

final report

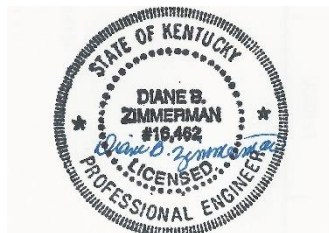
August 4, 2022  
Revised January 4, 2023

## Traffic Impact Study

3500 Lees Lane  
Louisville, KY

Prepared for

Louisville Metro Planning Commission  
Kentucky Transportation Cabinet



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## INTRODUCTION

The development plan for an apartment community on Lees Lane in Louisville, KY shows 312 apartment units. **Figure 1** displays a map of the site. Access to the community will be from two entrances on Ladd Avenue (extension) and one on Lees Lane. 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 Lees Lane with Cane Run Road and Ladd Avenue.

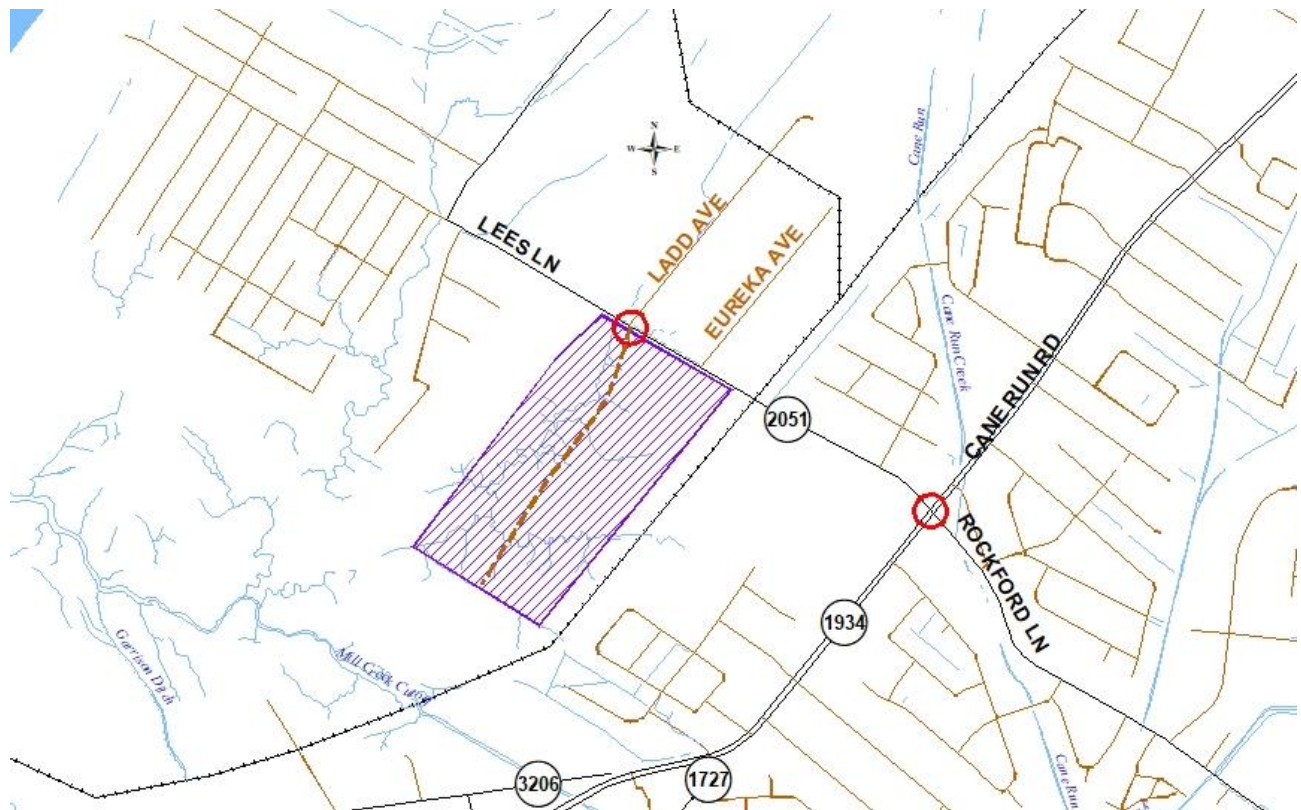


Figure 1. Site Map

## EXISTING CONDITIONS

Lees Lane, KY 2051, is maintained by the Kentucky Transportation Cabinet (KYTC) with an estimated 2022 ADT of 5,700 vehicles per day west of Cane Run Road as estimated from a 2019 count at KYTC station 852. The road is a two-lane highway with ten-foot lanes with three-foot shoulders through the study area (provided by the Kentucky Transportation Cabinet). The speed limit is 35 mph. There are no sidewalks. The intersection at Ladd Avenue is controlled with a stop sign on Ladd Avenue. The intersection with Cane Run Road is controlled with a traffic signal. At the intersection Lees Lane has a shared left/thru lane and a shared thru/right lane. There are dedicated left turn lanes on Cane Run Road.

Peak hour traffic count for the intersections were obtained on March 9, 2022. The a.m. peak was 7:00 to 8:00 and the p.m. peak hour varied. **Figure 2** illustrates the existing a.m. and p.m. peak hour traffic volumes. The Appendix contains the full count data.

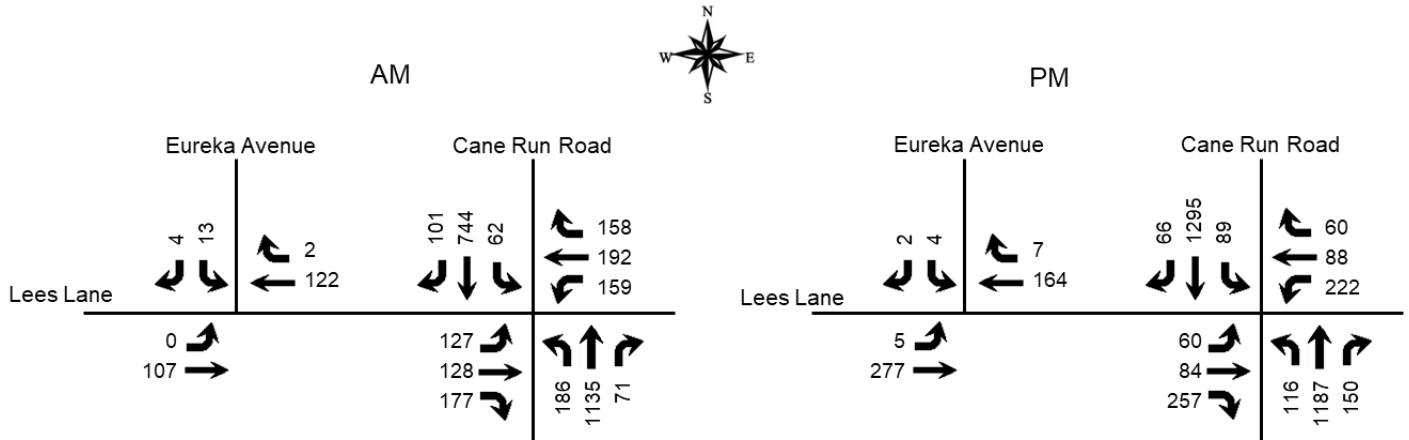


Figure 2. Existing Peak Hour Volumes

### FUTURE CONDITIONS

The projected completion year for this development is 2025. To predict traffic conditions in 2025, 2.6 percent annual growth in traffic was applied to Lees Lane west of the railroad track. This growth is based upon a review of the historical count data at the KYTC count station 852. Volumes on Cane Run Road were increased by 0.5 percent annual growth based upon a review of KYTC station 664. The Kentucky Transportation Cabinet has a project to improve the approaches of Lees Lane and Rockford Lane to provide dedicated left turn lanes. This project will be completed in 2023. **Figure 3** illustrates the 2025 traffic volumes without the development.

