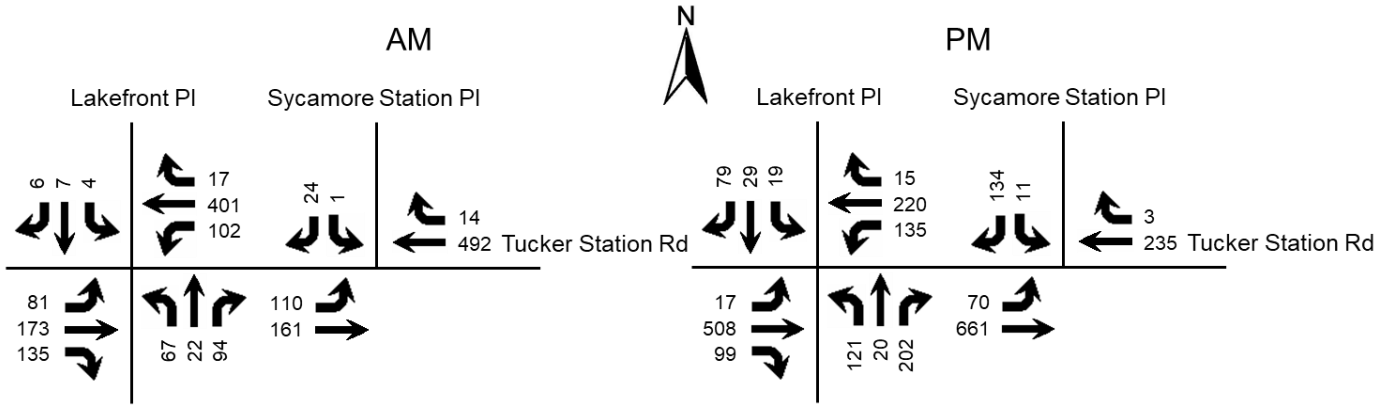


Figure 3. No Build Peak Hour Volumes

TRIP GENERATION

The Institute of Transportation Engineers Trip Generation Manual, 11th Edition contains trip generation rates for a wide range of developments. The land use of "Office 710" was reviewed and determined to be the best match. The trip generation results are listed in **Table 1**. The trips were assigned to the highway network with the percentages shown in **Figure 4**. **Figure 5** shows the trips generated by this development and distributed throughout the road network during the peak hours. **Figure 6** displays the individual turning movements for the peak hours when the development is completed.

Table 1. Peak Hour Trips Generated by Site

	A.M. Peak Hour			P.M. Peak Hour		
Land Use	Trips	In	Out	Trips	In	Out
Office (138,000 square feet)	221	194	27	217	37	180

