Mission Trails Traffic Impact Study

Johnson Drive and Beverly Avenue
Mission, Kansas

Prepared for:

EPC Real Estate Group

Prepared by TranSystems

September 2017

TranSystems
EXPERIENCE | Transportation

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September 19, 2017

Mr. Steve Coon
EPC Real Estate Group
411 Nichols Road, Suite 225
Kansas City, MO 64112

RE: Mission Trails Traffic Impact Study
Johnson Drive and Beverly Avenue
Mission, Kansas

Dear Mr. Coon:

In response to your request and authorization, TranSystems has completed a traffic impact study for a proposed mixed-use development to be located generally to the south and west of the Johnson Drive and Beverly Avenue intersection in Mission, Kansas. The purpose of this study was to assess the impact of the proposed development on the surrounding transportation system.

Included in this study is a discussion of the anticipated impact of the proposed development on the adjacent street network and identified improvements to mitigate deficiencies for the following scenarios:

- Existing Conditions
- Existing plus Development Conditions

We trust that the enclosed information proves beneficial to you and the City of Mission in this phase of the development process. We appreciate the opportunity to be of service to you and will be available to review this study at your convenience.

Sincerely,
TRANSYSTEMS

By:_____
Jeffrey J. Wilke, PE, PTOE

JJW/jjw/P101170141
Enclosure

Introduction

TranSystems has completed this traffic impact study for a proposed mixed-use development to be located generally to the south and west of the Johnson Drive and Beverly Avenue intersection in Mission, Kansas. The purpose of this study was to assess the impact of the proposed development on the surrounding transportation system. The location of the project relative to the major streets in the area is shown on ***Figure A-1*** in ***Appendix A***.

In addition to a description of the proposed development and the surrounding transportation infrastructure, this study includes trip generation estimates, trip distribution estimates, capacity analyses, and a summary of the findings.

Proposed Development Plan

Currently, there is a vacant 46,200 square foot building and a large surface parking lot on the site. When the building was last occupied, it functioned as an office building. The existing structure is to be demolished to construct the proposed development.

The proposed plan for the development includes a five-story building and attached 285-stall parking garage. The garage will be located in the southeastern side of the site, along Beverly Avenue. The building will contain 200 apartment units, a 5,000 square foot restaurant, and 1,500 square feet of retail space. The restaurant and retail space will be located on the ground floor, along Johnson Drive.

The garage will be accessed from one driveway on Johnson Drive to be located roughly 450 feet east of Lamar Avenue, and 200 feet west of Beverly Avenue. There will be 16 surface parking spaces along this driveway leading into the garage. There will also be on-street angle parking spaces constructed along the south side of Johnson Drive, adjacent to the development site. Another driveway to the garage will be provided from Beverly Avenue, approximately 320 feet south of Johnson Drive. This is essentially the same location as the southernmost driveway to the existing surface parking lot. A copy of the proposed site plan is included in ***Appendix A*** on ***Figure A-2*** for reference.

Study Area

To assess the impacts of the proposed development, the intersections listed below were identified for study during the A.M. and P.M. peak hours of a typical weekday.

- Johnson Drive and Lamar Avenue
- Johnson Drive and Beverly Avenue
- Martway Street and Beverly Avenue

Traffic Counts

Turning-movement traffic volume counts were collected at the Johnson Drive study intersections between Tuesday, September 12, 2017 and Thursday, September 14, 2017. The counts were collected at each intersection from 7:00 to 9:00 A.M. and from 4:00 to 6:00 P.M. Peak hour traffic counts for the Martway Street and Beverly Avenue intersection were obtained from a recent traffic study in the area.

These counts were collected on Wednesday, June 14, 2017. The existing lane configurations, traffic control devices, and peak hour traffic volumes have been illustrated on ***Figure A-3***.

Surrounding Street Network and Land Uses

The development site is located in the Downtown District of Mission with several different land uses on the same city block. To the west of the site are commercial businesses. The Mission Square senior living apartment building is located to the southwest of the site. South of the site is the Sylvester Powell Jr. Community Center. On the east, the site is bounded by Beverly Avenue. To the north, the site is bounded by Johnson Drive, which is lined with commercial businesses throughout the Downtown District. The development site does not include an existing restaurant, which will remain in the northeast corner of the same city block.

Johnson Drive is the main commercial corridor through the Downtown District. Johnson Drive is a four-lane undivided street with a posted speed limit of 25 m.p.h. Adjacent to the development site there is on-street angle parking provided along the north side of the street. To the east of Beverly Avenue, on-street angle parking is provided along both sides of the street. The horizontal and vertical alignment of the Johnson Drive is generally straight and level in the vicinity of the site. At the intersection with Lamar Avenue, Johnson Drive widens to provide left-turn lanes. The Johnson Drive and Lamar Avenue intersection is controlled with a traffic signal.

Beverly Avenue is a two-lane local street with no posted speed limit. The horizontal and vertical alignment of the street is generally straight and level in the vicinity of the site. Beverly Avenue is stop-controlled at the intersections with Johnson Drive and with Martway Street, while these intersecting streets are uncontrolled. There are crosswalks across all approaches to the Beverly Avenue and Johnson Drive intersection. The crosswalk across the east leg of the intersection is supplemented by pedestrian crossing warning signs and pedestrian activated rectangular rapid flashing beacons.

Access Management Review

According to the Kansas Department of Transportation's Access Management Policy, access points along a Class E route with a 25 m.p.h. posted speed limit in a central business district (CBD) should be spaced at least 65 feet apart (*KDOT Access Management Policy, Table 4-6*). The proposed site driveway on Johnson Drive just satisfies the access spacing criteria, as it is to be located roughly 70 feet west of an existing driveway for the restaurant. Projected volumes of turning traffic at the site driveway on Johnson Drive are below the thresholds for warranting turn lanes.

The site driveway on Beverly Avenue is located about 40 feet north of an existing driveway on the east side of the street. While this is does not meet the access spacing criteria, it is not anticipated to be a safety or operational concern. Both of these driveways have been in these same locations for many years. Further, Beverly Avenue is a low volume, low speed local street. According to the Access Management Policy, the minimum access spacing criteria is reduced to 40 feet for a 20 m.p.h. speed limit. It should also be noted that the proposed site plan includes closing one of the two existing

driveways onto Beverly Avenue from the site, which will improve overall access management along Beverly Avenue.

Operational Analysis

The scope of analysis for the assessment of the proposed development's impact on the surrounding transportation system is based in large part on the recommended practices of the Institute of Transportation Engineers (ITE), as outlined in their Traffic Engineering Handbook. ITE is a nationally-recognized organization of transportation professionals with members from both private and public sectors. The analysis of the proposed development's impact included development of trip generation and trip distribution estimates as well as a traffic operations assessment for each study scenario. Each of the analysis methodologies and findings are described in the subsequent sections.

Trip Generation

Trip generation estimates were prepared for the proposed development using the Institute of Transportation Engineer's Trip Generation, 9th Edition. ***Table 1*** shows the expected trips to be generated by the proposed development.

Table 1
Trip Generation

Land Use	Intensity	ITE Code	Average Weekday	A.M. Peak Hour			P.M. Peak Hour		
				Total	In	Out	Total	In	Out
Apartments	200 du	220	1,336	102	20	82	128	83	45
Restaurant	5,000 sf	932	636	55	31	24	50	30	20
Specialty Retail Center	1,500 sf	826	102	13	8	5	25	12	13
Total Development Trips			**2,074**	**170**	**59**	**111**	**203**	**125**	**78**

The trip generation estimates for the commercial portion of the development were calculated using the Specialty Retail Center land use. This land use is described in Trip Generation as small strip shopping centers that contain a variety of retail shops specializing in quality apparel, hard goods, and services. This would include real estate offices, dance studios, florists, and small restaurants. This land use does not include data for the A.M. peak hour. Therefore, the A.M. peak hour trips were calculated using the Shopping Center land use.

Trip Distribution

The estimated trips generated by the proposed development were distributed onto the street system based on the trip distributions summarized on the next page in ***Table 2***. These distributions are based primarily on existing travel patterns in the area and engineering judgment. The detailed distribution patterns through the study intersection are shown in ***Appendix B***.

Table 2
Trip Distribution

Direction To/From	Percentage
North on Lamar Avenue	15%
South on Lamar	10%
East on Jonson Drive	25%
West on Johnson Drive	30%
West on Martway Street	15%
East on Martway Street	5%
Total	**100%**

Traffic Operation Assessment

An assessment of traffic operations was made for the scenarios listed below.