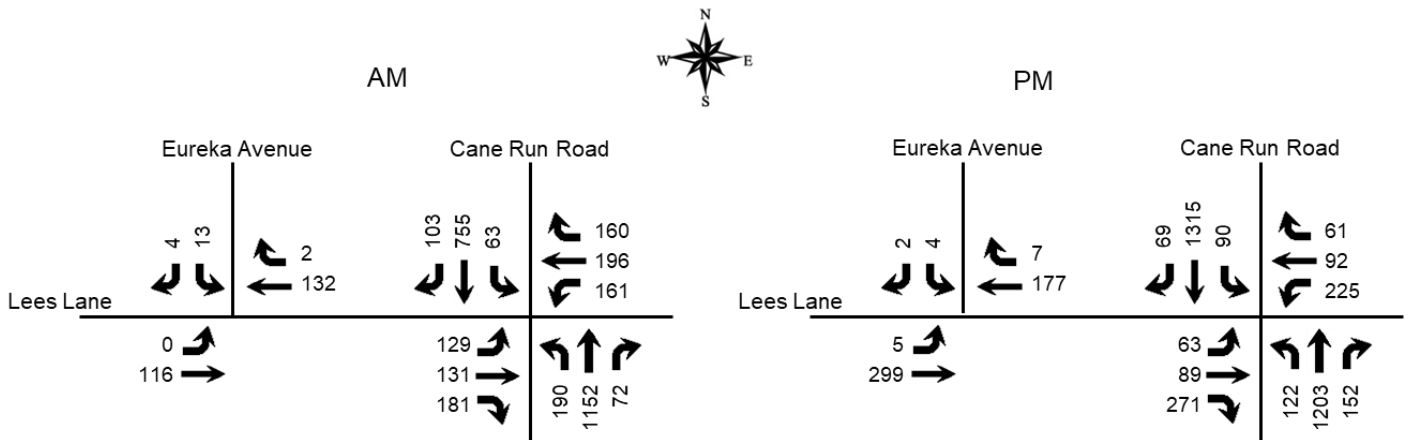


Figure 3. 2025 Peak Hour No Build Volumes

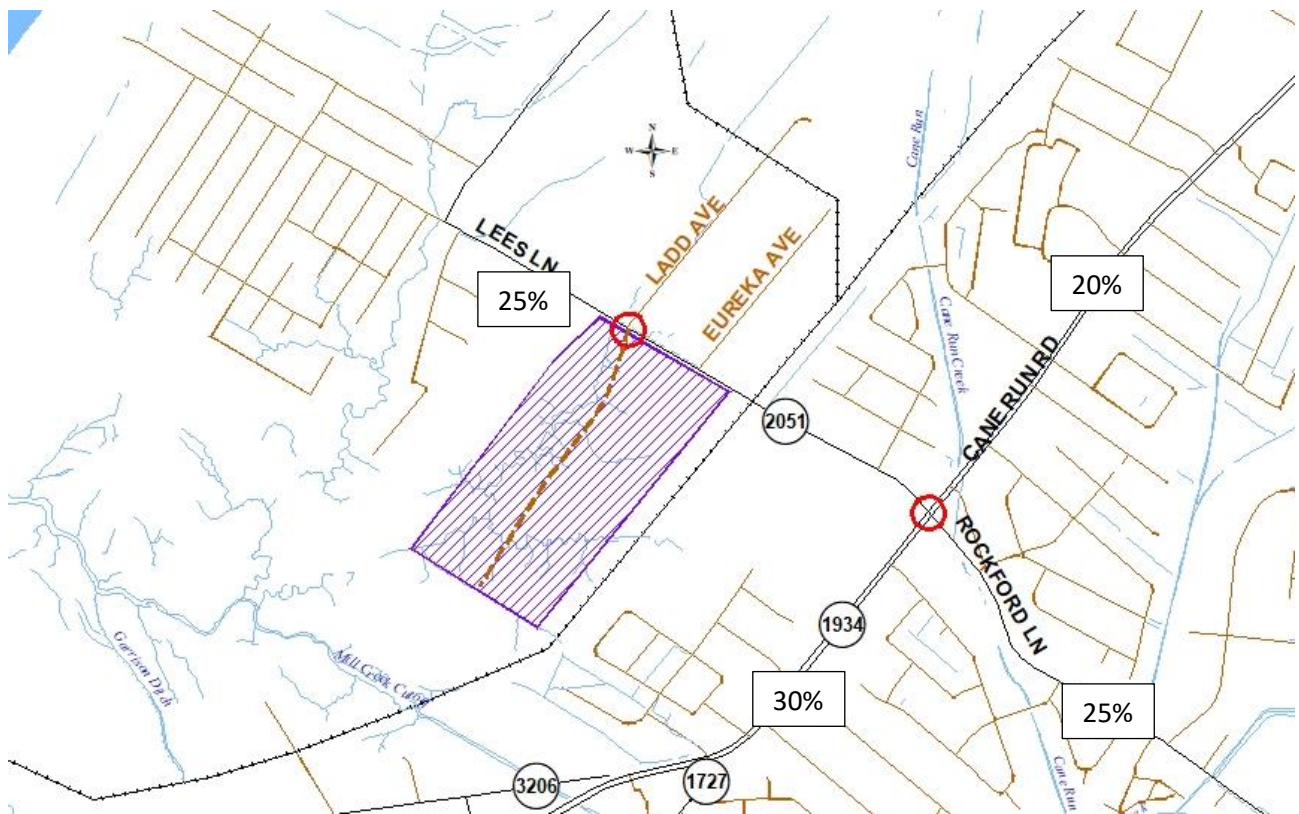
### TRIP GENERATION

The Institute of Transportation Engineers Trip Generation Manual, 11<sup>th</sup> Edition contains trip generation rates for a wide range of developments. The land use of “Multifamily Housing Low-Rise (220)” 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**

Land Use	A.M. Peak Hour			P.M. Peak Hour		
	Trips	In	Out	Trips	In	Out
Multifamily Housing Low-Rise (312 units)	120	29	91	155	98	57



**Figure 4. Trip Distribution Percentages**

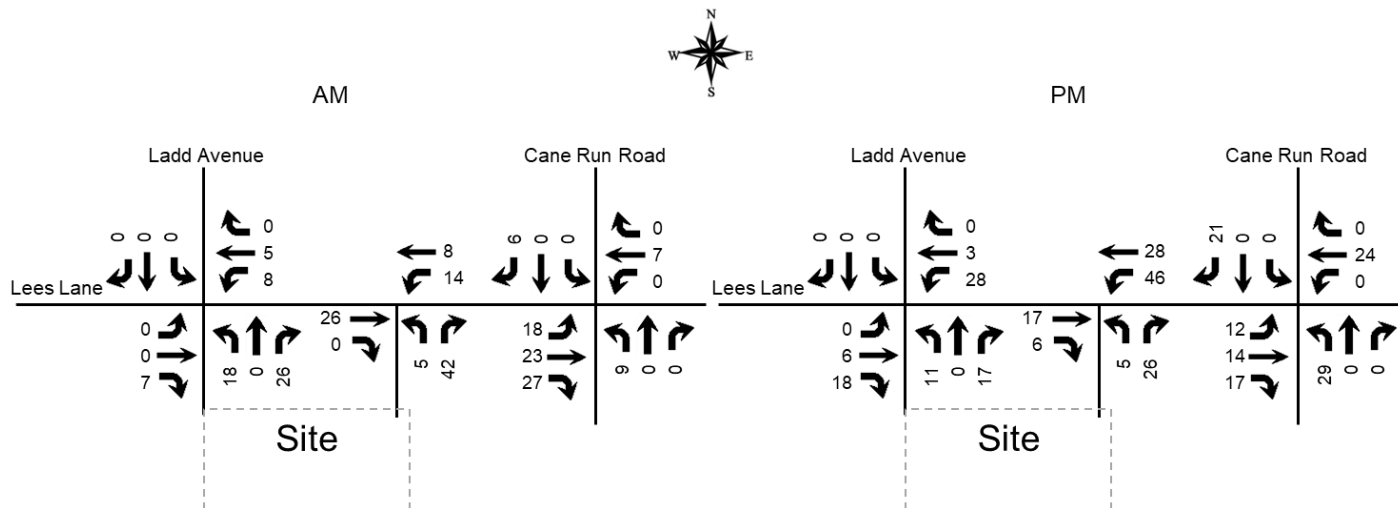


Figure 5. Peak Hour Trips Generated by Site

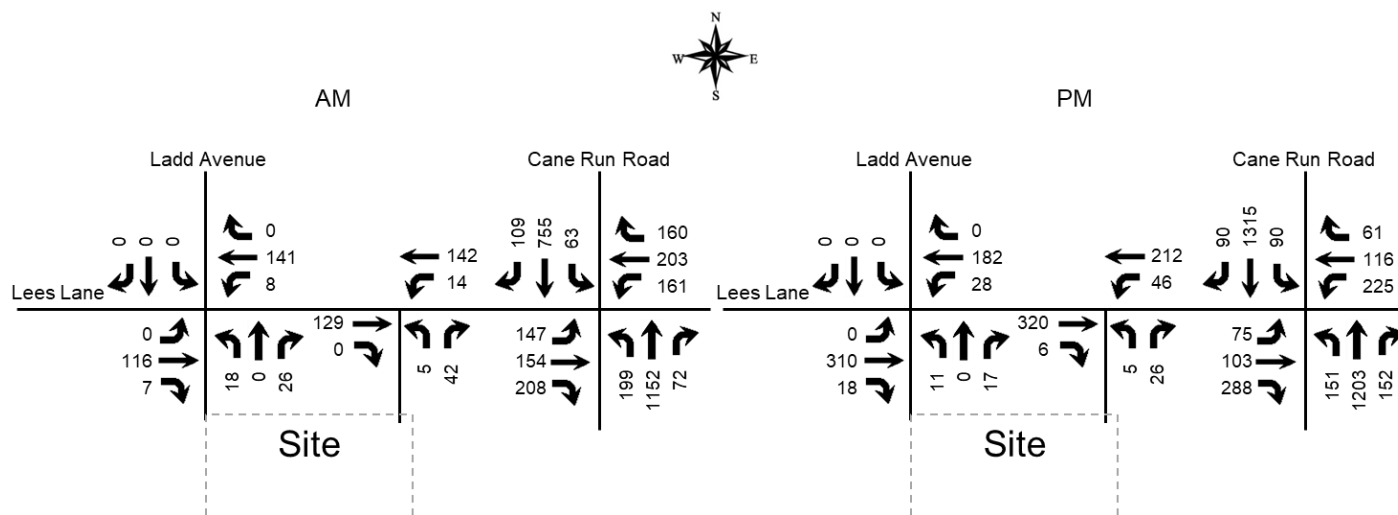


Figure 6. Build Peak Hour Volumes

## 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, 7<sup>th</sup> edition. Future delays and Level of Service were determined for the intersections using the HCS Streets and TWSC (version 2022) software. The delays and Level of Service are summarized in **Table 2**.

**Table 2. Peak Hour Level of Service**

Approach	A.M.			P.M.		
	2022 Existing	2025 No Build	2025 Build	2022 Existing	2025 No Build	2025 Build
<b>Lees Lane at Ladd Avenue</b>						
Lees Lane Westbound (left)			A 7.5			A 8.0
Ladd Avenue Northbound			A 9.8			B 11.6
<b>Lees Lane at Entrance</b>						
Lees Lane Westbound (left)			A 7.5			A 8.1
Entrance Northbound			A 9.4			B 11.1
<b>Cane Run Road at Lees Lane</b>						
	<b>E 61.0</b>	<b>D 48.7</b>	<b>D 50.9</b>	<b>D 52.6</b>	<b>D 35.8</b>	<b>D 33.8</b>
Lees Lane Eastbound	F 82.6	D 54.5	D 53.8	F 86.6	C 34.8	C 36.3
Rockford Lane Westbound	E 79.0	E 69.4	E 69.3	F 93.4	E 69.6	E 68.8
Cane Run Road Northbound	D 52.3	D 42.5	D 45.4	D 45.6	C 33.2	D 37.9
Cane Run Road Southbound	D 54.0	D 44.4	D 47.7	D 41.2	C 30.1	C 32.3

*Key: Level of Service, Delay in seconds per vehicle*

The entrance on Lees Lane was evaluated for turn lanes using the Kentucky Transportation Cabinet Highway Design Guidance Manual dated July, 2020. The traffic impact policy requires using volumes for ten years beyond opening date, or 2035. The 2035 volumes were determined by using 2.6% annual growth from the 2022 volumes on Lees Lane west of the railroad track and 0.5% annual growth on Cane Run Road. **Figure 7** is the 2035 No Build and **Figure 8** is the Build. The volumes in Figure 8 were utilized to determine turn lane requirements. Neither entrance meets the volume warrants for installing turn lanes. **Table 3** displays the level of service results for 2035.