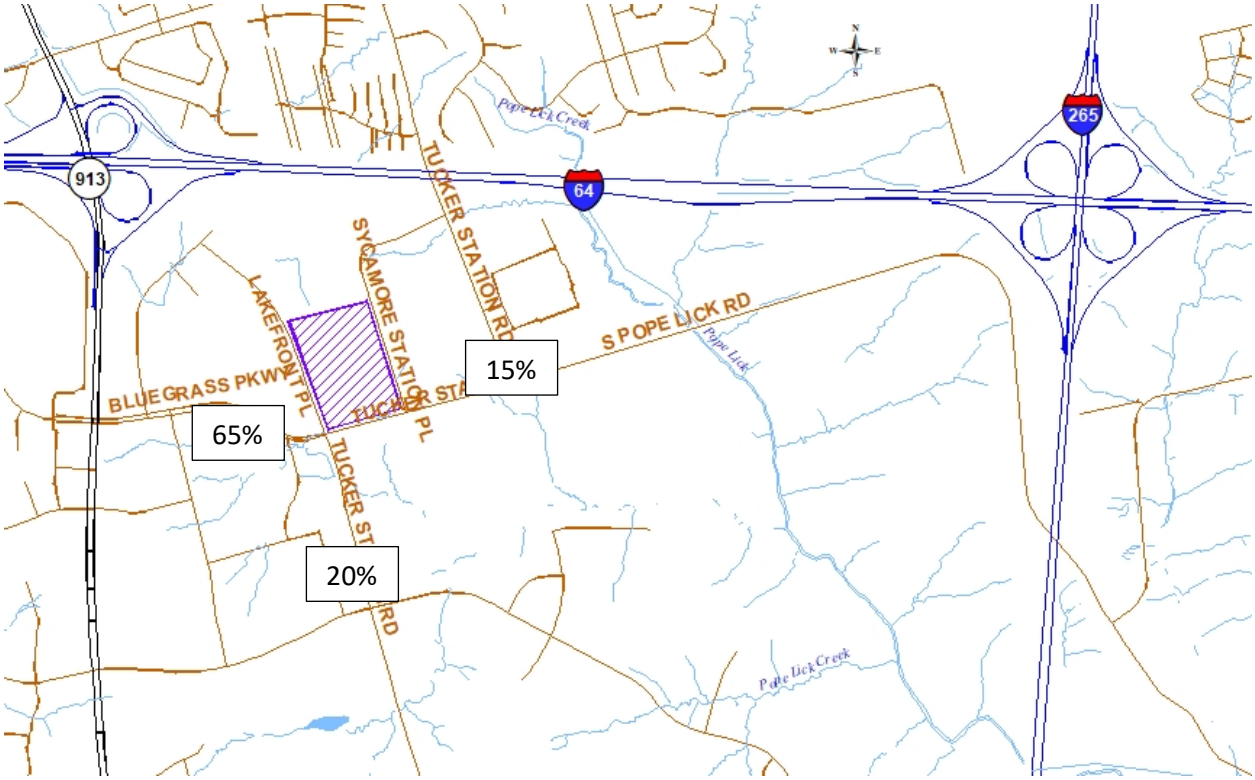


Figure 4. Trip Distribution Percentages

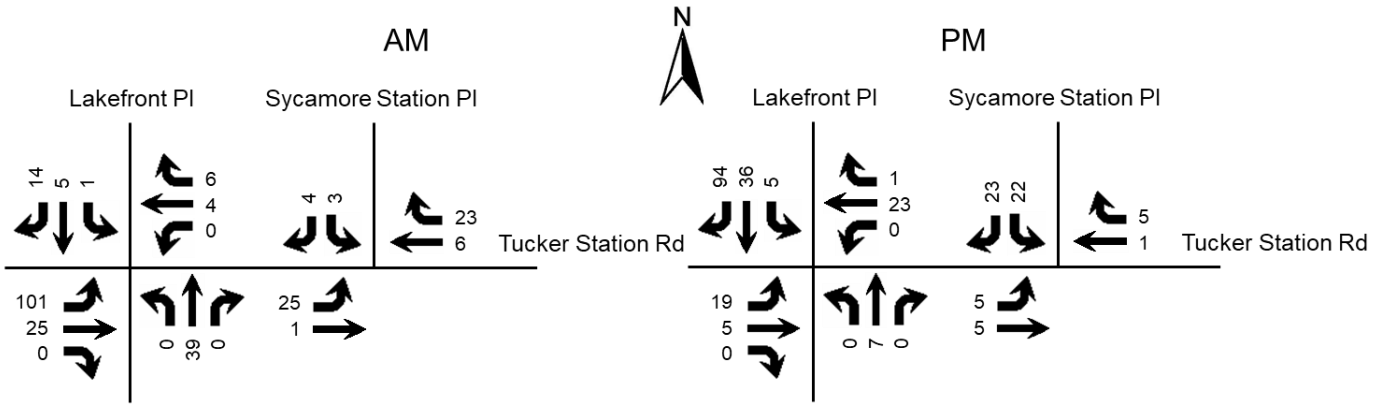


Figure 5. Peak Hour Trips Generated by Site

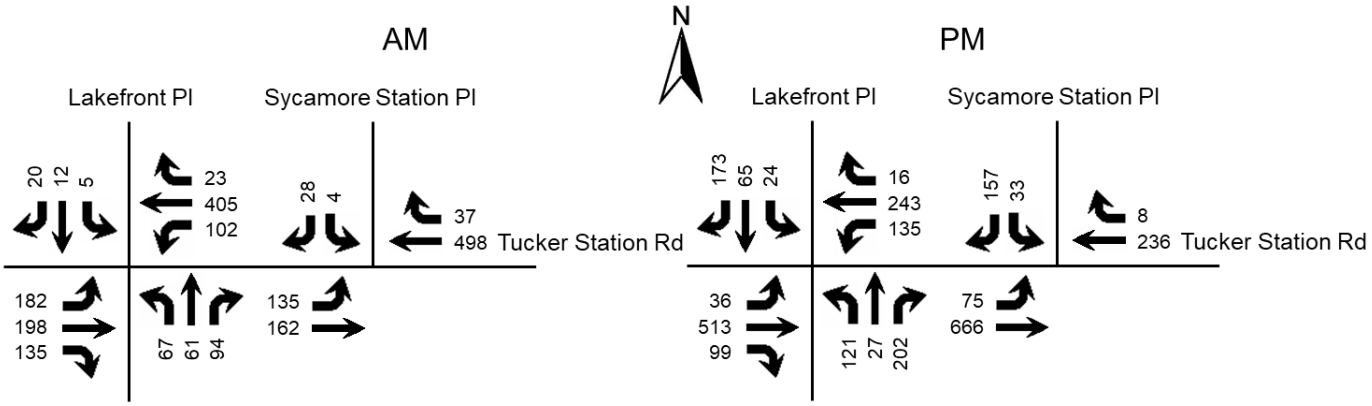


Figure 6. Build Peak Hour Volumes

ANALYSIS

The qualitative measure of operation for a roadway facility or intersection is evaluated by assigning a "Level of Service". Level of Service is a ranking scale from A through F, "A" is the best operating condition and "F" is the worst. Level of Service results depend upon the facility that is analyzed. In this case, the Level of Service is based upon the total delay experienced at an intersection.