- Existing Conditions
- Existing plus Development Conditions

The study intersections were evaluated using the Synchro traffic analysis software package on the basis of the methodologies outlined in the Highway Capacity Manual (HCM), 2000 Edition, which is published by the Transportation Research Board. The operating conditions at an intersection are graded by the "level of service" experienced by drivers. Level of service (LOS) describes the quality of traffic operating conditions and is rated from "A" to "F". LOS A represents the most desirable condition with free-flow movement of traffic with minimal delays. LOS F generally indicates severely congested conditions with excessive delays to motorists. Intermediate grades of B, C, D, and E reflect incremental increases in the average delay per stopped vehicle. Delay is measured in seconds per vehicle. ***Table 3*** shows the upper limit of delay associated with each level of service for signalized and unsignalized intersections.

Table 3
Intersection Level of Service Delay Thresholds

Level of Service (LOS)	Signalized	Unsignalized
A	≤ 10 Seconds	≤ 10 Seconds
B	≤ 20 Seconds	≤ 15 Seconds
C	≤ 35 Seconds	≤ 25 Seconds
D	≤ 55 Seconds	≤ 35 Seconds
E	≤ 80 Seconds	≤ 50 Seconds
F	> 80 Seconds	> 50 Seconds

While one of the primary measurements of traffic operations, LOS applies to both signalized and unsignalized intersections. There are however, significant differences between how these intersections

operate and how they are evaluated. LOS for signalized intersections reflects the operation of the intersection as a whole. While the individual movements may operate with varying LOS ratings, that is largely a function of the signal timings and how the intersection is operating relative to other signals in the vicinity.

Unsignalized intersections, in contrast, are evaluated based on the movement groupings which are required to yield to other traffic. Typically, these are the left turns off of the major street and the side-street approaches for two-way stop-controlled intersections. At unsignalized intersections lower LOS ratings (D, E and F) do not, in themselves, indicate the need for additional improvements. Many times there are convenient alternative routes to avoid the longer delays. Other times the volumes on the unsignalized approaches are relatively minor when compared to the major street traffic, and improvements such as a traffic signal installation may increase the average delay to all users of the intersection.

The LOS rating deemed acceptable varies by community, facility type, and traffic control device. For communities similar to Mission LOS D is generally considered the minimum desirable goal for signalized intersections. At unsignalized intersections LOS D, E, or even F are often considered acceptable for low to moderate traffic volumes where the installation of a traffic signal is not warranted by the conditions at the intersection, or the location has been deemed undesirable for signalization for other reasons, e.g. the close proximity of an existing traffic signal or the presence of a convenient alternative path.

Traffic queues are also evaluated as part of the analyses. Long traffic queues which extend beyond the amount of storage available, either between intersections or within turn lanes, can have significant impacts on operations. The projected vehicular queues are analyzed to ensure the analyses are reflective of the physical constraints of the study intersections and to identify if additional storage is needed for turn lanes.

Existing Conditions

The results of the intersection analyses for the Existing Conditions scenario are summarized on the following page in ***Table 4***. The study intersections were evaluated with the lane configurations, traffic volumes, and traffic control devices shown on ***Figure A-3***. The Synchro output files are included in ***Appendix C***.

The analysis results shown in ***Table 4*** indicate that all study intersections currently operate acceptably during both the A.M. and P.M. peak hours. Queues for turning movements are contained within their respective turn lanes.

Table 4
Intersection Operational Analysis
Existing Conditions

Intersection	A.M. Peak Hour		P.M. Peak Hour	
Movement	**LOS[1]**	**Delay[2]**	**LOS[1]**	**Delay[2]**
Johnson Drive and Lamar Avenue				
Traffic Signal	*C*	*24.5*	*C*	*29.3*
Johnson Drive and Beverly Avenue				
Northbound	*B*	*13.5*	*C*	*17.6*
Southbound	*C*	*15.0*	*B*	*14.5*
Martway Street and Beverly Avenue				
Northbound	*B*	*11.2*	*B*	*11.8*
Southbound	*B*	*10.6*	*B*	*13.9*

1 – Level of Service
2 – Delay in seconds per vehicle

Existing plus Development Conditions

The results of the intersection analyses for the Existing plus Development scenario are summarized in ***Table 5***. This study scenario considers the addition of traffic from the proposed development. The study intersections were evaluated with the lane configurations, traffic volumes, and traffic control devices shown on ***Figures A-4*** and ***A-5***. The Synchro output files are included in ***Appendix C***.

Table 5
Intersection Operational Analysis
Existing plus Development Conditions

Intersection	A.M. Peak Hour		P.M. Peak Hour	
Movement	**LOS[1]**	**Delay[2]**	**LOS[1]**	**Delay[2]**
Johnson Drive and Lamar Avenue				
Traffic Signal	*C*	*24.7*	*C*	*29.9*
Johnson Drive and Site Driveway				
	C	*15.5*	*C*	*21.2*
Johnson Drive and Beverly Avenue				
Northbound	*B*	*14.1*	*C*	*19.0*
Southbound	*C*	*15.9*	*C*	*15.4*
Beverly Avenue and Site Driveway				
Eastbound	*A*	*9.2*	*A*	*9.6*
Martway Street and Beverly Avenue				
Northbound	*B*	*11.6*	*B*	*12.3*
Southbound	*B*	*10.8*	*B*	*14.8*

1 – Level of Service
2 – Delay in seconds per vehicle

As shown in the table, all intersections are projected to operate at acceptable levels of service with the addition of traffic from the proposed development. Queues for turning movements are projected to be contained within their respective turn lanes. Queues of traffic exiting from the two site drives are projected to be minimal.

Summary

TranSystems has completed this traffic impact study for a proposed mixed-use development to be located generally to the south and west of the Johnson Drive and Beverly Avenue intersection in Mission, Kansas. The purpose of this study was to assess the impact of the proposed development on the surrounding transportation system.

The proposed development is projected to generate 170 trips during the A.M. peak hour, and 203 trips during the P.M. peak hour. The delays and levels of service at the study intersections are projected to be nominally impacted by the addition of development traffic. Queues for turning movements are projected to be contained within their respective turn lanes. Queues of traffic exiting from the two site drives are projected to be minimal.

Appendix A - Figures

LOCATION MAP

Mission Trails
Traffic Impact Study
Mission, Kansas

September 2017

No Scale

Figure A-1

TranSystems

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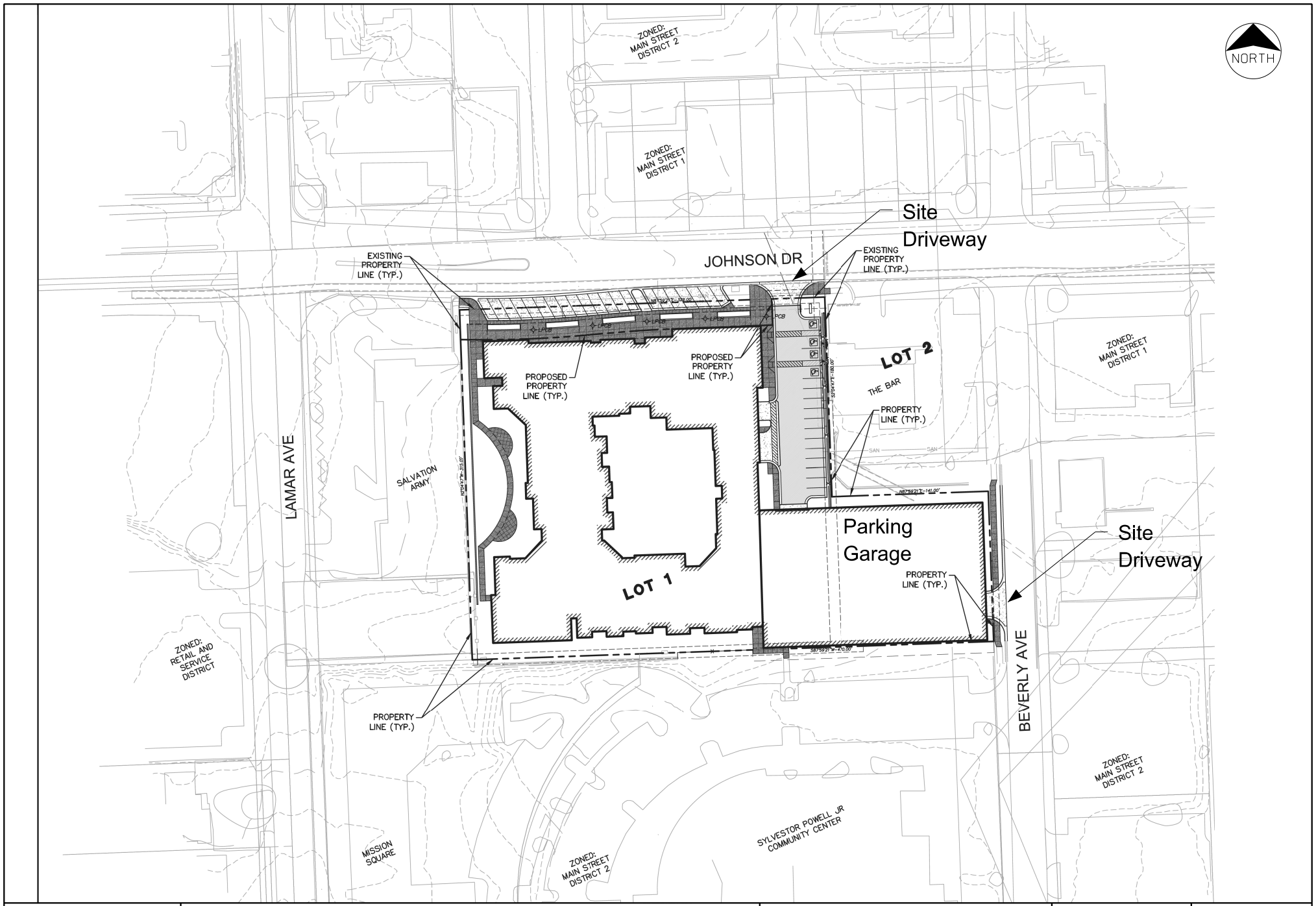