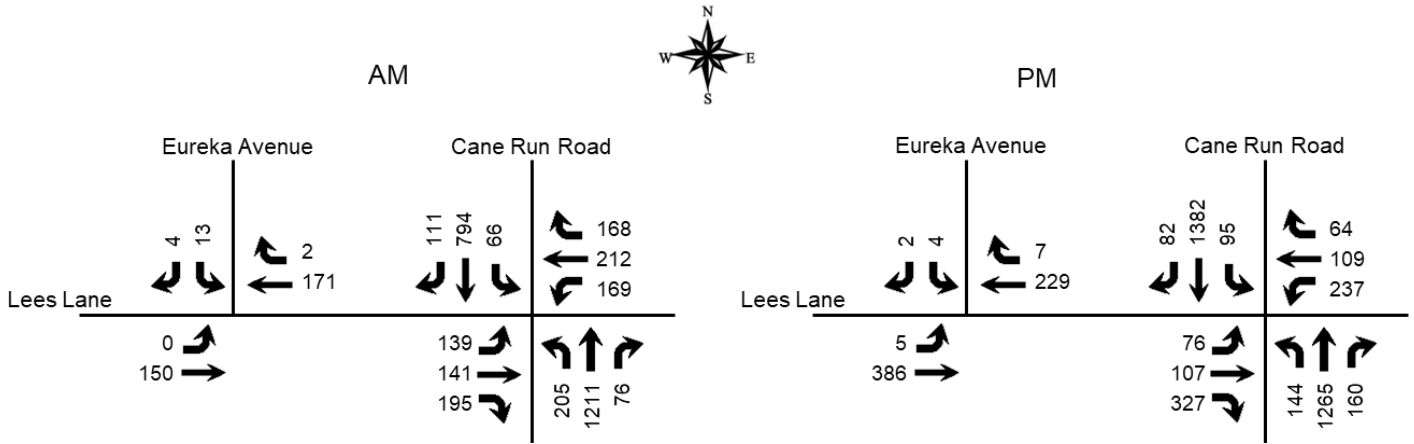


Figure 7. 2035 No Build Peak Hour Volumes

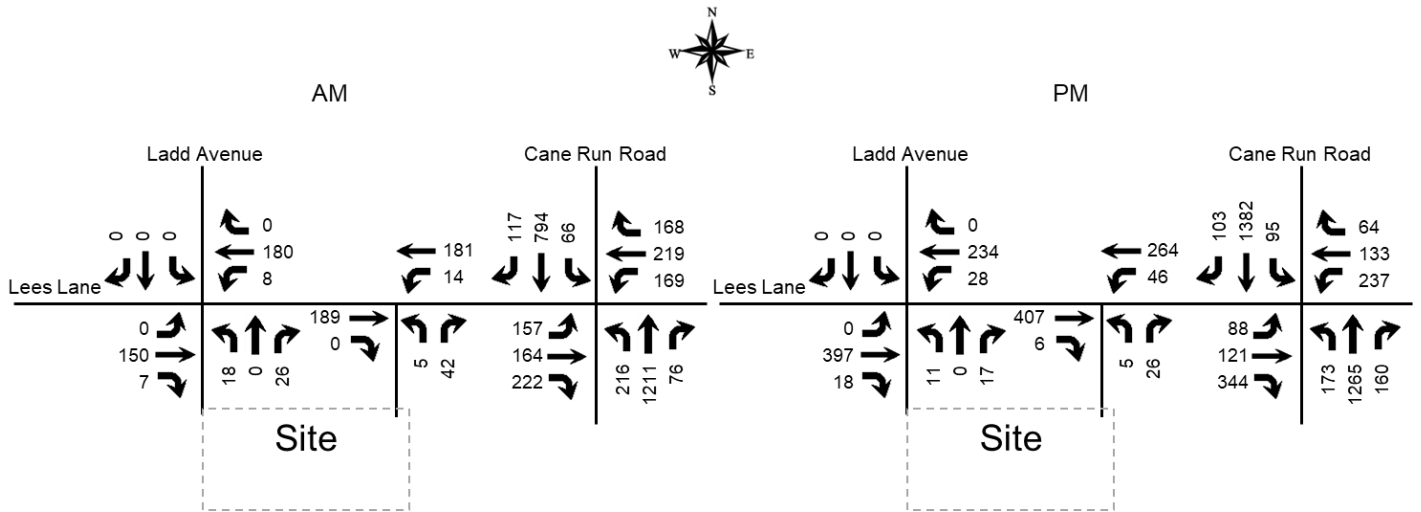


Figure 8. 2035 Build Peak Hour Volumes

Table 3. Peak Hour Level of Service

Approach	A.M.			P.M.		
	2022 Existing	2035 No Build	2035 Build	2022 Existing	2035 No Build	2035 Build
<b>Lees Lane at Ladd Avenue</b>						
Lees Lane Westbound (left)			A 7.6			A 8.3
Ladd Avenue Northbound			B 10.3			B 12.8



Approach	A.M.			P.M.		
	2022 Existing	2035 No Build	2035 Build	2022 Existing	2035 No Build	2035 Build
<b>Lees Lane at Entrance</b>						
Lees Lane Westbound (left)			A 7.7			A 8.3
Entrance Northbound			A 9.9			B 12.1
<b>Cane Run Road at Lees Lane</b>	<b>E 61.0</b>	<b>D 53.7</b>	<b>E 56.5</b>	<b>D 52.6</b>	<b>D 42.8</b>	<b>D 46.6</b>
Lees Lane Eastbound	F 82.6	D 52.7	D 53.0	F 86.6	D 36.0	D 34.3
Rockford Lane Westbound	E 79.0	E 69.7	E 70.1	F 93.4	E 64.8	E 66.3
Cane Run Road Northbound	D 52.3	D 50.2	D 54.2	D 45.6	D 43.8	D 45.9
Cane Run Road Southbound	D 54.0	D 51.0	D 54.8	D 41.2	D 37.8	D 45.8

*Key: Level of Service, Delay in seconds per vehicle*

## CONCLUSIONS

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2025 and 2035, there will be an impact to the existing highway network, with Levels of Service remaining within acceptable ranges. Turn lanes are not required at the entrances.

## APPENDIX

Traffic Counts



Classified Turn Movement Count || All vehicles

Louisville, KY

Site 1 of 2

Eureka Ave  
Less Ln (West)  
Less Ln (East)

Date

Wednesday, March 9, 2022

Lat/Long

38.187205°, -85.862197°

Weather

Wintry Mix  
42°F

0700 - 0900 (Weekday 2h Session) (03-09-2022)

All vehicles

TIME	Southbound Eureka Ave				Eastbound Less Ln (West)				Westbound Less Ln (East)				Int Total
	Left 1.1	Right 1.2	U-Turn 1.3	App Total	Left 1.4	Thru 1.5	U-Turn 1.6	App Total	Thru 1.7	Right 1.8	U-Turn 1.9	App Total	
0700 - 0715	3	0	0	3	0	39	0	39	29	1	0	30	72
0715 - 0730	2	1	0	3	0	31	0	31	36	0	0	36	70
0730 - 0745	5	2	0	7	0	25	0	25	29	1	0	30	62
0745 - 0800	3	1	0	4	0	12	0	12	28	0	0	28	44
Hourly Total	13	4	0	17	0	107	0	107	122	2	0	124	248
0800 - 0815	2	0	0	2	0	23	0	23	29	2	0	31	56
0815 - 0830	2	0	0	2	0	31	0	31	14	0	0	14	47
0830 - 0845	3	1	0	4	0	33	0	33	22	2	0	24	61
0845 - 0900	0	0	0	0	0	27	0	27	34	1	0	35	62
Hourly Total	7	1	0	8	0	114	0	114	99	5	0	104	226
Grand Total	20	5	0	25	0	221	0	221	221	7	0	228	474
Approach %	80.00	20.00	0.00	-	0.00	100.00	0.00	-	96.93	3.07	0.00	-	
Intersection %	4.22	1.05	0.00	5.27	0.00	46.62	0.00	46.62	46.62	1.48	0.00	48.10	
PHF	0.65	0.50	0.00	0.61	0.00	0.69	0.00	0.69	0.85	0.50	0.00	0.86	0.86

1600 - 1800 (Weekday 2h Session) (03-09-2022)

All vehicles

TIME	Southbound Eureka Ave				Eastbound Less Ln (West)				Westbound Less Ln (East)				Int Total
	Left 1.1	Right 1.2	U-Turn 1.3	App Total	Left 1.4	Thru 1.5	U-Turn 1.6	App Total	Thru 1.7	Right 1.8	U-Turn 1.9	App Total	
1600 - 1615	3	1	0	4	1	78	0	79	26	4	0	30	113
1615 - 1630	1	0	0	1	0	73	0	73	33	4	0	37	111
1630 - 1645	2	0	0	2	2	67	0	69	48	1	0	49	120
1645 - 1700	1	0	0	1	0	56	0	56	38	1	0	39	96
Hourly Total	7	1	0	8	3	274	0	277	145	10	0	155	440
1700 - 1715	0	0	0	0	2	77	0	79	40	1	0	41	120
1715 - 1730	1	2	0	3	1	77	0	78	38	4	0	42	123
1730 - 1745	3	3	0	6	2	55	0	57	22	2	0	24	87
1745 - 1800	0	0	0	0	2	44	0	46	33	4	0	37	83
Hourly Total	4	5	0	9	7	253	0	260	133	11	0	144	413
Grand Total	11	6	0	17	10	527	0	537	278	21	0	299	853
Approach %	64.71	35.29	0.00	-	1.86	98.14	0.00	-	92.98	7.02	0.00	-	
Intersection %	1.29	0.70	0.00	1.99	1.17	61.78	0.00	62.95	32.59	2.46	0.00	35.05	
PHF	0.50	0.25	0.00	0.50	0.63	0.90	0.00	0.89	0.85	0.44	0.00	0.87	0.93

**Classified Turn Movement Count || All vehicles**

Louisville, KY

**Site 2 of 2**  
KY-1934 Cane Run Rd (South)  
KY-1934 Cane Run Rd (North)  
Lees Ln  
Rockford Ln

**Date**  
Wednesday, March 9, 2022

**Weather**  
Wintry Mix  
42°F

**Lat/Long**  
38.183856°, -85.855314°

**0700 - 0900 (Weekday 2h Session) (03-09-2022)**  
All vehicles

TIME	Northbound					Southbound					Eastbound					Westbound					Int Total
	KY-1934 Cane Run Rd (South)					KY-1934 Cane Run Rd (North)					Lees Ln					Rockford Ln					
	Left	Thru	Right	U-Turn	App Total	Left	Thru	Right	U-Turn	App Total	Left	Thru	Right	U-Turn	App Total	Left	Thru	Right	U-Turn	App Total	
0700 - 0715	65	272	18	0	355	12	172	25	1	210	27	28	58	0	113	35	44	26	0	105	783
0715 - 0730	57	277	18	0	352	14	185	39	0	238	41	36	53	0	130	32	47	39	0	118	838
0730 - 0745	43	292	20	0	355	21	198	21	0	240	33	52	48	0	133	43	72	42	0	157	885
0745 - 0800	21	294	15	0	330	14	189	16	0	219	26	12	18	0	56	49	29	51	0	129	734
Hourly Total	186	1135	71	0	1392	61	744	101	1	907	127	128	177	0	432	159	192	158	0	509	3240
0800 - 0815	26	330	22	0	378	13	180	6	0	199	10	14	16	0	40	33	17	41	0	91	708
0815 - 0830	14	268	11	0	293	13	174	11	0	198	7	15	20	0	42	29	10	24	0	63	596
0830 - 0845	19	298	35	0	352	16	179	10	0	205	6	6	26	0	38	35	8	34	0	77	672
0845 - 0900	32	241	21	0	294	18	203	15	0	236	6	8	31	0	45	49	21	51	0	121	696
Hourly Total	91	1137	89	0	1317	60	736	42	0	838	29	43	93	0	165	146	56	150	0	352	2672
Grand Total	277	2272	160	0	2709	121	1480	143	1	1745	156	171	270	0	597	305	248	308	0	861	5912
Approach %	10.23	83.87	5.91	0.00	-	6.93	84.81	8.19	0.06	-	26.13	28.64	45.23	0.00	-	35.42	28.80	35.77	0.00	-	-
Intersection %	4.69	38.43	2.71	0.00	45.82	2.05	25.03	2.42	0.02	29.52	2.64	2.89	4.57	0.00	10.10	5.16	4.19	5.21	0.00	14.56	-
PHF	0.72	0.97	0.89	0.00	0.98	0.73	0.94	0.65	0.25	0.94	0.77	0.62	0.76	0.00	0.81	0.81	0.67	0.77	0.00	0.81	0.92