To evaluate the impact of the proposed development, the vehicle delays at the intersections were determined using procedures detailed in the Highway Capacity Manual, 7th edition. Future delays and Level of Service were determined for the intersections using the HCS Streets and TWSC (version 2023) software. The delays and Level of Service are summarized in **Table 2**.

Table 2. Peak Hour Level of Service

	A.M.			P.M.		
Approach	2022 Existing	2024 No Build	2024 Build	2022 Existing	2024 No Build	2024 Build
Bluegrass Parkway at Lakefront Place						
Bluegrass Parkway Eastbound (left)	A 8.5	A 8.6	A 9.0	A 7.9	A 7.9	A 8.0
Tucker Station Road Westbound (left)	A 8.2	A 8.2	A 8.3	A 9.5	A 9.6	A 9.6
Tucker Station Road Northbound	C 19.9	C 20.6	F 115.5	D 34.9	E 38.6	F 240.7
Lakefront Place Southbound	C 21.5	C 22.1	F 127.3	E 36.1	E 45.1	F 196.7

	A.M.			P.M.		
Approach	2022 Existing	2024 No Build	2024 Build	2022 Existing	2024 No Build	2024 Build
Tucker Station Road at Sycamore Station Place						
Tucker Station Road Eastbound (left)	A 9.0	A 9.0	A 9.3	A 7.9	A 7.9	A 7.9
Sycamore Station Place Southbound	B 12.1	B 12.2	B 12.7	B 10.9	B 11.0	B 12.0

Key: Level of Service, Delay in seconds per vehicle

The intersection of Bluegrass Parkway/Tucker Station Road with Lakefront Place/Tucker Station Road will experience significant minor street delays. Additional lanes will not reduce the delay below Level of Service F. The only improvement that will reduce the minor street delay is a traffic signal. The intersection does currently meet the Manual on Uniform Traffic Control Devices Warrant 1 B for three of the four hours counted. Metro Traffic Engineering should continue to monitor the intersection volumes to determine when the signal warrant has been satisfied.

CONCLUSIONS

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2024, there will be an impact to the existing highway network. The minor street delays on Lakefront Place and Tucker Station Road will exceed reasonable levels. The intersection of Bluegrass Parkway/Tucker Station Road with Lakefront Place/Tucker Station Road should continue to be monitored to determine when the signal warrant has been satisfied.

APPENDIX

Traffic Counts

Classified Turn Movement Count || All vehicles

Marr Traffic DATA COLLECTION

Louisville, KY

www.marrtraffic.com

Site 1 of 4
Tucker Station Rd (South)
Lakefront Pl (North)
Bluegrass Pkwy
Tucker Station Rd (East)

Date
Thursday, November 3, 2022

Weather
Fair
61°F

Lat/Long
38.216555°, -85.531101°

0700 - 0900 (Weekday 2h Session) (11-03-2022)

All vehicles

	Northbound					Southbound					Eastbound					Westbound					
	Tucker Station Rd (South)					Lakefront Pl (North)					Bluegrass Pkwy					Tucker Station Rd (East)					
	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Int
TIME	1.1	1.2	1.3	1.4	Total	1.5	1.6	1.7	1.8	Total	1.9	1.10	1.11	1.12	Total	1.13	1.14	1.15	1.16	Total	Total
0700 - 0715	9	3	19	0	31	0	3	0	0	3	8	20	11	0	39	6	47	3	0	56	129
0715 - 0730	15	1	20	0	36	0	1	4	0	5	13	21	30	0	64	22	77	2	0	101	206
0730 - 0745	22	7	24	0	53	1	0	2	0	3	12	23	29	0	64	20	107	1	0	128	248
0745 - 0800	14	7	23	0	44	0	3	1	0	4	23	39	31	0	93	29	95	5	0	129	270
Hourly Total	60	18	86	0	**164**	1	7	7	0	**15**	56	103	101	0	**260**	77	326	11	0	**414**	**853**
0800 - 0815	11	4	24	0	39	1	0	2	0	3	27	55	39	0	121	32	100	2	0	134	297
0815 - 0830	19	4	21	0	44	2	4	1	0	7	17	53	35	0	105	19	91	9	0	119	275
0830 - 0845	13	6	17	0	36	2	0	3	0	5	16	38	42	0	96	17	53	6	0	76	213
0845 - 0900	20	5	24	0	49	1	3	3	0	7	14	35	30	0	79	18	52	1	0	71	206
Hourly Total	63	19	86	0	**168**	6	7	9	0	**22**	74	181	146	0	**401**	86	296	18	0	**400**	**991**
Grand Total	123	37	172	0	**332**	7	14	16	0	**37**	130	284	247	0	**661**	163	622	29	0	**814**	**1844**
Approach %	37.05	11.14	51.81	0.00	-	18.92	37.84	43.24	0.00	-	19.67	42.97	37.37	0.00	-	20.02	76.41	3.56	0.00	-	
Intersection %	6.67	2.01	9.33	0.00	18.00	0.38	0.76	0.87	0.00	2.01	7.05	15.40	13.39	0.00	35.85	8.84	33.73	1.57	0.00	44.14	
PHF	0.75	0.79	0.96	0.00	**0.85**	0.50	0.44	0.75	0.00	**0.61**	0.73	0.77	0.86	0.00	**0.79**	0.78	0.92	0.47	0.00	**0.95**	**0.92**