TranSystems	SITE PLAN	Mission Trails Traffic Impact Study Mission, Kansas	September 2017 No Scale	Figure A-2

Figure A-3

September 2017

No Scale

Mission Trails
Traffic Impact Study
Mission, Kansas

EXISTING LANE CONFIGURATIONS
AND PEAK HOUR TRAFFIC VOLUMES

TranSystems

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Legend

- Traffic Signal
- Stop Sign
- Lane Configuration

Figure A-4

September 2017

No Scale

Mission Trails
Traffic Impact Study
Mission, Kansas

EXISTING PLUS DEVELOPMENT CONDITIONS
LANE CONFIGURATIONS

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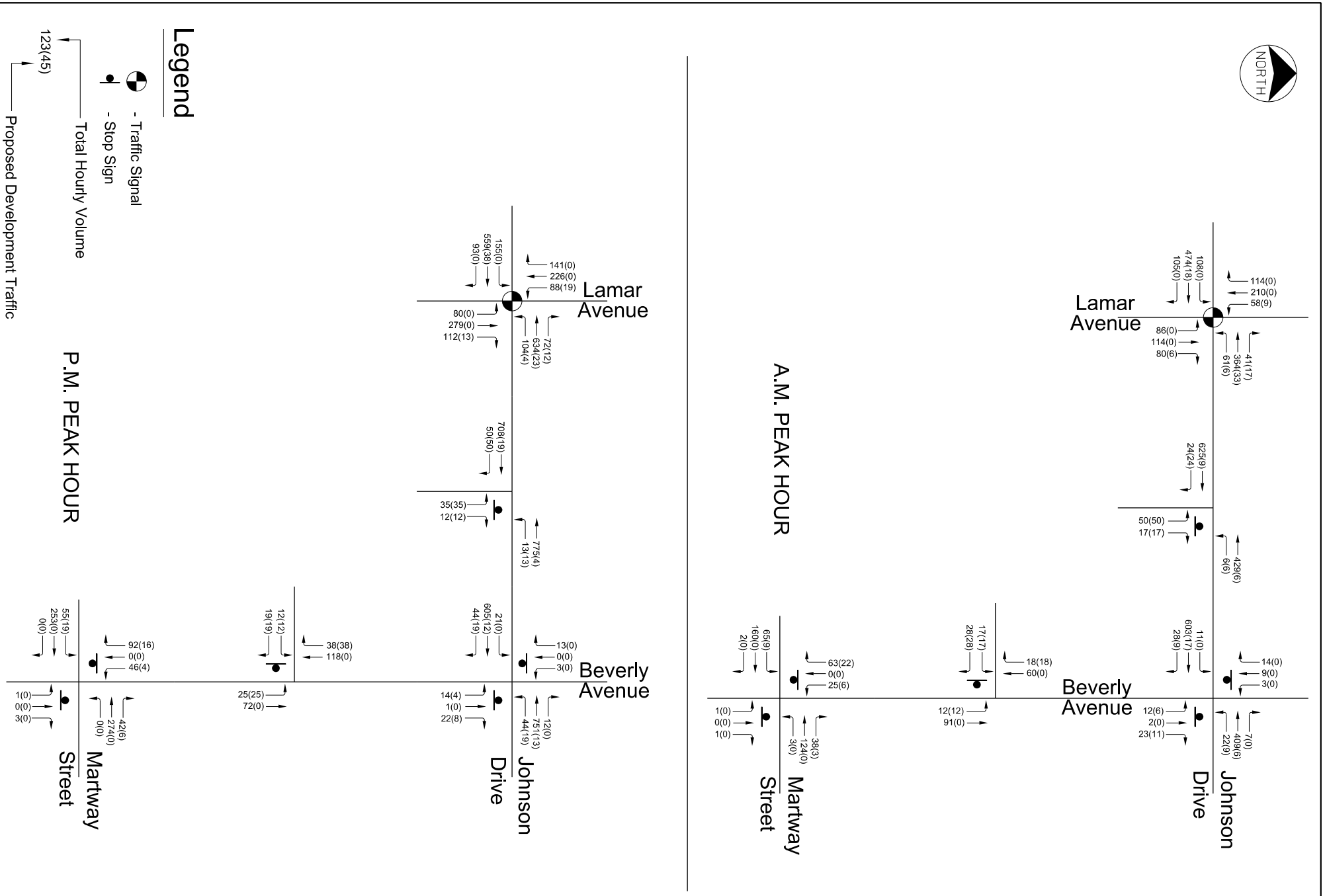


TranSystems	EXISTING PLUS DEVELOPMENT CONDITIONS PEAK HOUR TRAFFIC VOLUMES	Mission Trails Traffic Impact Study Mission, Kansas	September 2017 No Scale	Figure A-5

Appendix B – Trip Generation and Distribution

See attached worksheets.

Mission Trails Traffic Impact Study

Mission, Kansas

Trip Generation

Land Use	Intensity		ITE Code	Daily	A.M. Peak Hour Total	A.M. % In	A.M. % Out	A.M. In	A.M. Out	P.M. Peak Hour Total	P.M. % In	P.M. % Out	P.M. In	P.M. Out
Existing Land Use														
General Office Building	46,200	sf	710	510	73	88%	12%	64	9	69	17%	83%	12	57
Total Exsiting Development Trips				*510*	*73*			*64*	*9*	*69*			*12*	*57*
Proposed Land Use														
Apartments	200	du	220	1336	102	20%	80%	20	82	128	65%	35%	83	45
Restaurant	5,000	sf	932	636	55	55%	45%	31	24	50	60%	40%	30	20
Specialty Retail Center	1,500	sf	826	102	13	62%	38%	8	5	25	44%	56%	12	13
Total Proposed Development Trips				*2,074*	*170*			*59*	*111*	*203*			*125*	*78*
Net New Trips				**1,564**	**97**			**-5**	**102**	**134**			**113**	**21**

Notes:

Trip generation estimates based on 9th Edition

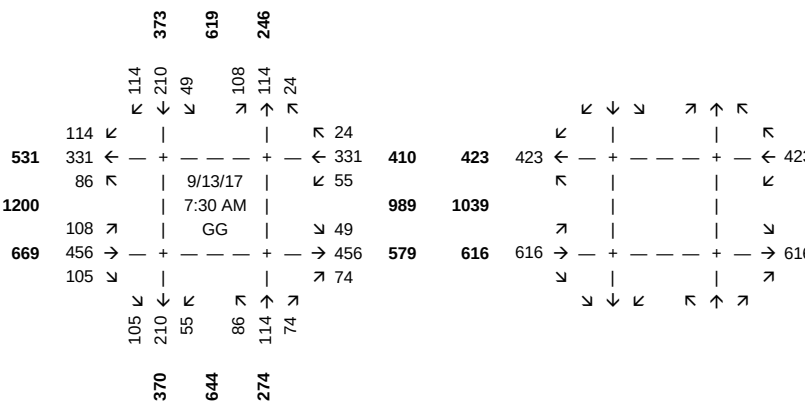
Mission Trails Traffic Impact Study

Mission, Kansas

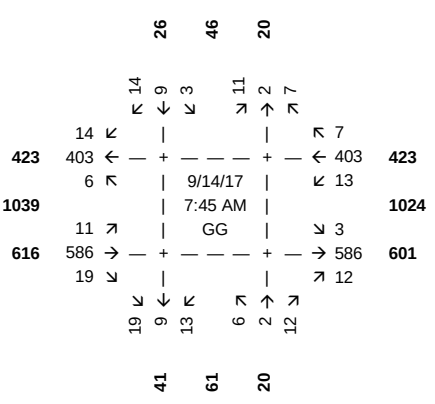
Existing Traffic Volumes

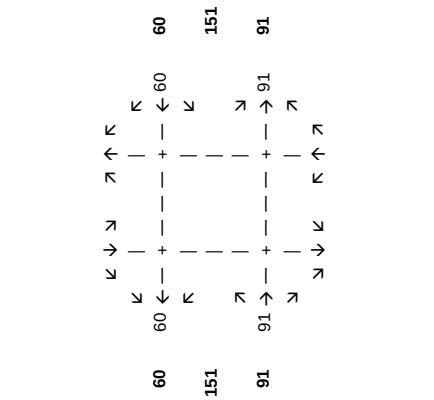
A.M. Peak Hour

Johnson Drive & Lamar Avenue

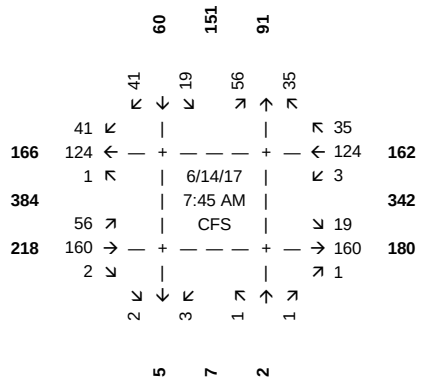


Johnson Drive & Beverly Avenue





Martway Street & Beverly Avenue



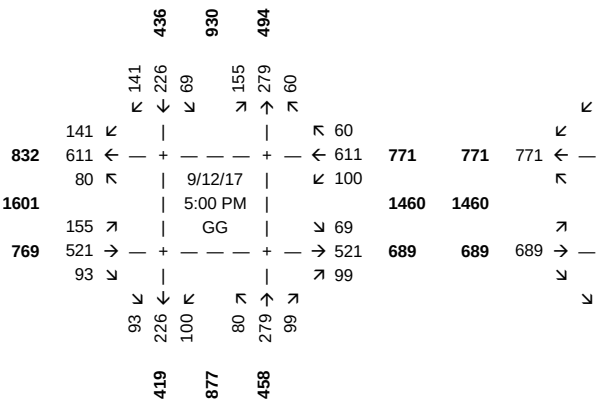
Mission Trails Traffic Impact Study

Mission, Kansas

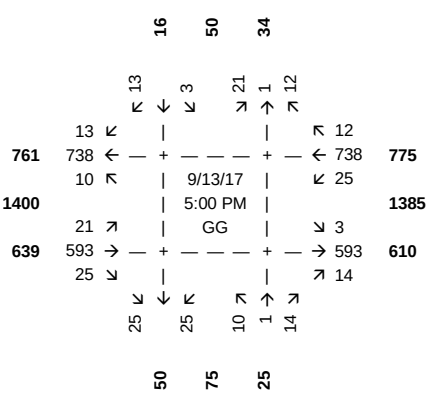
Existing Traffic Volumes

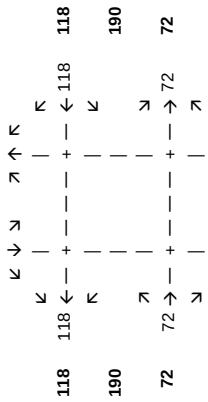
P.M. Peak Hour

Johnson Drive & Lamar Avenue

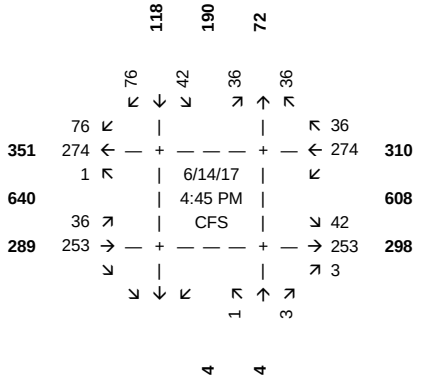


Johnson Drive & Beverly Avenue





Martway Street & Beverly Avenue



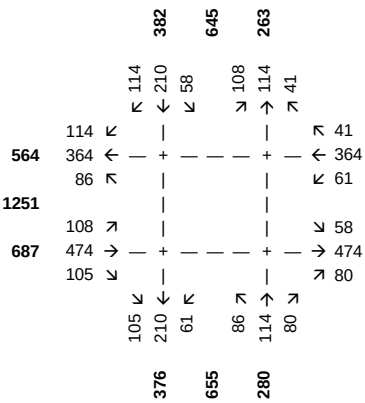
Mission Trails Traffic Impact Study

Mission, Kansas

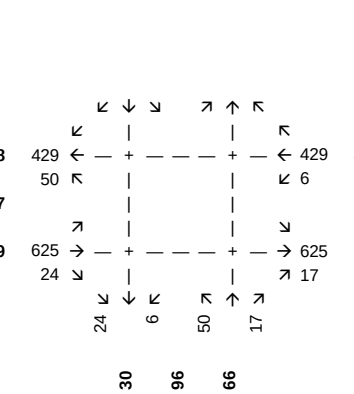
Existing plus Development Traffic Volumes

A.M. Peak Hour

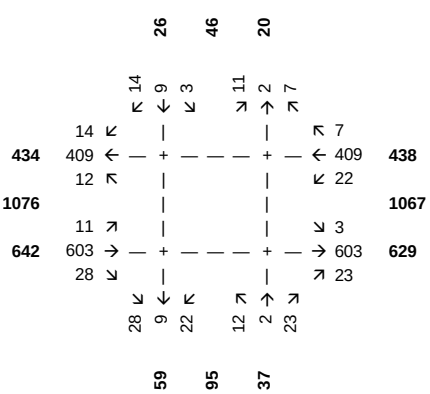
Johnson Drive & Lamar Avenue



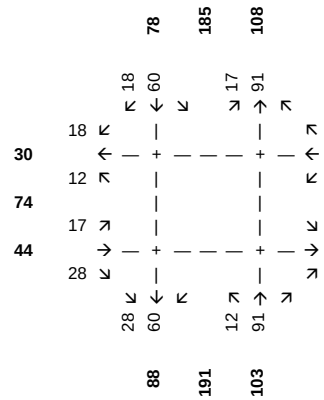
Johnson Drive & Site Driveway



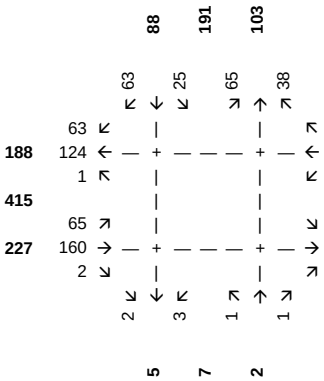
Johnson Drive & Beverly Avenue



Beverly Avenue & Site Driveway



Martway Street & Beverly Avenue



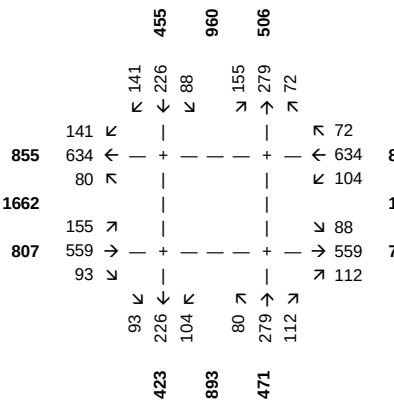
Mission Trails Traffic Impact Study

Mission, Kansas

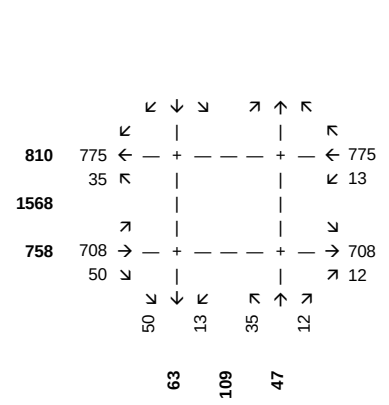
Existing plus Development Traffic Volumes