**1600 - 1800 (Weekday 2h Session) (03-09-2022)**  
All vehicles

TIME	Northbound					Southbound					Eastbound					Westbound					Int Total
	KY-1934 Cane Run Rd (South)					KY-1934 Cane Run Rd (North)					Lees Ln					Rockford Ln					
	Left	Thru	Right	U-Turn	App Total	Left	Thru	Right	U-Turn	App Total	Left	Thru	Right	U-Turn	App Total	Left	Thru	Right	U-Turn	App Total	
1600 - 1615	20	259	39	0	318	29	255	13	0	297	4	20	71	0	95	44	15	7	0	66	776
1615 - 1630	26	298	48	0	372	17	352	11	0	380	10	21	55	0	86	68	24	18	0	110	948
1630 - 1645	32	270	29	0	331	26	317	13	1	357	19	28	64	0	111	44	20	9	0	73	872
1645 - 1700	25	323	38	0	386	19	333	20	0	372	13	19	53	0	85	61	21	18	0	100	943
Hourly Total	103	1150	154	0	1407	91	1257	57	1	1406	46	88	243	0	377	217	80	52	0	349	3539
1700 - 1715	33	296	35	0	364	26	293	22	0	341	18	16	85	0	119	49	23	15	0	87	911
1715 - 1730	24	280	29	0	333	12	353	11	0	376	11	27	59	0	97	47	23	13	0	83	889
1730 - 1745	21	258	29	0	308	25	347	13	0	385	13	28	61	0	102	44	16	12	0	72	867
1745 - 1800	26	218	31	0	275	23	273	6	0	302	15	20	51	0	86	50	19	18	0	87	750
Hourly Total	104	1052	124	0	1280	86	1266	52	0	1404	57	91	256	0	404	190	81	58	0	329	3417
Grand Total	207	2202	278	0	2687	177	2523	109	1	2810	103	179	499	0	781	407	161	110	0	678	6956
Approach %	7.70	81.95	10.35	0.00	-	6.30	89.79	3.88	0.04	-	13.19	22.92	63.89	0.00	-	60.03	23.75	16.22	0.00	-	-
Intersection %	2.98	31.66	4.00	0.00	38.63	2.54	36.27	1.57	0.01	40.40	1.48	2.57	7.17	0.00	11.23	5.85	2.31	1.58	0.00	9.75	-
PHF	0.88	0.92	0.78	0.00	0.94	0.85	0.92	0.75	0.25	0.95	0.79	0.75	0.76	0.00	0.84	0.82	0.92	0.83	0.00	0.84	0.97

HCS Reports

HCS Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	Diane Zimmerman							Intersection	Lees Ln at Ladd Ave							
Agency/Co.	Diane B. Zimmerman Traffic Engineering							Jurisdiction								
Date Performed	8/5/2022							East/West Street	Lees Lane							
Analysis Year	2025							North/South Street	Entrance							
Time Analyzed	AM Peak							Peak Hour Factor	0.86							
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25							
Project Description	Lees Lane															
Lanes																
<p style="text-align: center;">Major Street: East-West</p>																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0	0	1	0		0	0	0	
Configuration				TR		LT					LR					
Volume (veh/h)			116	7		8	141			18		26				
Percent Heavy Vehicles (%)						0				0		0				
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)						4.10				6.40		6.20				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.20				3.50		3.30				
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)						9				51						
Capacity, c (veh/h)						1452				797						
v/c Ratio						0.01				0.06						
95% Queue Length, Q <sub>95</sub> (veh)						0.0				0.2						
Control Delay (s/veh)						7.5	0.1			9.8						
Level of Service (LOS)						A	A			A						
Approach Delay (s/veh)						0.5				9.8						
Approach LOS						A				A						

HCS Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	Diane Zimmerman							Intersection	Lees Ln at Ladd Ave							
Agency/Co.	Diane B. Zimmerman Traffic Engineering							Jurisdiction								
Date Performed	8/5/2022							East/West Street	Lees Lane							
Analysis Year	2035							North/South Street	Entrance							
Time Analyzed	AM Peak							Peak Hour Factor	0.86							
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25							
Project Description	Lees Lane															
Lanes																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6	7	8	9		10	11	12	
Number of Lanes	0	0	1	0	0	0	1	0	0	1	0		0	0	0	
Configuration				TR		LT					LR					
Volume (veh/h)			150	7		8	180			18		26				
Percent Heavy Vehicles (%)						0				0		0				
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)						4.10				6.40		6.20				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.20				3.50		3.30				
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)						9				51						
Capacity, c (veh/h)						1405				735						
v/c Ratio						0.01				0.07						
95% Queue Length, Q <sub>95</sub> (veh)						0.0				0.2						
Control Delay (s/veh)						7.6	0.1			10.3						
Level of Service (LOS)						A	A			B						
Approach Delay (s/veh)						0.4				10.3						
Approach LOS						A				B						

HCS Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	Diane Zimmerman							Intersection	Lees Ln at Ladd Ave							
Agency/Co.	Diane B. Zimmerman Traffic Engineering							Jurisdiction								
Date Performed	8/5/2022							East/West Street	Lees Lane							
Analysis Year	2025							North/South Street	Entrance							
Time Analyzed	PM Peak							Peak Hour Factor	0.93							
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25							
Project Description	Lees Lane															
Lanes																
<p style="text-align: center;">Major Street: East-West</p>																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6	7	8	9		10	11	12	
Number of Lanes	0	0	1	0	0	0	1	0	0	1	0		0	0	0	
Configuration				TR		LT					LR					
Volume (veh/h)			310	18		28	182		11		17					
Percent Heavy Vehicles (%)						0			0		0					
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)						4.10			6.40		6.20					
Base Follow-Up Headway (sec)						2.2			3.5		3.3					
Follow-Up Headway (sec)						2.20			3.50		3.30					
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)					30				30							
Capacity, c (veh/h)					1217				579							
v/c Ratio					0.02				0.05							
95% Queue Length, Q <sub>95</sub> (veh)					0.1				0.2							
Control Delay (s/veh)					8.0	0.2			11.6							
Level of Service (LOS)					A	A			B							
Approach Delay (s/veh)					1.3				11.6							
Approach LOS					A				B							

HCS Two-Way Stop-Control Report																	
General Information								Site Information									
Analyst	Diane Zimmerman							Intersection	Lees Ln at Ladd Ave								
Agency/Co.	Diane B. Zimmerman Traffic Engineering							Jurisdiction									
Date Performed	8/5/2022							East/West Street	Lees Lane								
Analysis Year	2035							North/South Street	Entrance								
Time Analyzed	PM Peak							Peak Hour Factor	0.93								
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25								
Project Description	Lees Lane																
Lanes																	
<p style="text-align: center;">Major Street: East-West</p>																	
Vehicle Volumes and Adjustments																	
Approach	Eastbound				Westbound				Northbound				Southbound				
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Priority	1U	1	2	3	4U	4	5	6			7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0			0	1	0		0	0	0
Configuration				TR		LT						LR					
Volume (veh/h)			397	18		28	234				11		17				
Percent Heavy Vehicles (%)						0					0		0				
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)						4.10					6.40		6.20				
Base Follow-Up Headway (sec)						2.2					3.5		3.3				
Follow-Up Headway (sec)						2.20					3.50		3.30				
Delay, Queue Length, and Level of Service																	
Flow Rate, v (veh/h)						30					30						
Capacity, c (veh/h)						1125					492						
v/c Ratio						0.03					0.06						
95% Queue Length, Q <sub>95</sub> (veh)						0.1					0.2						
Control Delay (s/veh)						8.3	0.3				12.8						
Level of Service (LOS)						A	A				B						
Approach Delay (s/veh)						1.1					12.8						
Approach LOS						A					B						



HCS Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	Diane Zimmerman							Intersection	Lees Ln at Entrance							
Agency/Co.	Diane B. Zimmerman Traffic Engineering							Jurisdiction								
Date Performed	8/5/2022							East/West Street	Lees Lane							
Analysis Year	2025							North/South Street	Entrance							
Time Analyzed	AM Peak							Peak Hour Factor	0.86							
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25							
Project Description	Lees Lane															
Lanes																
<p style="text-align: center;">Major Street: East-West</p>																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6	7	8	9		10	11	12	
Number of Lanes	0	0	1	0	0	0	1	0	0	1	0		0	0	0	
Configuration				TR		LT					LR					
Volume (veh/h)			129	0		14	142			5		42				
Percent Heavy Vehicles (%)						0				0		0				
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)						4.10				6.40		6.20				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.20				3.50		3.30				
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)						16						55				
Capacity, c (veh/h)						1444						865				
v/c Ratio						0.01						0.06				
95% Queue Length, Q <sub>95</sub> (veh)						0.0						0.2				
Control Delay (s/veh)						7.5	0.1					9.4				
Level of Service (LOS)						A	A					A				
Approach Delay (s/veh)						0.8						9.4				
Approach LOS						A						A				

HCS Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	Diane Zimmerman							Intersection	Lees Ln at Entrance							
Agency/Co.	Diane B. Zimmerman Traffic Engineering							Jurisdiction								
Date Performed	8/5/2022							East/West Street	Lees Lane							
Analysis Year	2035							North/South Street	Entrance							
Time Analyzed	AM Peak							Peak Hour Factor	0.86							
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25							
Project Description	Lees Lane															
Lanes																
<p style="text-align: center;">Major Street: East-West</p>																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			189	0		14	181			5		42				
Percent Heavy Vehicles (%)						0				0		0				
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)						4.10				6.40		6.20				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.20				3.50		3.30				
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)						16					55					
Capacity, c (veh/h)						1361					784					
v/c Ratio						0.01					0.07					
95% Queue Length, Q <sub>95</sub> (veh)						0.0					0.2					
Control Delay (s/veh)						7.7	0.1				9.9					
Level of Service (LOS)						A	A				A					
Approach Delay (s/veh)					0.6				9.9							
Approach LOS					A				A							

HCS Two-Way Stop-Control Report																	
General Information								Site Information									
Analyst	Diane Zimmerman							Intersection	Lees Ln at Entrance								
Agency/Co.	Diane B. Zimmerman Traffic Engineering							Jurisdiction									
Date Performed	8/5/2022							East/West Street	Lees Lane								
Analysis Year	2025							North/South Street	Entrance								
Time Analyzed	PM Peak							Peak Hour Factor	0.93								
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25								
Project Description	Lees Lane																
Lanes																	
<p style="text-align: center;">Major Street: East-West</p>																	
Vehicle Volumes and Adjustments																	
Approach	Eastbound				Westbound				Northbound				Southbound				
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Priority	1U	1	2	3	4U	4	5	6			7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0			0	1	0		0	0	0
Configuration				TR		LT						LR					
Volume (veh/h)			320	6		46	212				5		26				
Percent Heavy Vehicles (%)						0					0		0				
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)						4.10					6.40		6.20				
Base Follow-Up Headway (sec)						2.2					3.5		3.3				
Follow-Up Headway (sec)						2.20					3.50		3.30				
Delay, Queue Length, and Level of Service																	
Flow Rate, v (veh/h)						49					33						
Capacity, c (veh/h)						1220					626						
v/c Ratio						0.04					0.05						
95% Queue Length, Q <sub>95</sub> (veh)						0.1					0.2						
Control Delay (s/veh)						8.1	0.4				11.1						
Level of Service (LOS)						A	A				B						
Approach Delay (s/veh)						1.7					11.1						
Approach LOS						A					B						

HCS Two-Way Stop-Control Report																			
General Information								Site Information											
Analyst	Diane Zimmerman							Intersection	Lees Ln at Entrance										
Agency/Co.	Diane B. Zimmerman Traffic Engineering							Jurisdiction											
Date Performed	8/5/2022							East/West Street	Lees Lane										
Analysis Year	2035							North/South Street	Entrance										
Time Analyzed	PM Peak							Peak Hour Factor	0.93										
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25										
Project Description	Lees Lane																		
Lanes																			
<p style="text-align: center;">Major Street: East-West</p>																			
Vehicle Volumes and Adjustments																			
Approach	Eastbound				Westbound				Northbound				Southbound						
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R			
Priority	1U	1	2	3	4U	4	5	6			7	8	9			10	11	12	
Number of Lanes	0	0	1	0	0	0	1	0			0	1	0			0	0	0	
Configuration				TR			LT					LR							
Volume (veh/h)				407	6			46	264			5		26					
Percent Heavy Vehicles (%)								0				0		0					
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)								4.10					6.40			6.20			
Base Follow-Up Headway (sec)								2.2					3.5			3.3			
Follow-Up Headway (sec)								2.20					3.50			3.30			
Delay, Queue Length, and Level of Service																			
Flow Rate, v (veh/h)								49					33						
Capacity, c (veh/h)								1127					542						
v/c Ratio								0.04					0.06						
95% Queue Length, Q <sub>95</sub> (veh)								0.1					0.2						
Control Delay (s/veh)								8.3	0.4				12.1						
Level of Service (LOS)								A	A				B						
Approach Delay (s/veh)								1.6				12.1							
Approach LOS								A				B							