1600 - 1800 (Weekday 2h Session) (11-03-2022)

All vehicles

	Northbound					Southbound					Eastbound					Westbound					
	Tucker Station Rd (South)					Lakefront Pl (North)					Bluegrass Pkwy					Tucker Station Rd (East)					
	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Int
TIME	1.1	1.2	1.3	1.4	Total	1.5	1.6	1.7	1.8	Total	1.9	1.10	1.11	1.12	Total	1.13	1.14	1.15	1.16	Total	Total
1600 - 1615	33	3	28	0	64	10	15	33	0	58	3	97	23	0	123	29	46	7	0	82	327
1615 - 1630	23	2	26	0	51	7	3	14	0	24	6	101	23	1	131	24	50	3	0	77	283
1630 - 1645	37	7	47	0	91	7	9	30	0	46	5	108	23	0	136	33	84	3	0	120	393
1645 - 1700	28	7	48	0	83	5	8	18	0	31	2	98	33	0	133	30	47	2	0	79	326
Hourly Total	121	19	149	0	**289**	29	35	95	0	**159**	16	404	102	1	**523**	116	227	15	0	**358**	**1329**
1700 - 1715	28	3	56	0	87	3	9	18	0	30	6	139	20	0	165	38	49	3	0	90	372
1715 - 1730	26	3	48	0	77	4	2	11	0	17	4	153	21	0	178	31	37	7	0	75	347
1730 - 1745	18	9	35	0	62	8	7	8	0	23	5	106	20	0	131	22	43	2	0	67	283
1745 - 1800	22	3	31	0	56	4	5	9	0	18	1	82	21	0	104	25	34	3	0	62	240
Hourly Total	94	18	170	0	**282**	19	23	46	0	**88**	16	480	82	0	**578**	116	163	15	0	**294**	**1242**
Grand Total	215	37	319	0	**571**	48	58	141	0	**247**	32	884	184	1	**1101**	232	390	30	0	**652**	**2571**
Approach %	37.65	6.48	55.87	0.00	-	19.43	23.48	57.09	0.00	-	2.91	80.29	16.71	0.09	-	35.58	59.82	4.60	0.00	-	
Intersection %	8.36	1.44	12.41	0.00	22.21	1.87	2.26	5.48	0.00	9.61	1.24	34.38	7.16	0.04	42.82	9.02	15.17	1.17	0.00	25.36	
PHF	0.80	0.71	0.89	0.00	**0.93**	0.68	0.78	0.64	0.00	**0.67**	0.71	0.81	0.73	0.00	**0.86**	0.87	0.65	0.54	0.00	**0.76**	**0.91**

Classified Turn Movement Count || All vehicles

Marr Traffic DATA COLLECTION

Louisville, KY

www.marrtraffic.com

Site 4 of 4
Driveway
Sycamore Station Pl
Tucker Station Rd (West)
Tucker Station Rd (East)

Date
Thursday, November 3, 2022

Weather
Fair
61°F

Lat/Long
38.217145°, -85.528456°

0700 - 0900 (Weekday 2h Session) (11-03-2022)

All vehicles

	Northbound					Southbound					Eastbound					Westbound					
	Driveway					Sycamore Station Pl					Tucker Station Rd (West)					Tucker Station Rd (East)					
	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Int
TIME	4.1	4.2	4.3	4.4	Total	4.5	4.6	4.7	4.8	Total	4.9	4.10	4.11	4.12	Total	4.13	4.14	4.15	4.16	Total	Total
0700 - 0715	0	0	1	0	1	0	0	3	0	3	8	30	0	0	38	0	54	0	0	54	96
0715 - 0730	0	0	0	0	0	0	0	5	0	5	9	34	0	0	43	0	95	4	0	99	147
0730 - 0745	0	0	0	0	0	0	0	3	0	3	7	37	0	0	44	0	120	2	0	122	169
0745 - 0800	0	0	0	0	0	0	0	5	0	5	17	48	0	1	66	0	123	1	0	124	195
Hourly Total	0	0	1	0	**1**	0	0	16	0	**16**	41	149	0	1	**191**	0	392	7	0	**399**	**607**
0800 - 0815	0	0	0	0	0	0	0	9	0	9	39	36	0	0	75	0	128	5	0	133	217
0815 - 0830	0	0	0	0	0	1	0	7	0	8	44	37	0	0	81	0	111	6	0	117	206
0830 - 0845	0	0	0	0	0	0	0	2	0	2	19	33	0	0	52	0	74	2	0	76	130
0845 - 0900	0	0	0	0	0	0	0	6	0	6	18	47	0	0	65	0	64	1	0	65	136
Hourly Total	0	0	0	0	**0**	1	0	24	0	**25**	120	153	0	0	**273**	0	377	14	0	**391**	**689**
Grand Total	0	0	1	0	**1**	1	0	40	0	**41**	161	302	0	1	**464**	0	769	21	0	**790**	**1296**
Approach %	0.00	0.00	100.00	0.00	-	2.44	0.00	97.56	0.00	-	34.70	65.09	0.00	0.22	-	0.00	97.34	2.66	0.00	-	
Intersection %	0.00	0.00	0.08	0.00	0.08	0.08	0.00	3.09	0.00	3.16	12.42	23.30	0.00	0.08	35.80	0.00	59.34	1.62	0.00	60.96	
PHF	0.00	0.00	0.00	0.00	**0.00**	0.25	0.00	0.67	0.00	**0.69**	0.61	0.82	0.00	0.25	**0.82**	0.00	0.94	0.58	0.00	**0.93**	**0.91**