P.M. Peak Hour

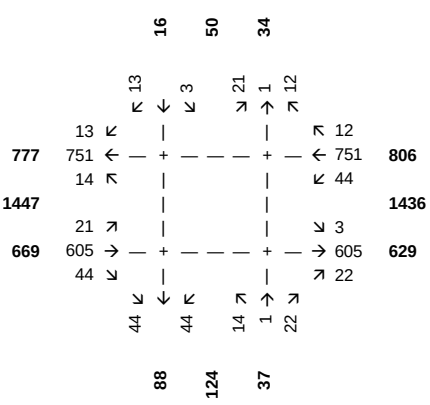
Johnson Drive & Lamar Avenue



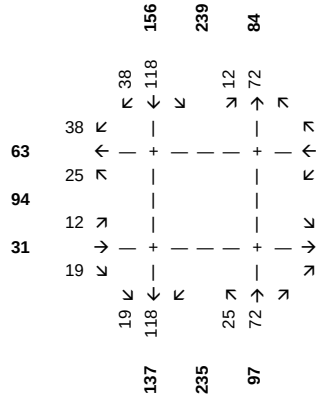
Johnson Drive & Site Driveway



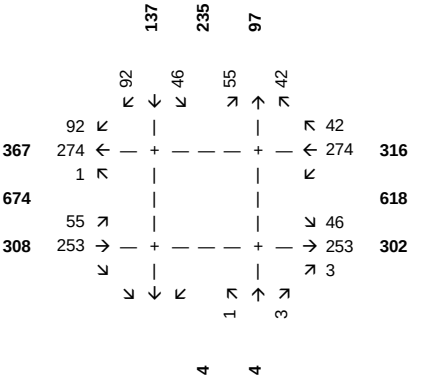
Johnson Drive & Beverly Avenue



Beverly Avenue & Site Driveway



Martway Street & Beverly Avenue



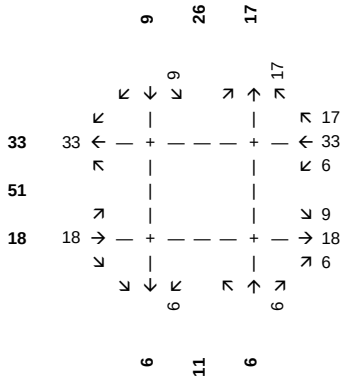
Mission Trails Traffic Impact Study

Mission, Kansas

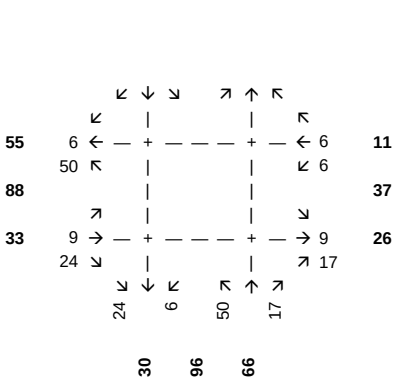
Development Trips

A.M. Peak Hour

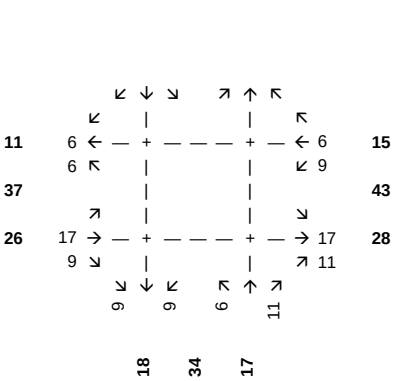
Johnson Drive & Lamar Avenue



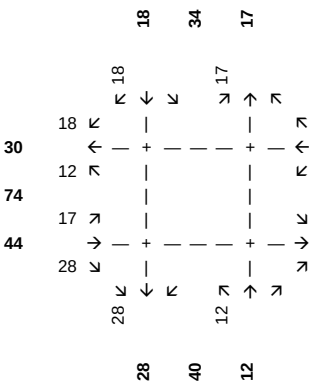
Johnson Drive & Site Driveway



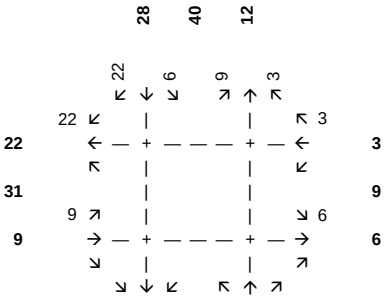
Johnson Drive & Beverly Avenue



Beverly Avenue & Site Driveway



Martway Street & Beverly Avenue



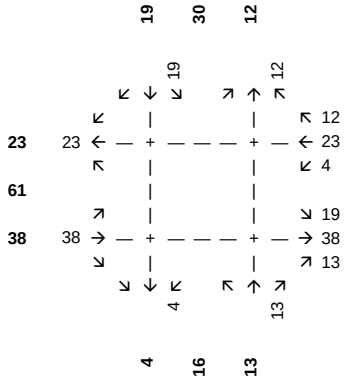
Mission Trails Traffic Impact Study

Mission, Kansas

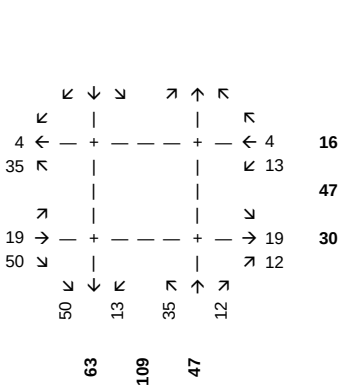
Development Trips

P.M. Peak Hour

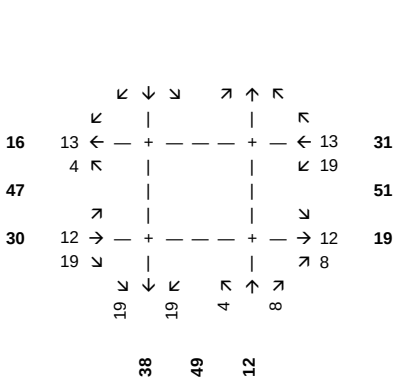
Johnson Drive & Lamar Avenue



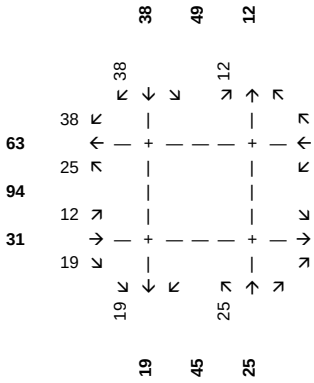
Johnson Drive & Site Driveway



Johnson Drive & Beverly Avenue



Beverly Avenue & Site Driveway



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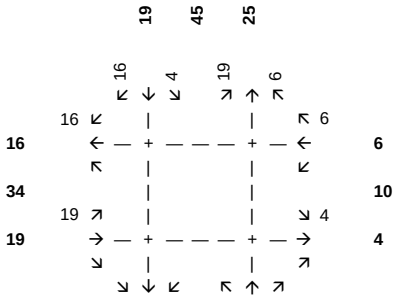