### HCS Signalized Intersection Results Summary

General Information				Intersection Information																							
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250																						
Analyst	Diane Zimmerman	Analysis Date	8/4/2022	Area Type	Other																						
Jurisdiction		Time Period	AM Peak	PHF	0.92																						
Urban Street	Cane Run Road	Analysis Year	2022	Analysis Period	1> 7:00																						
Intersection	Lees Lane	File Name	AM 22.xus																								
Project Description	3500 Lees Lane																										
Demand Information				EB			WB			NB			SB														
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R															
Demand ( v ), veh/h	127	128	177	159	192	158	186	1135	71	62	744	101															
Signal Information																											
Cycle, s	180.0	Reference Phase	2																								
Offset, s	0	Reference Point	End																								
Uncoordinated	No	Simult. Gap E/W	Off	Green	17.6	55.9	6.1	30.5	34.8	0.0																	
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.3	4.3	4.3	3.6	3.6	0.0																	
				Red	3.0	3.0	3.0	3.0	3.0	0.0																	
Timer Results				EBL			EBT			WBL			WBT			NBL			NBT			SBL			SBT		
Assigned Phase				4			8			5			2			1			6								
Case Number				12.0			12.0			1.2			4.0			1.3			4.0								
Phase Duration, s				37.1			41.4			24.9			88.1			13.4			76.6								
Change Period, ( Y+R c ), s				6.6			6.6			7.3			7.3			7.3			7.3								
Max Allow Headway ( MAH ), s				5.7			4.7			6.5			0.0			4.5			0.0								
Queue Clearance Time ( g s ), s				27.2			32.1			15.8			2.0														
Green Extension Time ( g e ), s				3.3			2.7			1.9			0.0			4.4			0.0								
Phase Call Probability				1.00			1.00			1.00			0.97														
Max Out Probability				0.02			0.00			0.00			0.17														
Movement Group Results				EB			WB			NB			SB														
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R															
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16															
Adjusted Flow Rate ( v ), veh/h	257		213	299		254	202	662	649	67	469	449															
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1778		1570	1746		1601	1739	1811	1773	1654	1767	1692															
Queue Service Time ( g s ), s	25.2		23.4	30.1		27.4	13.8	57.1	57.3	0.0	40.0	40.0															
Cycle Queue Clearance Time ( g c ), s	25.2		23.4	30.1		27.4	13.8	57.1	57.3	0.0	40.0	40.0															
Green Ratio ( g/C )	0.17		0.17	0.19		0.19	0.42	0.45	0.45	0.33	0.38	0.38															
Capacity ( c ), veh/h	302		266	337		309	262	813	796	143	680	651															
Volume-to-Capacity Ratio ( X )	0.851		0.799	0.888		0.820	0.771	0.814	0.816	0.472	0.690	0.690															
Back of Queue ( Q ), ft/ln ( 95 th percentile)																											
Back of Queue ( Q ), veh/ln ( 95 th percentile)	18.3		15.3	20.7		17.4	11.0	35.5	35.1	5.6	25.5	24.6															
Queue Storage Ratio ( RQ ) ( 95 th percentile)	2.72		2.28	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00															
Uniform Delay ( d 1 ), s/veh	72.5		71.8	70.7		69.6	41.6	43.1	43.2	76.6	46.4	46.4															
Incremental Delay ( d 2 ), s/veh	11.5		9.1	10.8		6.4	12.3	8.8	9.1	2.9	5.7	5.9															
Initial Queue Delay ( d 3 ), s/veh	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0															
Control Delay ( d ), s/veh	84.1		80.8	81.5		76.0	53.9	51.9	52.2	79.5	52.0	52.3															
Level of Service ( LOS )	F		F	F		E	D	D	D	E	D	D															
Approach Delay, s/veh / LOS	82.6		F	79.0		E	52.3		D	54.0		D															
Intersection Delay, s/veh / LOS				61.0						E																	
Multimodal Results				EB			WB			NB			SB														
Pedestrian LOS Score / LOS	2.32		B	2.34		B	2.17		B	2.13		B															
Bicycle LOS Score / LOS	0.87		A	0.94		A	1.74		B	1.30		A															

Beginning in 2023, this intersection will be modified to an eastbound L, T, R lane and westbound L, T/R. There will be dedicated left-turn phasing for e/w and an eastbound right-turn overlap with northbound left.

HCS Signalized Intersection Results Summary																								
<b>General Information</b>							<b>Intersection Information</b>																	
Agency	Diane B. Zimmerman Traffic Engineering						Duration, h	0.250																
Analyst	Diane Zimmerman			Analysis Date	Jan 5, 2023			Area Type	Other															
Jurisdiction				Time Period	AM Peak			PHF	0.92															
Urban Street	Cane Run Road			Analysis Year	2025 No Build			Analysis Period	1> 7:00															
Intersection	Lees Lane			File Name	AM 25 NB.xus																			
Project Description	3500 Lees Lane																							
<b>Demand Information</b>				EB			WB			NB			SB											
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R												
Demand ( v ), veh/h	129	131	181	161	196	160	190	1152	72	63	755	103												
<b>Signal Information</b>																								
Cycle, s	180.0	Reference Phase	2																					
Offset, s	0	Reference Point	End																					
Uncoordinated	No	Simult. Gap E/W	Off	Green	16.6	65.3	6.2	13.2	2.7	40.9														
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.3	4.3	4.3	3.6	0.0	3.6														
				Red	3.0	3.0	3.0	3.0	0.0	3.0														
<b>Timer Results</b>				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT													
Assigned Phase	7			4			3			8			5			2			1			6		
Case Number	1.1			3.0			1.1			4.0			1.2			4.0			1.3			4.0		
Phase Duration, s	19.8			47.5			22.5			50.2			23.9			96.5			13.5			86.1		
Change Period, ( Y+R ), s	6.6			6.6			6.6			6.6			7.3			7.3			7.3			7.3		
Max Allow Headway ( MAH ), s	4.1			5.2			4.1			5.2			6.5			0.0			4.5			0.0		
Queue Clearance Time ( g <sub>s</sub> ), s	12.9			20.4			15.5			39.9			15.0						2.0					
Green Extension Time ( g <sub>e</sub> ), s	0.3			4.6			0.4			3.7			1.6			0.0			4.4			0.0		
Phase Call Probability	1.00			1.00			1.00			1.00			1.00						0.97					
Max Out Probability	0.00			0.01			0.02			0.15			0.01						0.17					
<b>Movement Group Results</b>				EB			WB			NB			SB											
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R												
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16												
Adjusted Flow Rate ( v ), veh/h	140	142	197	175	365		207	671	659	68	476	456												
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1753	1826	1510	1767	1671		1739	1811	1773	1654	1767	1692												
Queue Service Time ( g <sub>s</sub> ), s	10.9	11.8	18.4	13.5	37.9		13.0	53.5	53.7	0.0	37.4	37.4												
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	10.9	11.8	18.4	13.5	37.9		13.0	53.5	53.7	0.0	37.4	37.4												
Green Ratio ( g/C )	0.30	0.23	0.32	0.32	0.25		0.47	0.50	0.50	0.39	0.44	0.44												
Capacity ( c ), veh/h	189	415	482	396	414		291	897	878	168	774	741												
Volume-to-Capacity Ratio ( X )	0.740	0.343	0.408	0.442	0.883		0.710	0.748	0.750	0.407	0.616	0.616												
Back of Queue ( Q ), ft/ln ( 95 th percentile)	228.5	245.9	305.7	260.5	652.1		263.9	855.8	832.1	149	630.2	581.2												
Back of Queue ( Q ), veh/ln ( 95 th percentile)	8.9	9.5	11.5	10.2	24.7		10.2	32.7	32.3	5.5	23.5	22.7												
Queue Storage Ratio ( RQ ) ( 95 th percentile)	1.31	1.41	1.36	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00												
Uniform Delay ( d <sub>1</sub> ), s/veh	52.2	58.3	48.0	47.2	65.2		35.8	36.4	36.5	66.7	38.9	38.9												
Incremental Delay ( d <sub>2</sub> ), s/veh	5.6	0.8	1.0	0.8	14.4		8.5	5.7	5.9	1.9	3.7	3.8												
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0												
Control Delay ( d ), s/veh	57.8	59.1	48.9	48.0	79.6		44.3	42.1	42.3	68.6	42.6	42.7												
Level of Service (LOS)	E	E	D	D	E		D	D	D	E	D	D												
Approach Delay, s/veh / LOS	54.5			D			69.4			E			42.5			D			44.4			D		
Intersection Delay, s/veh / LOS							48.7						D											
<b>Multimodal Results</b>				EB			WB			NB			SB											
Pedestrian LOS Score / LOS	2.32			B			2.32			B			2.12			B								
Bicycle LOS Score / LOS	1.28			A			1.38			A			1.76			B			1.31			A		