1600 - 1800 (Weekday 2h Session) (11-03-2022)

All vehicles

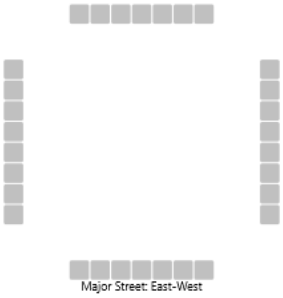
	Northbound					Southbound					Eastbound					Westbound					
	Driveway					Sycamore Station Pl					Tucker Station Rd (West)					Tucker Station Rd (East)					
	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Left	Thru	Right	U-Turn	App	Int
TIME	4.1	4.2	4.3	4.4	Total	4.5	4.6	4.7	4.8	Total	4.9	4.10	4.11	4.12	Total	4.13	4.14	4.15	4.16	Total	Total
1600 - 1615	0	0	0	0	0	4	0	27	0	31	8	124	1	0	133	0	55	1	0	56	220
1615 - 1630	0	0	2	0	2	1	0	26	0	27	11	120	0	0	131	0	51	2	0	53	213
1630 - 1645	0	0	0	0	0	4	0	67	0	71	12	149	0	0	161	0	54	0	0	54	286
1645 - 1700	0	0	0	0	0	4	0	27	0	31	15	133	0	0	148	0	52	3	0	55	234
Hourly Total	0	0	2	0	**2**	13	0	147	0	**160**	46	526	1	0	**573**	0	212	6	0	**218**	**953**
1700 - 1715	0	0	0	0	0	2	0	29	0	31	19	178	0	0	197	0	59	0	0	59	287
1715 - 1730	0	0	0	0	0	1	0	8	0	9	23	188	0	0	211	0	66	0	0	66	286
1730 - 1745	0	0	0	0	0	1	0	10	0	11	11	140	0	0	151	0	58	0	0	58	220
1745 - 1800	0	0	0	0	0	2	0	9	0	11	13	107	0	0	120	0	53	0	0	53	184
Hourly Total	0	0	0	0	**0**	6	0	56	0	**62**	66	613	0	0	**679**	0	236	0	0	**236**	**977**
Grand Total	0	0	2	0	**2**	19	0	203	0	**222**	112	1139	1	0	**1252**	0	448	6	0	**454**	**1930**
Approach %	0.00	0.00	100.00	0.00	-	8.56	0.00	91.44	0.00	-	8.95	90.97	0.08	0.00	-	0.00	98.68	1.32	0.00	-	
Intersection %	0.00	0.00	0.10	0.00	0.10	0.98	0.00	10.52	0.00	11.50	5.80	59.02	0.05	0.00	64.87	0.00	23.21	0.31	0.00	23.52	
PHF	0.00	0.00	0.00	0.00	**0.00**	0.69	0.00	0.49	0.00	**0.50**	0.75	0.86	0.00	0.00	**0.85**	0.00	0.88	0.25	0.00	**0.89**	**0.95**

HCS Reports

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Bluegrass Pkwy at Lakefront PL
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC	Jurisdiction	
Date Performed	12/27/2022	East/West Street	Bluegrass Pkway/Tucker Station
Analysis Year	2022	North/South Street	Lakefront Pl/Tucker Station
Time Analyzed	AM Peak	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Farm Credit		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	1	0	1	1	0		0	1	1		0	1	1
Configuration		L	T	R		L		TR		LT		R		LT		R
Volume (veh/h)		79	170	134		100	393	17		66	22	92		4	7	6
Percent Heavy Vehicles (%)		3				0				2	0	2		0	14	0
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized		No								No				No		
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.10				7.12	6.50	6.22		7.10	6.64	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.20				3.52	4.00	3.32		3.50	4.13	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		86				109				96		100		12		7
Capacity, c (veh/h)		1109				1240				235		857		173		624
v/c Ratio		0.08				0.09				0.41		0.12		0.07		0.01
95% Queue Length, Q_{95} (veh)		0.3				0.3				1.9		0.4		0.2		0.0
Control Delay (s/veh)		8.5				8.2				30.5		9.8		27.4		10.8
Level of Service (LOS)		A				A				D		A		D		B
Approach Delay (s/veh)		1.8				1.6				19.9				21.5		
Approach LOS		A				A				C				C		