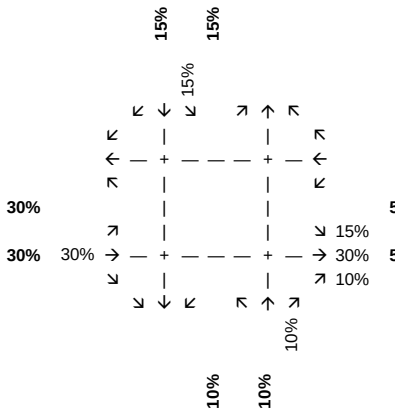
Mission Trails Traffic Impact Study

Mission, Kansas

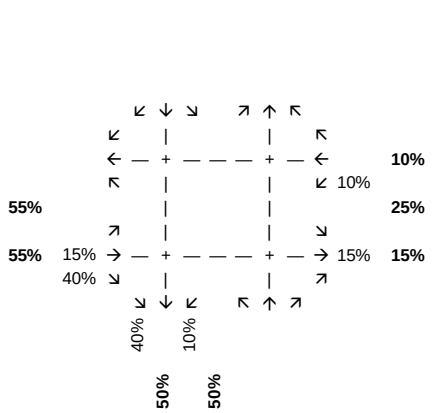
Trip Distribution

INBOUND

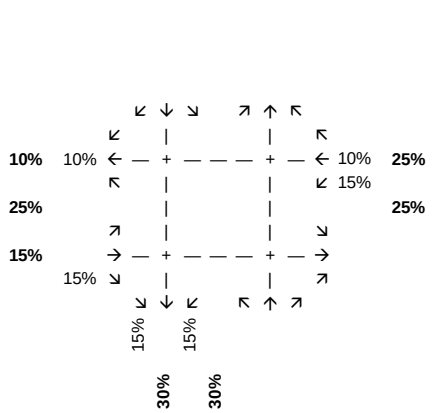
Johnson Drive & Lamar Avenue



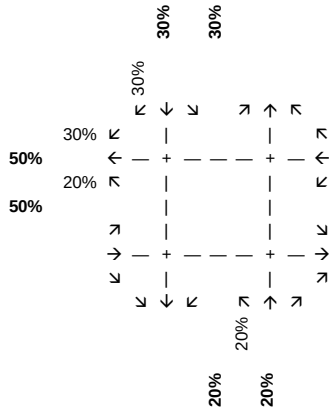
Johnson Drive & Site Driveway



Johnson Drive & Beverly Avenue



Beverly Avenue & Site Driveway



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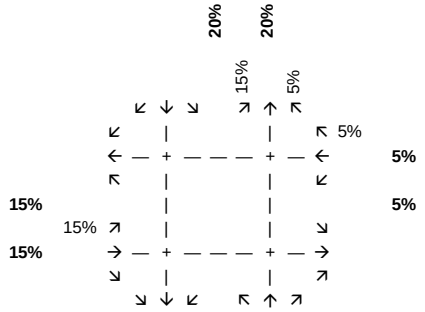


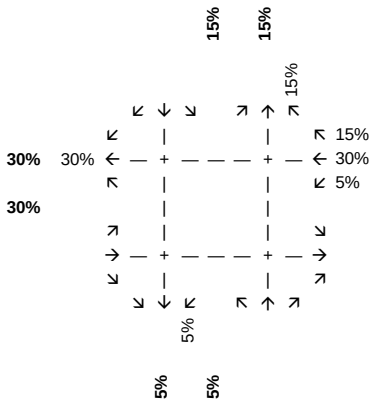
Mission Trails Traffic Impact Study

Mission, Kansas

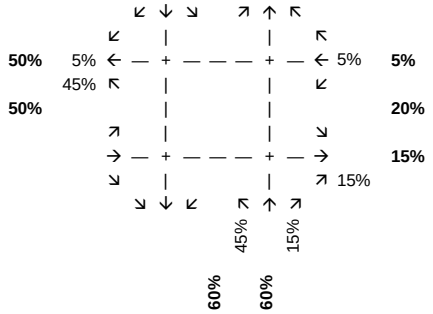
Trip Distribution

OUTBOUND

Johnson Drive & Lamar Avenue



Johnson Drive & Site Driveway



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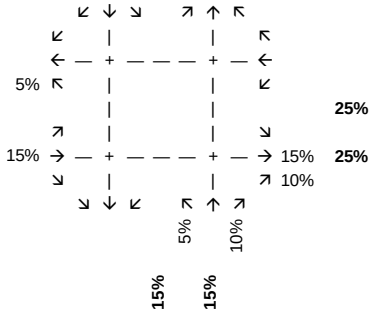
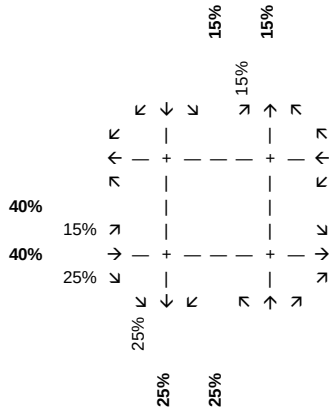
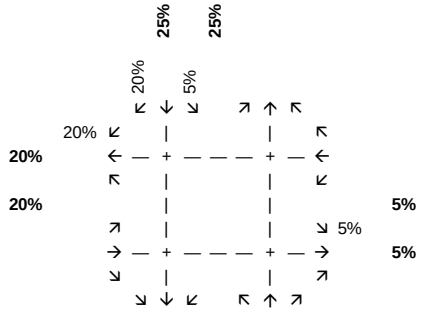


Beverly Avenue & Site Driveway



Martway Street & Beverly Avenue



Appendix C – Capacity Analysis Reports

See attached reports.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	117	610	60	386	93	124	80	53	352
v/c Ratio	0.28	0.63	0.19	0.43	0.25	0.20	0.13	0.11	0.67
Control Delay	18.2	29.1	18.0	28.6	16.9	23.0	1.1	15.7	32.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.2	29.1	18.0	28.6	16.9	23.0	1.1	15.7	32.5
Queue Length 50th (ft)	36	140	18	87	27	48	0	15	151
Queue Length 95th (ft)	84	234	49	155	65	102	6	41	278
Internal Link Dist (ft)		1163		581		669			739
Turn Bay Length (ft)	160		100		130		130	130	
Base Capacity (vph)	470	1807	336	1676	376	1194	1063	477	1107
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.34	0.18	0.23	0.25	0.10	0.08	0.11	0.32

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	108	456	105	55	331	24	86	114	74	49	210	114
Future Volume (vph)	108	456	105	55	331	24	86	114	74	49	210	114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3440		1770	3503		1770	1863	1583	1770	1764	
Flt Permitted	0.44	1.00		0.32	1.00		0.33	1.00	1.00	0.68	1.00	
Satd. Flow (perm)	824	3440		589	3503		609	1863	1583	1262	1764	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	117	496	114	60	360	26	93	124	80	53	228	124
RTOR Reduction (vph)	0	17	0	0	5	0	0	0	54	0	18	0
Lane Group Flow (vph)	117	593	0	60	381	0	93	124	26	53	334	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	28.3	21.4		24.9	19.7		31.7	25.9	25.9	26.1	23.1	
Effective Green, g (s)	28.3	21.4		24.9	19.7		31.7	25.9	25.9	26.1	23.1	
Actuated g/C Ratio	0.36	0.27		0.31	0.25		0.40	0.33	0.33	0.33	0.29	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	375	925		261	868		327	606	515	433	512	
v/s Ratio Prot	c0.03	c0.17		0.01	0.11		c0.02	0.07		0.00	c0.19	
v/s Ratio Perm	0.08			0.06			c0.09		0.02	0.04		
v/c Ratio	0.31	0.64		0.23	0.44		0.28	0.20	0.05	0.12	0.65	
Uniform Delay, d1	17.7	25.7		19.6	25.2		15.9	19.4	18.4	18.5	24.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	1.5		0.5	0.4		0.5	0.2	0.0	0.1	3.0	
Delay (s)	18.2	27.2		20.0	25.6		16.4	19.5	18.4	18.6	27.6	
Level of Service	B	C		C	C		B	B	B	B	C	
Approach Delay (s)		25.7			24.8			18.3			26.5	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	79.5	Sum of lost time (s)	24.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	586	19	13	403	7	6	2	12	3	9	14
Future Volume (Veh/h)	11	586	19	13	403	7	6	2	12	3	9	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	637	21	14	438	8	7	2	13	3	10	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		661										
pX, platoon unblocked				0.90			0.90	0.90	0.90	0.90	0.90	
vC, conflicting volume	446			658			938	1146	329	826	1152	223
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	446			408			719	948	44	595	955	223
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			97	99	99	99	96	98
cM capacity (veh/h)	1111			1037			266	229	919	337	227	780

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	330	340	233	227	22	28
Volume Left	12	0	14	0	7	3
Volume Right	0	21	0	8	13	15
cSH	1111	1700	1037	1700	447	388
Volume to Capacity	0.01	0.20	0.01	0.13	0.05	0.07
Queue Length 95th (ft)	1	0	1	0	4	6
Control Delay (s)	0.4	0.0	0.6	0.0	13.5	15.0
Lane LOS	A		A		B	C
Approach Delay (s)	0.2		0.3		13.5	15.0
Approach LOS					B	C