HCS Signalized Intersection Results Summary																			
<b>General Information</b>							<b>Intersection Information</b>												
Agency	Diane B. Zimmerman Traffic Engineering						Duration, h	0.250											
Analyst	Diane Zimmerman		Analysis Date	Jan 5, 2023			Area Type	Other											
Jurisdiction			Time Period	AM Peak			PHF	0.92											
Urban Street	Cane Run Road		Analysis Year	2025 Build			Analysis Period	1> 7:00											
Intersection	Lees Lane		File Name	AM 25 B.xus															
Project Description	3500 Lees Lane																		
<b>Demand Information</b>				EB			WB			NB			SB						
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R							
Demand (v), veh/h	147	154	208	161	203	160	199	1152	72	63	755	109							
<b>Signal Information</b>																			
Cycle, s	180.0	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	No	Simult. Gap E/W	Off	Green	17.5	62.1	6.3	14.6	1.1	43.3	1	2	3	4					
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.3	4.3	4.3	3.6	0.0	3.6									
				Red	3.0	3.0	3.0	3.0	0.0	3.0	5	6	7	8					
<b>Timer Results</b>				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase	7		4		3		8		5		2		1		6				
Case Number	1.1		3.0		1.1		4.0		1.2		4.0		1.3		4.0				
Phase Duration, s	21.2		49.9		22.3		51.0		24.8		94.3		13.6		83.0				
Change Period, (Y+R <sub>c</sub> ), s	6.6		6.6		6.6		6.6		7.3		7.3		7.3		7.3				
Max Allow Headway (MAH), s	4.1		5.2		4.1		5.2		6.5		0.0		4.5		0.0				
Queue Clearance Time (g <sub>s</sub> ), s	14.2		23.0		15.3		40.6		16.0				2.0						
Green Extension Time (g <sub>e</sub> ), s	0.3		5.1		0.4		3.8		1.5		0.0		4.5		0.0				
Phase Call Probability	1.00		1.00		1.00		1.00		1.00				0.97						
Max Out Probability	0.01		0.02		0.02		0.27		0.04				0.18						
<b>Movement Group Results</b>				EB			WB			NB			SB						
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R							
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16							
Adjusted Flow Rate (v), veh/h	160	167	226	175	373		216	671	659	68	480	459							
Adjusted Saturation Flow Rate (s), veh/h/ln	1753	1826	1510	1767	1673		1739	1811	1773	1654	1767	1688							
Queue Service Time (g <sub>s</sub> ), s	12.2	13.8	21.0	13.3	38.6		14.0	54.8	55.0	0.0	38.9	38.9							
Cycle Queue Clearance Time (g <sub>c</sub> ), s	12.2	13.8	21.0	13.3	38.6		14.0	54.8	55.0	0.0	38.9	38.9							
Green Ratio (g/C)	0.32	0.24	0.34	0.33	0.25		0.45	0.48	0.48	0.37	0.42	0.42							
Capacity (c), veh/h	203	439	510	392	422		284	875	857	161	743	710							
Volume-to-Capacity Ratio (X)	0.787	0.381	0.443	0.446	0.883		0.761	0.767	0.769	0.425	0.646	0.646							
Back of Queue (Q), ft/ln (95 th percentile)	253.4	278.9	340.3	256.5	665.7		285.6	879.3	855.6	153.3	657.5	605.2							
Back of Queue (Q), veh/ln (95 th percentile)	9.8	10.7	12.8	10.0	25.2		11.0	33.6	33.2	5.6	24.5	23.6							
Queue Storage Ratio (RQ) (95 th percentile)	1.45	1.59	1.51	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00							
Uniform Delay (d <sub>1</sub> ), s/veh	50.5	57.1	46.4	45.8	64.8		38.1	38.2	38.3	70.0	41.5	41.5							
Incremental Delay (d <sub>2</sub> ), s/veh	7.8	0.9	1.0	0.8	15.2		11.1	6.4	6.6	2.1	4.3	4.5							
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0							
Control Delay (d), s/veh	58.4	58.1	47.4	46.6	79.9		49.1	44.6	44.9	72.1	45.8	46.0							
Level of Service (LOS)	E	E	D	D	E		D	D	D	E	D	D							
Approach Delay, s/veh / LOS	53.8		D		69.3		E		45.4		D		47.7		D				
Intersection Delay, s/veh / LOS	50.9						D												
<b>Multimodal Results</b>				EB			WB			NB			SB						
Pedestrian LOS Score / LOS	2.32		B		2.31		B		2.00		B		2.13		B				
Bicycle LOS Score / LOS	1.40		A		1.39		A		1.76		B		1.32		A				

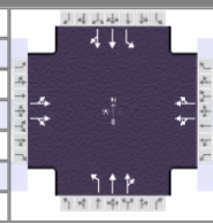
HCS Signalized Intersection Results Summary																											
<b>General Information</b>							<b>Intersection Information</b>																				
Agency	Diane B. Zimmerman Traffic Engineering						Duration, h	0.250																			
Analyst	Diane Zimmerman		Analysis Date	Jan 5, 2023			Area Type	Other																			
Jurisdiction			Time Period	AM Peak			PHF	0.92																			
Urban Street	Cane Run Road		Analysis Year	2035 No Build			Analysis Period	1> 7:00																			
Intersection	Lees Lane		File Name	AM 35 NB.xus																							
Project Description	3500 Lees Lane																										
<b>Demand Information</b>				EB			WB			NB			SB														
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R												
Demand ( v ), veh/h				139	141	195	169	212	168	205	1211	76	66	794	111												
<b>Signal Information</b>																											
Cycle, s	180.0	Reference Phase	2																								
Offset, s	0	Reference Point	End	Green	18.1	60.3	6.5	13.9	2.4	43.7	1			2													
Uncoordinated	No	Simult. Gap E/W	Off	Yellow	4.3	4.3	4.3	3.6	0.0	3.6	3			4													
Force Mode	Fixed	Simult. Gap N/S	On	Red	3.0	3.0	3.0	3.0	0.0	3.0	5			6													
<b>Timer Results</b>				EBL			EBT			WBL			WBT			NBL			NBT			SBL			SBT		
Assigned Phase				7			4			3			8			5			2			1			6		
Case Number				1.1			3.0			1.1			4.0			1.2			4.0			1.3			4.0		
Phase Duration, s				20.5			50.3			22.9			52.7			25.4			93.0			13.8			81.4		
Change Period, ( Y+R <sub>c</sub> ), s				6.6			6.6			6.6			6.6			7.3			7.3			7.3			7.3		
Max Allow Headway ( MAH ), s				4.1			5.2			4.1			5.2			6.5			0.0			4.5			0.0		
Queue Clearance Time ( g <sub>s</sub> ), s				13.6			21.3			15.9			42.6			16.6						2.0					
Green Extension Time ( g <sub>e</sub> ), s				0.3			4.9			0.4			3.5			1.5			0.0			4.7			0.0		
Phase Call Probability				1.00			1.00			1.00			1.00			1.00						0.97					
Max Out Probability				0.00			0.01			0.04			0.34			0.08						0.20					
<b>Movement Group Results</b>				EB			WB			NB			SB														
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R												
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16												
Adjusted Flow Rate ( v ), veh/h				151	153	212	184	391		223	705	693	72	503	481												
Adjusted Saturation Flow Rate ( s ), veh/h/ln				1753	1826	1510	1767	1672		1739	1811	1773	1654	1767	1690												
Queue Service Time ( g <sub>s</sub> ), s				11.6	12.5	19.3	13.9	40.6		14.6	60.2	60.6	0.0	42.1	42.1												
Cycle Queue Clearance Time ( g <sub>c</sub> ), s				11.6	12.5	19.3	13.9	40.6		14.6	60.2	60.6	0.0	42.1	42.1												
Green Ratio ( g/C )				0.32	0.24	0.34	0.33	0.26		0.45	0.48	0.48	0.36	0.41	0.41												
Capacity ( c ), veh/h				194	443	518	412	438		271	862	844	146	727	696												
Volume-to-Capacity Ratio ( X )				0.779	0.346	0.409	0.446	0.894		0.821	0.818	0.821	0.491	0.691	0.691												
Back of Queue ( Q ), ft/ln ( 95 th percentile)				240.3	257.4	317.3	266	700.4		308.1	966.4	941.7	162.8	708.1	652.9												
Back of Queue ( Q ), veh/ln ( 95 th percentile)				9.3	9.9	11.9	10.4	26.5		11.8	36.9	36.5	6.0	26.4	25.5												
Queue Storage Ratio ( RQ ) ( 95 th percentile)				1.37	1.47	1.41	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00												
Uniform Delay ( d <sub>1</sub> ), s/veh				50.7	56.4	45.2	45.2	64.1		40.1	40.5	40.6	76.2	43.5	43.5												
Incremental Delay ( d <sub>2</sub> ), s/veh				6.9	0.8	0.9	0.8	16.8		16.4	8.5	8.8	3.1	5.3	5.6												
Initial Queue Delay ( d <sub>3</sub> ), s/veh				0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0													
Control Delay ( d ), s/veh				57.6	57.2	46.0	45.9	80.8		56.5	49.0	49.4	79.2	48.9	49.1												
Level of Service ( LOS )				E	E	D	D	F		E	D	D	E	D	D												
Approach Delay, s/veh / LOS				52.7		D	69.7	E		50.2		D	51.0		D												
Intersection Delay, s/veh / LOS				53.7						D																	
<b>Multimodal Results</b>				EB			WB			NB			SB														
Pedestrian LOS Score / LOS				2.32		B	2.31		B	2.00		B	2.13		B												
Bicycle LOS Score / LOS				1.34		A	1.44		A	1.83		B	1.36		A												



HCS Signalized Intersection Results Summary																			
<b>General Information</b>							<b>Intersection Information</b>												
Agency	Diane B. Zimmerman Traffic Engineering						Duration, h	0.250											
Analyst	Diane Zimmerman			Analysis Date	Jan 5, 2023			Area Type	Other										
Jurisdiction				Time Period	AM Peak			PHF	0.92										
Urban Street	Cane Run Road			Analysis Year	2035 Build			Analysis Period	1> 7:00										
Intersection	Lees Lane			File Name	AM 35 B.xus														
Project Description	3500 Lees Lane																		
<b>Demand Information</b>				EB			WB			NB			SB						
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R							
Demand ( v ), veh/h	157	164	222	169	219	168	216	1211	76	66	794	117							
<b>Signal Information</b>																			
Cycle, s	180.0	Reference Phase	2																
Offset, s	0	Reference Point	End	Green	19.2	57.2	6.6	15.2	0.9	45.9									
Uncoordinated	No	Simult. Gap E/W	Off	Yellow	4.3	4.3	4.3	3.6	0.0	3.6									
Force Mode	Fixed	Simult. Gap N/S	On	Red	3.0	3.0	3.0	3.0	0.0	3.0	5	6	7	8					
<b>Timer Results</b>				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase	7		4		3		8		5		2		1		6				
Case Number	1.1		3.0		1.1		4.0		1.2		4.0		1.3		4.0				
Phase Duration, s	21.8		52.5		22.7		53.3		26.5		91.0		13.9		78.4				
Change Period, ( Y+R <sub>c</sub> ), s	6.6		6.6		6.6		6.6		7.3		7.3		7.3		7.3				
Max Allow Headway ( MAH ), s	4.1		5.2		4.1		5.2		6.5		0.0		4.5		0.0				
Queue Clearance Time ( g <sub>s</sub> ), s	14.8		23.9		15.7		43.4		17.9				2.0						
Green Extension Time ( g <sub>e</sub> ), s	0.4		5.4		0.4		3.4		1.4		0.0		4.8		0.0				
Phase Call Probability	1.00		1.00		1.00		1.00		1.00				0.97						
Max Out Probability	0.01		0.03		0.03		0.52		0.25				0.20						
<b>Movement Group Results</b>				EB			WB			NB			SB						
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R							
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16							
Adjusted Flow Rate ( v ), veh/h	171	178	241	184	399		235	705	693	72	507	484							
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1753	1826	1510	1767	1675		1739	1811	1773	1654	1767	1687							
Queue Service Time ( g <sub>s</sub> ), s	12.8	14.5	21.9	13.7	41.4		15.9	61.4	61.9	0.0	43.8	43.8							
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	12.8	14.5	21.9	13.7	41.4		15.9	61.4	61.9	0.0	43.8	43.8							
Green Ratio ( g/C )	0.34	0.25	0.36	0.34	0.27		0.44	0.46	0.46	0.34	0.39	0.39							
Capacity ( c ), veh/h	206	465	546	406	444		267	842	824	140	697	666							
Volume-to-Capacity Ratio ( X )	0.828	0.383	0.442	0.452	0.898		0.880	0.838	0.841	0.513	0.726	0.726							
Back of Queue ( Q ), ft/ln ( 95 th percentile)	270.4	290.2	350.5	262.1	716.2		345.3	993.8	968.5	163.3	739.3	680.6							
Back of Queue ( Q ), veh/ln ( 95 th percentile)	10.5	11.2	13.2	10.2	27.1		13.3	37.9	37.5	6.0	27.6	26.6							
Queue Storage Ratio ( RQ ) ( 95 th percentile)	1.55	1.66	1.56	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00							
Uniform Delay ( d <sub>1</sub> ), s/veh	49.2	55.4	43.7	43.9	63.8		41.7	42.2	42.3	78.1	46.2	46.2							
Incremental Delay ( d <sub>2</sub> ), s/veh	12.1	0.9	1.0	0.8	18.0		24.5	9.7	10.1	3.5	6.5	6.8							
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0							
Control Delay ( d ), s/veh	61.3	56.3	44.6	44.7	81.8		66.2	51.9	52.4	81.6	52.7	53.0							
Level of Service ( LOS )	E	E	D	D	F		E	D	D	F	D	D							
Approach Delay, s/veh / LOS	53.0		D		70.1		E		54.2		D		54.8		D				
Intersection Delay, s/veh / LOS	56.6						E												
<b>Multimodal Results</b>				EB			WB			NB			SB						
Pedestrian LOS Score / LOS	2.31		B		2.31		B		2.00		B		2.13		B				
Bicycle LOS Score / LOS	1.46		A		1.45		A		1.84		B		1.36		A				