HCS™ TWSC Version 2023
Lakefront AM 22.xtw

Generated: 12/27/2022 7:00:02 PM

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Bluegrass Pkwy at Lakefront PL
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC	Jurisdiction	
Date Performed	12/27/2022	East/West Street	Bluegrass Pkway/Tucker Station
Analysis Year	2024	North/South Street	Lakefront Pl/Tucker Station
Time Analyzed	AM Peak No Build	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Farm Credit		

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	1	0	1	1	0		0	1	1		0	1	1
Configuration		L	T	R		L		TR		LT		R		LT		R
Volume (veh/h)		81	173	135		102	401	17		67	22	94		4	7	6
Percent Heavy Vehicles (%)		3				0				2	0	2		0	14	0
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized		No								No				No		
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.10				7.12	6.50	6.22		7.10	6.64	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.20				3.52	4.00	3.32		3.50	4.13	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		88				111				97		102		12		7
Capacity, c (veh/h)		1101				1236				227		854		167		617
v/c Ratio		0.08				0.09				0.43		0.12		0.07		0.01
95% Queue Length, Q_{95} (veh)		0.3				0.3				2.0		0.4		0.2		0.0
Control Delay (s/veh)		8.6				8.2				32.1		9.8		28.2		10.9
Level of Service (LOS)		A				A				D		A		D		B
Approach Delay (s/veh)		1.8				1.6				20.6				22.1		
Approach LOS		A				A				C				C		

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HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Bluegrass Pkwy at Lakefront PL
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC	Jurisdiction	
Date Performed	12/27/2022	East/West Street	Bluegrass Pkway/Tucker Station
Analysis Year	2024	North/South Street	Lakefront Pl/Tucker Station
Time Analyzed	AM Peak Build	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Farm Credit		

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	1	0	1	1	0		0	1	1		0	1	1
Configuration		L	T	R		L		TR		LT		R		LT		R
Volume (veh/h)		182	198	135		102	405	23		67	61	94		5	12	6
Percent Heavy Vehicles (%)		3				0				2	0	2		0	14	0
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized		No								No				No		
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.10				7.12	6.50	6.22		7.10	6.64	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.20				3.52	4.00	3.32		3.50	4.13	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		198				111				139		102		18		7
Capacity, c (veh/h)		1091				1208				122		825		38		611
v/c Ratio		0.18				0.09				1.14		0.12		0.49		0.01
95% Queue Length, Q_{95} (veh)		0.7				0.3				8.4		0.4		1.7		0.0
Control Delay (s/veh)		9.0				8.3				192.9		10.0		168.3		11.0
Level of Service (LOS)		A				A				F		A		F		B
Approach Delay (s/veh)		3.2				1.6				115.5				127.3		
Approach LOS		A				A				F				F		

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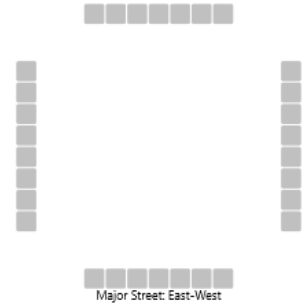
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Bluegrass Pkwy at Lakefront PL
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC	Jurisdiction	
Date Performed	12/27/2022	East/West Street	Bluegrass Pkway/Tucker Station
Analysis Year	2022	North/South Street	Lakefront Pl/Tucker Station
Time Analyzed	PM Peak	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Farm Credit		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	1	0	1	1	0		0	1	1		0	1	1
Configuration		L	T	R		L		TR		LT		R		LT		R
Volume (veh/h)		17	498	97		132	216	15		119	20	198		19	28	77
Percent Heavy Vehicles (%)		12				1				2	0	2		0	0	1
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized		No								No				No		
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.22				4.11				7.12	6.50	6.22		7.10	6.50	6.21
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.31				2.21				3.52	4.00	3.32		3.50	4.00	3.31

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		18				143				151		215		51		84
Capacity, c (veh/h)		1258				944				202		541		96		798
v/c Ratio		0.01				0.15				0.75		0.40		0.53		0.10
95% Queue Length, Q_{95} (veh)		0.0				0.5				5.0		1.9		2.4		0.3
Control Delay (s/veh)		7.9				9.5				61.9		16.0		78.9		10.0
Level of Service (LOS)		A				A				F		C		F		B
Approach Delay (s/veh)		0.2				3.5				34.9				36.1		
Approach LOS		A				A				D				E		