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	34.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	160	2	3	124	35	1	0	1	19	0	41
Future Volume (Veh/h)	56	160	2	3	124	35	1	0	1	19	0	41
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	61	174	2	3	135	38	1	0	1	21	0	45
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	173			176			502	476	175	458	458	154
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	173			176			502	476	175	458	458	154
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			100			100	100	100	96	100	95
cM capacity (veh/h)	1404			1400			440	466	868	495	477	892

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	237	176	2	66
Volume Left	61	3	1	21
Volume Right	2	38	1	45
cSH	1404	1400	584	710
Volume to Capacity	0.04	0.00	0.00	0.09
Queue Length 95th (ft)	3	0	0	8
Control Delay (s)	2.3	0.1	11.2	10.6
Lane LOS	A	A	B	B
Approach Delay (s)	2.3	0.1	11.2	10.6
Approach LOS			B	B

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	34.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	168	667	109	729	87	303	108	75	399
v/c Ratio	0.51	0.58	0.34	0.73	0.34	0.57	0.18	0.23	0.77
Control Delay	21.7	28.6	19.9	36.3	23.1	34.5	0.7	20.8	40.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	28.6	19.9	36.3	23.1	34.5	0.7	20.8	40.3
Queue Length 50th (ft)	57	170	35	205	32	158	0	28	208
Queue Length 95th (ft)	122	273	83	335	71	267	0	63	349
Internal Link Dist (ft)		1163		581		669			739
Turn Bay Length (ft)	160		100		130		130	130	
Base Capacity (vph)	407	1609	332	1337	253	904	866	323	867
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.41	0.33	0.55	0.34	0.34	0.12	0.23	0.46

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	521	93	100	611	60	80	279	99	69	226	141
Future Volume (vph)	155	521	93	100	611	60	80	279	99	69	226	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3459		1770	3492		1770	1863	1583	1770	1756	
Flt Permitted	0.18	1.00		0.32	1.00		0.27	1.00	1.00	0.41	1.00	
Satd. Flow (perm)	327	3459		596	3492		496	1863	1583	766	1756	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	168	566	101	109	664	65	87	303	108	75	246	153
RTOR Reduction (vph)	0	12	0	0	6	0	0	0	78	0	21	0
Lane Group Flow (vph)	168	655	0	109	723	0	87	303	30	75	378	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	41.9	30.1		33.9	26.1		30.6	26.1	26.1	30.6	26.1	
Effective Green, g (s)	41.9	30.1		33.9	26.1		30.6	26.1	26.1	30.6	26.1	
Actuated g/C Ratio	0.45	0.33		0.37	0.28		0.33	0.28	0.28	0.33	0.28	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	332	1125		317	985		226	525	446	302	495	
v/s Ratio Prot	c0.06	c0.19		0.03	c0.21		c0.02	0.16		0.01	c0.22	
v/s Ratio Perm	0.16			0.10			0.11		0.02	0.07		
v/c Ratio	0.51	0.58		0.34	0.73		0.38	0.58	0.07	0.25	0.76	
Uniform Delay, d1	17.1	26.0		19.9	30.1		22.8	28.5	24.3	21.9	30.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.2	0.8		0.7	2.9		1.1	1.5	0.1	0.4	6.9	
Delay (s)	18.3	26.7		20.6	32.9		23.9	30.0	24.4	22.4	37.3	
Level of Service	B	C		C	C		C	C	C	C	D	
Approach Delay (s)		25.0			31.3			27.7			34.9	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	92.5	Sum of lost time (s)	24.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	593	25	25	738	12	10	1	14	3	0	13
Future Volume (Veh/h)	21	593	25	25	738	12	10	1	14	3	0	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	645	27	27	802	13	11	1	15	3	0	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		661										
pX, platoon unblocked				0.89			0.89	0.89	0.89	0.89	0.89	
vC, conflicting volume	815			672			1174	1574	336	1246	1580	408
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	815			397			958	1405	21	1039	1413	408
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			97			94	99	98	98	100	98
cM capacity (veh/h)	808			1036			177	117	940	155	116	593

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	346	350	428	414	27	17
Volume Left	23	0	27	0	11	3
Volume Right	0	27	0	13	15	14
cSH	808	1700	1036	1700	312	396
Volume to Capacity	0.03	0.21	0.03	0.24	0.09	0.04
Queue Length 95th (ft)	2	0	2	0	7	3
Control Delay (s)	1.0	0.0	0.8	0.0	17.6	14.5
Lane LOS	A		A		C	B
Approach Delay (s)	0.5		0.4		17.6	14.5
Approach LOS					C	B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	253	0	0	274	26	1	0	3	42	0	76
Future Volume (Veh/h)	36	253	0	0	274	26	1	0	3	42	0	76
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	39	275	0	0	298	28	1	0	3	46	0	83
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	326			275			748	679	275	668	665	312
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	326			275			748	679	275	668	665	312
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			100	100	100	87	100	89
cM capacity (veh/h)	1234			1288			284	362	764	361	369	728

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	314	326	4	129
Volume Left	39	0	1	46
Volume Right	0	28	3	83
cSH	1234	1288	537	535
Volume to Capacity	0.03	0.00	0.01	0.24
Queue Length 95th (ft)	2	0	1	23
Control Delay (s)	1.3	0.0	11.8	13.9
Lane LOS	A		B	B
Approach Delay (s)	1.3	0.0	11.8	13.9
Approach LOS			B	B

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	117	629	66	441	93	124	87	63	352
v/c Ratio	0.29	0.63	0.21	0.48	0.26	0.22	0.15	0.13	0.67
Control Delay	18.4	29.4	18.1	28.9	17.2	24.7	1.7	16.1	32.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.4	29.4	18.1	28.9	17.2	24.7	1.7	16.1	32.8
Queue Length 50th (ft)	36	147	20	101	28	49	0	19	154
Queue Length 95th (ft)	84	244	53	176	66	103	10	48	281
Internal Link Dist (ft)		1163		372		669			739
Turn Bay Length (ft)	160		100		130		130	130	
Base Capacity (vph)	453	1789	333	1651	371	1186	1057	476	1100
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.35	0.20	0.27	0.25	0.10	0.08	0.13	0.32

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	108	474	105	61	364	41	86	114	80	58	210	114
Future Volume (vph)	108	474	105	61	364	41	86	114	80	58	210	114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3443		1770	3485		1770	1863	1583	1770	1764	
Flt Permitted	0.40	1.00		0.31	1.00		0.33	1.00	1.00	0.68	1.00	
Satd. Flow (perm)	743	3443		569	3485		624	1863	1583	1262	1764	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	117	515	114	66	396	45	93	124	87	63	228	124
RTOR Reduction (vph)	0	16	0	0	7	0	0	0	61	0	19	0
Lane Group Flow (vph)	117	613	0	66	434	0	93	124	26	63	333	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	28.8	21.9		25.6	20.3		29.3	23.6	23.6	26.5	22.2	
Effective Green, g (s)	28.8	21.9		25.6	20.3		29.3	23.6	23.6	26.5	22.2	
Actuated g/C Ratio	0.36	0.28		0.32	0.26		0.37	0.30	0.30	0.34	0.28	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	360	953		264	894		313	555	472	450	495	
v/s Ratio Prot	c0.03	c0.18		0.02	0.12		c0.02	0.07		0.01	c0.19	
v/s Ratio Perm	0.09			0.06			0.09		0.02	0.04		
v/c Ratio	0.33	0.64		0.25	0.48		0.30	0.22	0.05	0.14	0.67	
Uniform Delay, d1	17.3	25.2		19.0	25.0		17.1	20.9	19.8	18.1	25.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	1.5		0.5	0.4		0.5	0.2	0.0	0.1	3.6	
Delay (s)	17.8	26.7		19.5	25.4		17.7	21.1	19.8	18.3	28.8	
Level of Service	B	C		B	C		B	C	B	B	C	
Approach Delay (s)		25.3			24.6			19.7			27.2	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	79.1	Sum of lost time (s)	24.0
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	625	24	6	429	50	17
Future Volume (Veh/h)	625	24	6	429	50	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	679	26	7	466	54	18
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	452					
pX, platoon unblocked			0.88		0.88	0.88
vC, conflicting volume			705		939	352
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			383		650	0
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		85	98
cM capacity (veh/h)			1028		350	951

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	453	252	162	311	72
Volume Left	0	0	7	0	54
Volume Right	0	26	0	0	18
cSH	1700	1700	1028	1700	416
Volume to Capacity	0.27	0.15	0.01	0.18	0.17
Queue Length 95th (ft)	0	0	1	0	15
Control Delay (s)	0.0	0.0	0.4	0.0	15.5
Lane LOS			A		C
Approach Delay (s)	0.0		0.1		15.5
Approach LOS					C