### HCS Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250		
Analyst	Diane Zimmerman	Analysis Date	8/4/2022	Area Type	Other		
Jurisdiction		Time Period	PM Peak	PHF	0.97		
Urban Street	Cane Run Road	Analysis Year	2022	Analysis Period	1> 4:15		
Intersection	Lees Lane	File Name	PM 22.xus				
Project Description	3500 Lees Lane						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand ( v ), veh/h	60	84	257	222	88	60	116	1187	150	89	1295	66

Signal Information				Signal Timing (s)									
Cycle, s	180.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	Off	Green	7.6	78.4	6.0	26.6	26.3	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.3	4.3	4.3	3.6	3.6	0.0			
				Red	3.0	3.0	3.0	3.0	3.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2	1	6
Case Number		12.0		12.0	1.3	4.0	1.2	4.0
Phase Duration, s		33.2		32.9	13.3	99.0	14.9	100.6
Change Period, ( Y+R <sub>c</sub> ), s		6.6		6.6	7.3	7.3	7.3	7.3
Max Allow Headway ( MAH ), s		5.7		4.6	6.5	0.0	4.5	0.0
Queue Clearance Time ( g <sub>s</sub> ), s		25.2		25.6	2.7		7.4	
Green Extension Time ( g <sub>e</sub> ), s		1.4		0.7	0.2	0.0	0.3	0.0
Phase Call Probability		1.00		1.00	1.00		0.99	
Max Out Probability		0.48		1.00	1.00		0.00	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate ( v ), veh/h	148		203	229		153	120	701	678	92	706	697
Adjusted Saturation Flow Rate ( s ), veh/h/ln	1789		1547	1711		1674	1739	1811	1740	1654	1767	1736
Queue Service Time ( g <sub>s</sub> ), s	13.9		23.2	23.6		15.4	0.7	55.7	56.4	5.4	57.8	58.1
Cycle Queue Clearance Time ( g <sub>c</sub> ), s	13.9		23.2	23.6		15.4	0.7	55.7	56.4	5.4	57.8	58.1
Green Ratio ( g/C )	0.15		0.15	0.15		0.15	0.46	0.51	0.51	0.49	0.52	0.52
Capacity ( c ), veh/h	264		237	250		245	167	922	886	155	916	900
Volume-to-Capacity Ratio ( X )	0.562		0.856	0.915		0.623	0.716	0.760	0.765	0.594	0.772	0.774
Back of Queue ( Q ), ft/ln ( 95 th percentile)												
Back of Queue ( Q ), veh/ln ( 95 th percentile)	10.8		15.9	18.3		11.2	10.3	33.8	33.0	4.2	34.1	33.8
Queue Storage Ratio ( RQ ) ( 95 th percentile)	1.61		2.36	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay ( d <sub>1</sub> ), s/veh	71.3		74.7	74.8		72.2	74.5	35.3	35.5	37.5	34.8	34.9
Incremental Delay ( d <sub>2</sub> ), s/veh	3.2		20.7	30.3		3.9	18.4	5.8	6.2	4.3	6.3	6.4
Initial Queue Delay ( d <sub>3</sub> ), s/veh	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay ( d ), s/veh	74.5		95.4	105.0		76.0	92.9	41.2	41.7	41.9	41.1	41.3
Level of Service ( LOS )	E		F	F		E	F	D	D	D	D	D
Approach Delay, s/veh / LOS	86.6		F	93.4		F	45.6		D	41.2		D
Intersection Delay, s/veh / LOS	52.6						D					

Multimodal Results	EB	WB	NB	SB
Pedestrian LOS Score / LOS	2.32	B	2.34	B
Bicycle LOS Score / LOS	0.78	A	0.80	A

HCS Signalized Intersection Results Summary																
<b>General Information</b>						<b>Intersection Information</b>										
Agency	Diane B. Zimmerman Traffic Engineering					Duration, h	0.250									
Analyst	Diane Zimmerman		Analysis Date	Jan 5, 2023		Area Type	Other									
Jurisdiction		Time Period	PM Peak		PHF	0.97										
Urban Street	Cane Run Road		Analysis Year	2025 No Build		Analysis Period	1> 4:15									
Intersection	Lees Lane		File Name	PM 25 NB.xus												
Project Description	3500 Lees Lane															
<b>Demand Information</b>																
	EB			WB			NB			SB						
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h	63	89	271	225	92	61	122	1203	152	90	1315	69				
<b>Signal Information</b>																
Cycle, s	180.0	Reference Phase	2													
Offset, s	0	Reference Point	End							1	2	3	4			
Uncoordinated	No	Simult. Gap E/W	Off		Green	7.0	91.1	6.0	9.6	3.8	27.4					
Force Mode	Fixed	Simult. Gap N/S	On		Yellow	4.3	4.3	4.3	3.6	0.0	3.6					
					Red	3.0	3.0	3.0	3.0	0.0	3.0	5	6	7	8	
<b>Timer Results</b>																
	EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase	7		4		3		8		5		2		1		6	
Case Number	1.1		3.0		1.1		4.0		1.3		4.0		1.2		4.0	
Phase Duration, s	16.2		34.0		20.0		37.8		13.3		111.7		14.3		112.7	
Change Period, (Y+R <sub>c</sub> ), s	6.6		6.6		6.6		6.6		7.3		7.3		7.3		7.3	
Max Allow Headway (MAH), s	4.1		4.2		4.1		4.2		6.5		0.0		4.5		0.0	
Queue Clearance Time (g <sub>s</sub> ), s	7.5		26.3		16.4		17.5		2.0				6.7			
Green Extension Time (g <sub>e</sub> ), s	0.1		1.1		0.0		1.7		0.3		0.0		0.3		0.0	
Phase Call Probability	0.96		1.00		1.00		1.00		1.00				0.99			
Max Out Probability	0.13		0.33		1.00		0.00		1.00				0.00			
<b>Movement Group Results</b>																
	EB			WB			NB			SB						
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16				
Adjusted Flow Rate (v), veh/h	65	92	218	232	158		126	710	687	93	718	708				
Adjusted Saturation Flow Rate (s), veh/h/ln	1753	1826	1510	1767	1676		1739	1811	1740	1654	1767	1735				
Queue Service Time (g <sub>s</sub> ), s	5.5	8.1	24.3	14.4	15.5		0.0	48.7	49.3	4.7	51.1	51.5				
Cycle Queue Clearance Time (g <sub>c</sub> ), s	5.5	8.1	24.3	14.4	15.5		0.0	48.7	49.3	4.7	51.1	51.5				
Green Ratio (g/C)	0.21	0.15	0.19	0.24	0.17		0.53	0.58	0.58	0.56	0.59	0.59				
Capacity (c), veh/h	226	278	297	328	291		204	1051	1009	187	1034	1016				
Volume-to-Capacity Ratio (X)	0.287	0.330	0.733	0.708	0.543		0.618	0.676	0.681	0.495	0.694	0.697				
Back of Queue (Q), ft/ln (95 th percentile)	116.5	180	322.5	168.9	291.7		266.1	757.8	730.5	95.7	792.6	751.1				
Back of Queue (Q), veh/ln (95 th percentile)	4.5	6.9	12.1	6.6	11.0		10.2	28.9	28.3	3.5	29.6	29.3				
Queue Storage Ratio (RQ) (95 th percentile)	0.67	1.03	1.43	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00				
Uniform Delay (d <sub>1</sub> ), s/veh	59.5	68.1	6.4	62.9	67.9		62.3	26.1	26.2	28.7	26.1	26.1				
Incremental Delay (d <sub>2</sub> ), s/veh	0.7	0.7	6.5	6.9	1.6		9.4	3.5	3.7	2.4	3.8	4.0				
Initial Queue Delay (d <sub>3</sub> ), s/veh	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0				
Control Delay (d), s/veh	60.2	68.8	12.9	69.8	69.5		71.7	29.6	29.9	31.1	29.9	30.1				
Level of Service (LOS)	E	E	B	E	E		E	C	C	C	C	C				
Approach Delay, s/veh / LOS	34.8		C		69.6		E		33.2		C		30.1		C	
Intersection Delay, s/veh / LOS	35.8			D												
<b>Multimodal Results</b>																
	EB			WB			NB			SB						
Pedestrian LOS Score / LOS	2.32			B			2.32			B						
Bicycle LOS Score / LOS	1.11			A			1.13			A						