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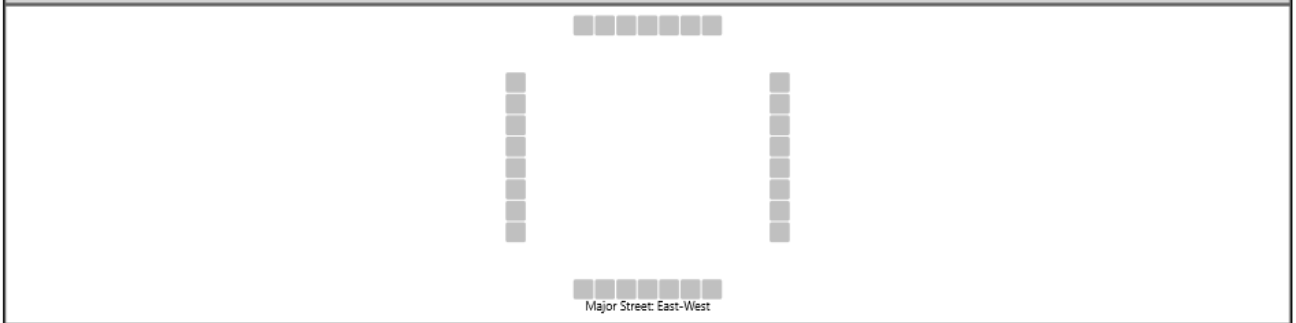
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Bluegrass Pkwy at Lakefront PL
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC	Jurisdiction	
Date Performed	12/27/2022	East/West Street	Bluegrass Pkway/Tucker Station
Analysis Year	2024	North/South Street	Lakefront Pl/Tucker Station
Time Analyzed	PM Peak No Build	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Farm Credit		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	1	0	1	1	0		0	1	1		0	1	1
Configuration		L	T	R		L		TR		LT		R		LT		R
Volume (veh/h)		17	508	99		135	220	15		121	20	202		19	29	79
Percent Heavy Vehicles (%)		12				1				2	0	2		0	0	1
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized		No								No				No		
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.22				4.11				7.12	6.50	6.22		7.10	6.50	6.21
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.31				2.21				3.52	4.00	3.32		3.50	4.00	3.31

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		18				147				153		220		52		86
Capacity, c (veh/h)		1253				933				194		533		83		794
v/c Ratio		0.01				0.16				0.79		0.41		0.63		0.11
95% Queue Length, Q_{95} (veh)		0.0				0.6				5.5		2.0		2.9		0.4
Control Delay (s/veh)		7.9				9.6				70.3		16.4		102.8		10.1
Level of Service (LOS)		A				A				F		C		F		B
Approach Delay (s/veh)		0.2				3.5				38.6				45.1		
Approach LOS		A				A				E				E		

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HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Bluegrass Pkwy at Lakefront PL
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC	Jurisdiction	
Date Performed	12/27/2022	East/West Street	Bluegrass Pkway/Tucker Station
Analysis Year	2024	North/South Street	Lakefront Pl/Tucker Station
Time Analyzed	PM Peak Build	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Farm Credit		

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	1	0	1	1	0		0	1	1		0	1	1
Configuration		L	T	R		L		TR		LT		R		LT		R
Volume (veh/h)		36	513	99		135	243	16		121	27	202		24	65	173
Percent Heavy Vehicles (%)		12				1				2	0	2		0	0	1
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized		No								No				No		
Median Type | Storage		Left Only								1						

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.22				4.11				7.12	6.50	6.22		7.10	6.50	6.21
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.31				2.21				3.52	4.00	3.32		3.50	4.00	3.31

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		39				147				161		220		97		188
Capacity, c (veh/h)		1226				929				83		529		53		768
v/c Ratio		0.03				0.16				1.94		0.41		1.82		0.24
95% Queue Length, Q_{95} (veh)		0.1				0.6				14.0		2.0		9.3		1.0
Control Delay (s/veh)		8.0				9.6				546.7		16.5		557.2		11.2
Level of Service (LOS)		A				A				F		C		F		B
Approach Delay (s/veh)		0.4				3.3				240.7				196.7		
Approach LOS		A				A				F				F		

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HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Tucker Station at Sycamore Station Place
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC	Jurisdiction	
Date Performed	12/27/2022	East/West Street	Tucker Station
Analysis Year	2022	North/South Street	Sycamore Station Place
Time Analyzed	AM Peak	Peak Hour Factor	0.91
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Farm Credit		

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		L	T					TR						L		R
Volume (veh/h)		108	158				482	14						1		24
Percent Heavy Vehicles (%)		1												0		4
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)		4.1												7.1		6.2
Critical Headway (sec)		4.11												6.40		6.24
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.21												3.50		3.34

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		119												1		26
Capacity, c (veh/h)		1029												388		540
v/c Ratio		0.12												0.00		0.05
95% Queue Length, Q_{95} (veh)		0.4												0.0		0.2
Control Delay (s/veh)		9.0												14.3		12.0
Level of Service (LOS)		A												B		B
Approach Delay (s/veh)		3.6												12.1		
Approach LOS		A												B		

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HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Tucker Station at Sycamore Station Place
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC	Jurisdiction	
Date Performed	12/27/2022	East/West Street	Tucker Station
Analysis Year	2024	North/South Street	Sycamore Station Place
Time Analyzed	AM Peak No Build	Peak Hour Factor	0.91
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Farm Credit		