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	28.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	603	28	22	409	7	12	2	23	3	9	14
Future Volume (Veh/h)	11	603	28	22	409	7	12	2	23	3	9	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	655	30	24	445	8	13	2	25	3	10	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		661										
pX, platoon unblocked				0.91			0.91	0.91	0.91	0.91	0.91	
vC, conflicting volume	453			685			984	1195	342	874	1206	226
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	453			447			778	1010	70	656	1022	226
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			95	99	97	99	95	98
cM capacity (veh/h)	1104			1006			239	209	888	299	205	776

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	340	358	246	230	40	28
Volume Left	12	0	24	0	13	3
Volume Right	0	30	0	8	25	15
cSH	1104	1700	1006	1700	434	359
Volume to Capacity	0.01	0.21	0.02	0.14	0.09	0.08
Queue Length 95th (ft)	1	0	2	0	8	6
Control Delay (s)	0.4	0.0	1.1	0.0	14.1	15.9
Lane LOS	A		A		B	C
Approach Delay (s)	0.2		0.5		14.1	15.9
Approach LOS					B	C

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	39.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	28	12	91	60	18
Future Volume (Veh/h)	17	28	12	91	60	18
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	30	13	99	65	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	200	75	85			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	200	75	85			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	97	99			
cM capacity (veh/h)	782	986	1512			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	48	112	85
Volume Left	18	13	0
Volume Right	30	0	20
cSH	898	1512	1700
Volume to Capacity	0.05	0.01	0.05
Queue Length 95th (ft)	4	1	0
Control Delay (s)	9.2	0.9	0.0
Lane LOS	A	A	
Approach Delay (s)	9.2	0.9	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	22.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	160	2	3	124	38	1	0	1	25	0	63
Future Volume (Veh/h)	65	160	2	3	124	38	1	0	1	25	0	63
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	174	2	3	135	41	1	0	1	27	0	68
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	176			176			546	499	175	480	480	156
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	176			176			546	499	175	480	480	156
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			100	100	100	94	100	92
cM capacity (veh/h)	1400			1400			397	448	868	476	460	890

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	247	179	2	95
Volume Left	71	3	1	27
Volume Right	2	41	1	68
cSH	1400	1400	545	714
Volume to Capacity	0.05	0.00	0.00	0.13
Queue Length 95th (ft)	4	0	0	11
Control Delay (s)	2.5	0.1	11.6	10.8
Lane LOS	A	A	B	B
Approach Delay (s)	2.5	0.1	11.6	10.8
Approach LOS			B	B

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	36.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	168	709	113	767	87	303	122	96	399
v/c Ratio	0.52	0.61	0.36	0.75	0.35	0.58	0.22	0.30	0.77
Control Delay	22.1	29.7	20.1	36.7	23.9	35.2	4.9	22.6	41.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.1	29.7	20.1	36.7	23.9	35.2	4.9	22.6	41.2
Queue Length 50th (ft)	57	187	37	221	33	161	0	37	213
Queue Length 95th (ft)	123	298	86	357	72	270	34	78	354
Internal Link Dist (ft)		1163		372		669			739
Turn Bay Length (ft)	160		100		130		130	130	
Base Capacity (vph)	398	1581	335	1350	248	866	808	319	830
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.45	0.34	0.57	0.35	0.35	0.15	0.30	0.48

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	559	93	104	634	72	80	279	112	88	226	141
Future Volume (vph)	155	559	93	104	634	72	80	279	112	88	226	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3464		1770	3485		1770	1863	1583	1770	1756	
Flt Permitted	0.16	1.00		0.28	1.00		0.26	1.00	1.00	0.41	1.00	
Satd. Flow (perm)	306	3464		528	3485		490	1863	1583	760	1756	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	168	608	101	113	689	78	87	303	122	96	246	153
RTOR Reduction (vph)	0	11	0	0	7	0	0	0	88	0	20	0
Lane Group Flow (vph)	168	698	0	113	760	0	87	303	34	96	379	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	42.7	30.9		35.7	27.4		31.0	26.5	26.5	31.0	26.5	
Effective Green, g (s)	42.7	30.9		35.7	27.4		31.0	26.5	26.5	31.0	26.5	
Actuated g/C Ratio	0.45	0.33		0.38	0.29		0.33	0.28	0.28	0.33	0.28	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	322	1136		309	1013		222	524	445	298	493	
v/s Ratio Prot	c0.07	c0.20		0.03	c0.22		c0.02	0.16		0.02	c0.22	
v/s Ratio Perm	0.17			0.11			0.11		0.02	0.09		
v/c Ratio	0.52	0.61		0.37	0.75		0.39	0.58	0.08	0.32	0.77	
Uniform Delay, d1	17.6	26.6		19.7	30.3		23.3	29.1	24.9	22.8	31.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.5	1.0		0.7	3.2		1.1	1.6	0.1	0.6	7.1	
Delay (s)	19.1	27.6		20.5	33.5		24.5	30.6	24.9	23.4	38.1	
Level of Service	B	C		C	C		C	C	C	C	D	
Approach Delay (s)		26.0			31.8			28.2			35.3	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	29.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	94.2	Sum of lost time (s)	24.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	708	50	13	775	35	12
Future Volume (Veh/h)	708	50	13	775	35	12
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	770	54	14	842	38	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	452					
pX, platoon unblocked			0.85		0.85	0.85
vC, conflicting volume			824		1246	412
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			443		939	0
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		83	99
cM capacity (veh/h)			948		220	923

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	513	311	295	561	51
Volume Left	0	0	14	0	38
Volume Right	0	54	0	0	13
cSH	1700	1700	948	1700	273
Volume to Capacity	0.30	0.18	0.01	0.33	0.19
Queue Length 95th (ft)	0	0	1	0	17
Control Delay (s)	0.0	0.0	0.6	0.0	21.2
Lane LOS			A		C
Approach Delay (s)	0.0		0.2		21.2
Approach LOS					C

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	40.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	605	44	44	751	12	14	1	22	3	0	13
Future Volume (Veh/h)	21	605	44	44	751	12	14	1	22	3	0	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	658	48	48	816	13	15	1	24	3	0	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		661										
pX, platoon unblocked				0.89			0.89	0.89	0.89	0.89	0.89	
vC, conflicting volume	829			706			1246	1653	353	1318	1670	414
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	829			433			1037	1493	38	1118	1512	414
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			95			90	99	97	98	100	98
cM capacity (veh/h)	798			1004			152	101	916	132	98	587

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	352	377	456	421	40	17
Volume Left	23	0	48	0	15	3
Volume Right	0	48	0	13	24	14
cSH	798	1700	1004	1700	297	365
Volume to Capacity	0.03	0.22	0.05	0.25	0.13	0.05
Queue Length 95th (ft)	2	0	4	0	11	4
Control Delay (s)	1.0	0.0	1.4	0.0	19.0	15.4
Lane LOS	A		A		C	C
Approach Delay (s)	0.5		0.7		19.0	15.4
Approach LOS					C	C

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	19	25	72	118	38
Future Volume (Veh/h)	12	19	25	72	118	38
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	21	27	78	128	41
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	280	148	169			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	280	148	169			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	98	98			
cM capacity (veh/h)	696	898	1409			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	34	105	169
Volume Left	13	27	0
Volume Right	21	0	41
cSH	808	1409	1700
Volume to Capacity	0.04	0.02	0.10
Queue Length 95th (ft)	3	1	0
Control Delay (s)	9.6	2.1	0.0
Lane LOS	A	A	
Approach Delay (s)	9.6	2.1	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	27.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	253	0	0	274	42	1	0	3	46	0	92
Future Volume (Veh/h)	55	253	0	0	274	42	1	0	3	46	0	92
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	275	0	0	298	46	1	0	3	50	0	100
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	344			275			816	739	275	719	716	321
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	344			275			816	739	275	719	716	321
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			100	100	100	85	100	86
cM capacity (veh/h)	1215			1288			245	328	764	329	338	720

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	335	344	4	150
Volume Left	60	0	1	50
Volume Right	0	46	3	100
cSH	1215	1288	499	516
Volume to Capacity	0.05	0.00	0.01	0.29
Queue Length 95th (ft)	4	0	1	30
Control Delay (s)	1.8	0.0	12.3	14.8
Lane LOS	A		B	B
Approach Delay (s)	1.8	0.0	12.3	14.8
Approach LOS			B	B

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		