### HCS Signalized Intersection Results Summary

General Information				Intersection Information													
Agency	Diane B. Zimmerman Traffic Engineering			Duration, h	0.250												
Analyst	Diane Zimmerman	Analysis Date	Jan 5, 2023	Area Type	Other												
Jurisdiction		Time Period	PM Peak	PHF	0.97												
Urban Street	Cane Run Road	Analysis Year	2025 Build	Analysis Period	1> 4:15												
Intersection	Lees Lane	File Name	PM 25 B.xus														
Project Description	3500 Lees Lane																
Demand Information		EB			WB			NB			SB						
Approach Movement		L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h		75	103	288	225	116	61	151	1203	152	90	1315	90				
Signal Information																	
Cycle, s	180.0	Reference Phase	2														
Offset, s	0	Reference Point	End														
Uncoordinated	No	Simult. Gap E/W	Off	Green	7.1	89.1	6.0	9.8	3.6	29.3							
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.3	4.3	4.3	3.6	0.0	3.6							
				Red	3.0	3.0	3.0	3.0	0.0	3.0							
Timer Results		EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase		7		4		3		8		5		2		1		6	
Case Number		1.1		3.0		1.1		4.0		1.3		4.0		1.2		4.0	
Phase Duration, s		16.4		35.9		20.0		39.5		13.3		109.7		14.4		110.8	
Change Period, (Y+R <sub>c</sub> ), s		6.6		6.6		6.6		6.6		7.3		7.3		7.3		7.3	
Max Allow Headway (MAH), s		4.1		4.2		4.1		4.2		6.5		0.0		4.5		0.0	
Queue Clearance Time (g <sub>s</sub> ), s		8.5		28.3		16.4		19.8		3.9				6.9			
Green Extension Time (g <sub>e</sub> ), s		0.1		1.0		0.0		1.8		0.2		0.0		0.3		0.0	
Phase Call Probability		0.98		1.00		1.00		1.00		1.00				0.99			
Max Out Probability		0.44		0.73		1.00		0.01		1.00				0.00			
Movement Group Results		EB			WB			NB			SB						
Approach Movement		L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement		7	4	14	3	8	18	5	2	12	1	6	16				
Adjusted Flow Rate (v), veh/h		77	106	235	232	182		156	710	687	93	731	718				
Adjusted Saturation Flow Rate (s), veh/h/ln		1753	1826	1510	1767	1691		1739	1811	1740	1654	1767	1726				
Queue Service Time (g <sub>s</sub> ), s		6.5	9.3	26.3	14.4	17.8		1.9	50.0	50.6	4.9	53.9	54.4				
Cycle Queue Clearance Time (g <sub>c</sub> ), s		6.5	9.3	26.3	14.4	17.8		1.9	50.0	50.6	4.9	53.9	54.4				
Green Ratio (g/C)		0.22	0.16	0.20	0.25	0.18		0.52	0.57	0.57	0.55	0.58	0.58				
Capacity (c), veh/h		221	297	313	330	309		192	1031	990	182	1016	993				
Volume-to-Capacity Ratio (X)		0.349	0.357	0.751	0.702	0.590		0.812	0.689	0.694	0.511	0.719	0.723				
Back of Queue (Q), ft/ln (95 th percentile)		137.9	205	344.5	165.9	330.3		341.9	779.7	751.6	98.6	835.9	790				
Back of Queue (Q), veh/ln (95 th percentile)		5.3	7.9	13.0	6.5	12.5		13.1	29.8	29.1	3.6	31.2	30.9				
Queue Storage Ratio (RQ) (95 th percentile)		0.79	1.17	1.53	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00				
Uniform Delay (d <sub>1</sub> ), s/veh		58.5	67.0	6.5	61.7	67.4		70.0	27.5	27.6	30.1	27.7	27.8				
Incremental Delay (d <sub>2</sub> ), s/veh		0.9	0.7	8.0	6.5	2.1		26.2	3.8	4.0	2.7	4.4	4.6				
Initial Queue Delay (d <sub>3</sub> ), s/veh		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0				
Control Delay (d), s/veh		59.4	67.7	14.5	68.2	69.5		96.2	31.3	31.6	32.7	32.1	32.4				
Level of Service (LOS)		E	E	B	E	E		F	C	C	C	C	C				
Approach Delay, s/veh / LOS		36.3		D	68.8	E		37.9		D	32.3		C				
Intersection Delay, s/veh / LOS				38.8							D						
Multimodal Results		EB			WB			NB			SB						
Pedestrian LOS Score / LOS		2.32		B	2.32		B	1.91		B	2.25		B				
Bicycle LOS Score / LOS		1.18		A	1.17		A	1.77		B	1.76		B				

HCS Signalized Intersection Results Summary															
<b>General Information</b>						<b>Intersection Information</b>									
Agency	Diane B. Zimmerman Traffic Engineering					Duration, h	0.250								
Analyst	Diane Zimmerman		Analysis Date	Jan 5, 2023		Area Type	Other								
Jurisdiction			Time Period	PM Peak		PHF	0.97								
Urban Street	Cane Run Road		Analysis Year	2035 No Build		Analysis Period	1> 4:15								
Intersection	Lees Lane		File Name	PM 35 NB.xus											
Project Description	3500 Lees Lane														
<b>Demand Information</b>				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				76	107	327	237	109	64	144	1265	160	95	1382	82
<b>Signal Information</b>															
Cycle, s	180.0	Reference Phase	2									1	2	3	4
Offset, s	0	Reference Point	End	Green	7.6	84.8	6.0	9.8	3.6	33.1					
Uncoordinated	No	Simult. Gap E/W	Off	Yellow	4.3	4.3	4.3	3.6	0.0	3.6					
Force Mode	Fixed	Simult. Gap N/S	On	Red	3.0	3.0	3.0	3.0	0.0	3.0		5	6	7	8
<b>Timer Results</b>				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase				7	4	3	8	5	2	1	6				
Case Number				1.1	3.0	1.1	4.0	1.3	4.0	1.2	4.0				
Phase Duration, s				16.4	39.7	20.0	43.3	13.3	105.4	14.9	107.0				
Change Period, (Y+R <sub>c</sub> ), s				6.6	6.6	6.6	6.6	7.3	7.3	7.3	7.3				
Max Allow Headway (MAH), s				4.1	4.2	4.1	4.2	6.5	0.0	4.5	0.0				
Queue Clearance Time (g <sub>s</sub> ), s				8.4	33.0	16.4	19.0	5.9		7.4					
Green Extension Time (g <sub>e</sub> ), s				0.1	0.1	0.0	2.0	0.0	0.0	0.3	0.0				
Phase Call Probability				0.98	1.00	1.00	1.00	1.00		0.99					
Max Out Probability				0.40	1.00	1.00	0.01	1.00		0.00					
<b>Movement Group Results</b>				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h				78	110	275	244	178		148	746	724	98	760	749
Adjusted Saturation Flow Rate (s), veh/h/ln				1753	1826	1510	1767	1684		1739	1811	1740	1654	1767	1731
Queue Service Time (g <sub>s</sub> ), s				6.4	9.4	31.0	14.4	17.0		3.9	57.3	58.3	5.4	60.6	61.3
Cycle Queue Clearance Time (g <sub>c</sub> ), s				6.4	9.4	31.0	14.4	17.0		3.9	57.3	58.3	5.4	60.6	61.3
Green Ratio (g/C)				0.24	0.18	0.22	0.27	0.20		0.50	0.55	0.55	0.52	0.55	0.55
Capacity (c), veh/h				252	336	345	355	343		176	987	948	159	979	959
Volume-to-Capacity Ratio (X)				0.311	0.329	0.799	0.687	0.520		0.843	0.755	0.763	0.616	0.777	0.781
Back of Queue (Q), ft/ln (95 th percentile)				135.3	206.7	180.5	179.9	314.9		339	893.1	865.7	112.7	939.9	893
Back of Queue (Q), veh/ln (95 th percentile)				5.2	8.0	6.8	7.0	11.9		13.0	34.1	33.6	4.1	35.1	34.9
Queue Storage Ratio (RQ) (95 th percentile)				0.77	1.18	0.80	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d <sub>1</sub> ), s/veh				55.4	63.8	6.7	59.2	63.8		75.2	31.7	31.9	35.9	31.4	31.6
Incremental Delay (d <sub>2</sub> ), s/veh				0.7	0.6	12.3	5.5	1.4		32.7	5.4	5.8	4.6	6.0	6.3
Initial Queue Delay (d <sub>3</sub> ), s/veh				0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh				56.1	64.4	19.0	64.6	65.2		107.9	37.0	37.7	40.5	37.5	37.9
Level of Service (LOS)				E	E	B	E	E		F	D	D	D	D	D
Approach Delay, s/veh / LOS				36.0		D	64.8		E	43.8		D	37.8		D
Intersection Delay, s/veh / LOS				42.8					D						
<b>Multimodal Results</b>				EB			WB			NB			SB		
Pedestrian LOS Score / LOS				2.32		B	2.32		B	1.91		B	2.25		B
Bicycle LOS Score / LOS				1.25		A	1.19		A	1.82		B	1.81		B

HCS Signalized Intersection Results Summary															
<b>General Information</b>						<b>Intersection Information</b>									
Agency	Diane B. Zimmerman Traffic Engineering					Duration, h	0.250								
Analyst	Diane Zimmerman		Analysis Date	Jan 5, 2023		Area Type	Other								
Jurisdiction		Time Period	PM Peak		PHF	0.97									
Urban Street	Cane Run Road		Analysis Year	2035 Build		Analysis Period	1> 4:15								
Intersection	Lees Lane		File Name	PM 35 B.xus											
Project Description	3500 Lees Lane														
<b>Demand Information</b>				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand ( v ), veh/h				88	121	344	237	133	64	173	1265	160	95	1382	103
<b>Signal Information</b>															
Cycle, s	180.0	Reference Phase	2												
Offset, s	0	Reference Point	End												
Uncoordinated	No	Simult. Gap E/W	Off		Green	7.9	78.7	11.4	9.9	3.5	33.4				
Force Mode	Fixed	Simult. Gap N/S	On		Yellow	4.3	4.3	4.3	3.6	0.0	3.6				
					Red	3.0	3.0	3.0	3.0	0.0	3.0				
<b>Timer Results</b>				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase				7	4	3	8	5	2	1	6				
Case Number				1.1	3.0	1.1	4.0	1.3	4.0	1.2	4.0				
Phase Duration, s				16.5	40.0	20.0	43.5	18.7	104.8	15.2	101.3				
Change Period, ( Y+R <sub>c</sub> ), s				6.6	6.6	6.6	6.6	7.3	7.3	7.3	7.3				
Max Allow Headway ( MAH ), s				4.1	4.2	4.1	4.2	6.5	0.0	4.5	0.0				
Queue Clearance Time ( g <sub>s</sub> ), s				9.5	34.0	16.4	21.5	11.4		7.7					
Green Extension Time ( g <sub>e</sub> ), s				0.1	0.0	0.0	2.2	0.0	0.0	0.3	0.0				
Phase Call Probability				0.99	1.00	1.00	1.00	1.00		0.99					
Max Out Probability				1.00	1.00	1.00	0.03	1.00		0.00					
<b>Movement Group Results</b>				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate ( v ), veh/h				91	125	293	244	203		178	746	724	98	772	759
Adjusted Saturation Flow Rate ( s ), veh/h/ln				1753	1826	1510	1767	1697		1739	1811	1740	1654	1767	1723
Queue Service Time ( g <sub>s</sub> ), s				7.5	10.7	32.0	14.4	19.5		9.4	57.8	58.8	5.7	66.8	67.7
Cycle Queue Clearance Time ( g <sub>c</sub> ), s				7.5	10.7	32.0	14.4	19.5		9.4	57.8	58.8	5.7	66.8	67.7
Green Ratio ( g/C )				0.24	0.19	0.25	0.27	0.21		0.50	0.54	0.54	0.49	0.52	0.52
Capacity ( c ), veh/h				236	339	393	346	348		205	980	942	150	922	900
Volume-to-Capacity Ratio ( X )				0.384	0.368	0.745	0.705	0.584		0.871	0.760	0.768	0.653	0.837	0.844
Back of Queue ( Q ), ft/ln ( 95 th percentile)				158	228.9	173.4	187.6	357.1		394.1	901.8	874.1	122.5	1049.7	998
Back of Queue ( Q ), veh/ln ( 95 th percentile)				6.1	8.8	6.5	7.3	13.5		15.2	34.4	33.9	4.5	39.2	39.0
Queue Storage Ratio ( RQ ) ( 95 th percentile)				0.90	1.31	0.77	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay ( d <sub>1</sub> ), s/veh				55.7	64.1	6.8	59.3	64.6		77.1	32.2	32.4	39.0	36.5	36.8
Incremental Delay ( d <sub>2</sub> ), s/veh				1.0	0.7	7.6	6.4	2.5		33.7	5.5	6.0	5.7	8.9	9.5
Initial Queue Delay ( d <sub>3</sub> ), s/veh				0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay ( d ), s/veh				56.7	64.7	14.3	65.7	67.1		110.9	37.7	38.4	44.7	45.5	46.3
Level of Service ( LOS )				E	E	B	E	E		F	D	D	D	D	D
Approach Delay, s/veh / LOS				34.3		C	66.3	E		45.9		D	45.8		D
Intersection Delay, s/veh / LOS				46.6					D						
<b>Multimodal Results</b>				EB			WB			NB			SB		
Pedestrian LOS Score / LOS				2.32		B	2.32		B	1.92		B	2.25		B
Bicycle LOS Score / LOS				1.33		A	1.23		A	1.85		B	1.83		B