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		L	T					TR						L		R
Volume (veh/h)		110	161				492	14						1		24
Percent Heavy Vehicles (%)		1												0		4
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)		4.1												7.1		6.2
Critical Headway (sec)		4.11												6.40		6.24
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.21												3.50		3.34

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		121												1		26
Capacity, c (veh/h)		1020												382		532
v/c Ratio		0.12												0.00		0.05
95% Queue Length, Q_{95} (veh)		0.4												0.0		0.2
Control Delay (s/veh)		9.0												14.5		12.1
Level of Service (LOS)		A												B		B
Approach Delay (s/veh)		3.7												12.2		
Approach LOS		A												B		

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HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Tucker Station at Sycamore Station Place
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC	Jurisdiction	
Date Performed	12/27/2022	East/West Street	Tucker Station
Analysis Year	2024	North/South Street	Sycamore Station Place
Time Analyzed	AM Peak Build	Peak Hour Factor	0.91
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Farm Credit		

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		L	T					TR						L		R
Volume (veh/h)		135	162				498	37						4		28
Percent Heavy Vehicles (%)		1												0		4
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)		4.1												7.1		6.2
Critical Headway (sec)		4.11												6.40		6.24
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.21												3.50		3.34

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		148												4		31
Capacity, c (veh/h)		992												352		519
v/c Ratio		0.15												0.01		0.06
95% Queue Length, Q_{95} (veh)		0.5												0.0		0.2
Control Delay (s/veh)		9.3												15.4		12.4
Level of Service (LOS)		A												C		B
Approach Delay (s/veh)	4.2												12.7			
Approach LOS	A												B			

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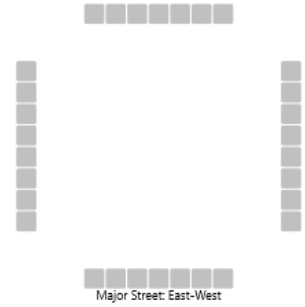
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Tucker Station at Sycamore Station Place
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC	Jurisdiction	
Date Performed	12/27/2022	East/West Street	Tucker Station
Analysis Year	2022	North/South Street	Sycamore Station Place
Time Analyzed	PM Peak	Peak Hour Factor	0.95
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Farm Credit		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		L	T					TR						L		R
Volume (veh/h)		69	648				230	3						11		131
Percent Heavy Vehicles (%)		3												0		2
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)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.40		6.22
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.50		3.32

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		73												12		138
Capacity, c (veh/h)		1315												335		795
v/c Ratio		0.06												0.03		0.17
95% Queue Length, Q_{95} (veh)		0.2												0.1		0.6
Control Delay (s/veh)		7.9												16.1		10.5
Level of Service (LOS)		A												C		B
Approach Delay (s/veh)	0.8												10.9			
Approach LOS	A												B			

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HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Tucker Station at Sycamore Station Place
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC	Jurisdiction	
Date Performed	12/27/2022	East/West Street	Tucker Station
Analysis Year	2024	North/South Street	Sycamore Station Place
Time Analyzed	PM Peak No Build	Peak Hour Factor	0.95
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Farm Credit		

Lanes

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		L	T					TR						L		R
Volume (veh/h)		70	661				235	3						11		134
Percent Heavy Vehicles (%)		3												0		2
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)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.40		6.22
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.50		3.32

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		74												12		141
Capacity, c (veh/h)		1309												329		790
v/c Ratio		0.06												0.04		0.18
95% Queue Length, Q_{95} (veh)		0.2												0.1		0.6
Control Delay (s/veh)		7.9												16.3		10.5
Level of Service (LOS)		A												C		B
Approach Delay (s/veh)		0.8												11.0		
Approach LOS		A												B		

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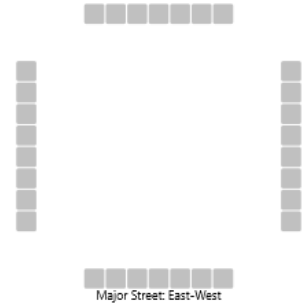
HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Tucker Station at Sycamore Station Place
Agency/Co.	Diane B. Zimmerman Traffic Engineering LLC	Jurisdiction	
Date Performed	12/27/2022	East/West Street	Tucker Station
Analysis Year	2024	North/South Street	Sycamore Station Place
Time Analyzed	PM Peak Build	Peak Hour Factor	0.95
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description	Farm Credit		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	0	1	0		0	0	0		1	0	1
Configuration		L	T					TR						L		R
Volume (veh/h)		75	666				236	8						33		157
Percent Heavy Vehicles (%)		3												0		2
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)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.40		6.22
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.50		3.32

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		79												35		165
Capacity, c (veh/h)		1302												322		786
v/c Ratio		0.06												0.11		0.21
95% Queue Length, Q_{95} (veh)		0.2												0.4		0.8
Control Delay (s/veh)		7.9												17.5		10.8
Level of Service (LOS)		A												C		B
Approach Delay (s/veh)	0.8												12.0			
Approach LOS	A												B			

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