REPORT

Crossroads IGA 8001 Smyrna Parkway Louisville, KY

Traffic Impact Study

Louisville Metro Planning

March 8, 2016

Revised May 2,2016



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Introduction

The proposed Crossroads IGA in Louisville, KY is located on Smyrna Parkway east of Applegate Lane (west) intersection and north of Highview Fire Station Number 2. Crossroads IGA is proposing a 14,532 square foot neighborhood grocery with eight fueling positions. The building will also house a hardware store and a fast-food restaurant. **Figure 1** displays a map of the site. Access to the tract will be from two entrances on Smyrna Parkway. The purpose of this study is to examine the traffic impacts of the proposed development upon the adjacent highway system. For this study the impact area was defined to be the intersection of Applegate Lane (west) and Smyrna Parkway.

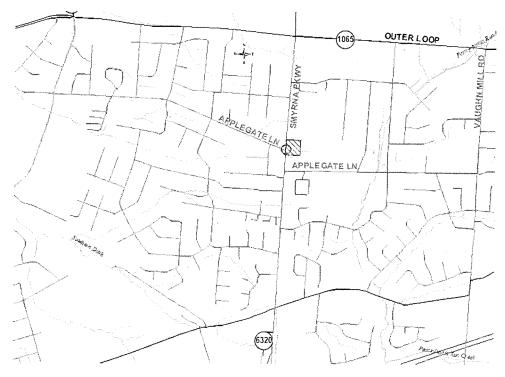


Figure 1
Site Location

Existing Conditions

Smyrna Parkway is maintained by Metro Louisville with an estimated 2015 ADT of 12,200 vehicles per day between Outer Loop (KY 1065) and Manslick Road (KY 2845), as estimated from the Kentucky Transportation Cabinet 2014 count at station 402. The road is a three lane road with ten-foot lanes a two-way left turn lane and curb and gutter. The posted speed limit is 35 mph. There are sidewalks on the west side. The intersection with Applegate Lane is controlled with a stop sign. There are no turn lanes on Applegate Lane.

A.m. and p.m. peak hour traffic counts were obtained at the intersection on December 17, 2015 (see Appendix A). The a.m. peak hour occurred between 7:00 and 8:00 and the p.m. peak hour occurred between 5:00 and 6:00 p.m. **Figure 2** illustrates the existing peak hour traffic volumes.

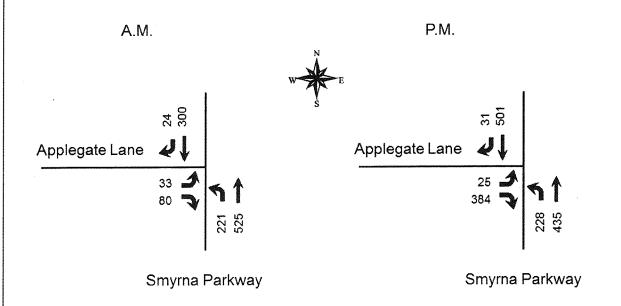
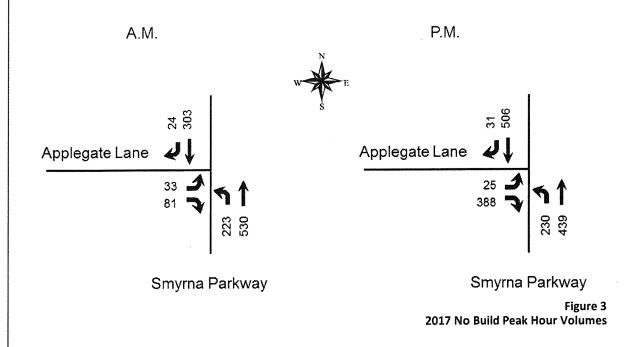


Figure 2 2015 Peak Hour Counts

Future Conditions

The projected completion year for this development is 2017, so the analysis year for this study is 2017. To predict traffic conditions in 2017, one percent annual growth in traffic was added. This growth is based upon a review of the historical growth at KYTC count stations 401 and 402. **Figure 3** displays the 2017 No Build volumes.





Trip Generation

The Institute of Transportation Engineers <u>Trip Generation Manual</u>, 9th Edition contains trip generation rates for a wide range of developments. The land uses of "Gasoline/Service Station with Convenience Market (945)", "Fast-Food with Drive-Through Window (934)" and "Hardware Store (816)" best describes this development. The trip generation results were compared with existing Crossroads IGA sites to confirm this as the best match. The trip generation results are listed in **Table 1**. The results of the trip generation analysis are that this development will generate 129 a.m. peak hour trips and 179 p.m. peak hour trips. The trips were assigned to the highway network with 70 percent to/from the south, 15 percent to/from the north and 15 percent to/from the west. This is based upon the residential density in the vicinity. **Figure 4** shows the trips generated by this development and distributed throughout the road network for the year 2017 during the peak hours. **Figure 5** displays the individual turning movements for the year 2017 for the peak hours when the development is completed.

Table 1 - Trip Generation

	AW	Peak H	e)HT	PM	Peak H	our
	Total	Enter	Exit	Total	Enter	Exit
Gasoline/Service Station with Conv Market (8 fueling positions)	81	41	40	108	54	54
Hardware Store (3,000 square feet)	3	2	1	38	18	20
Fast-Food with Drive-Through Window (1,000 square feet)	45	23	22	33	17	16
TOTAL	129	66	63	179	89	90

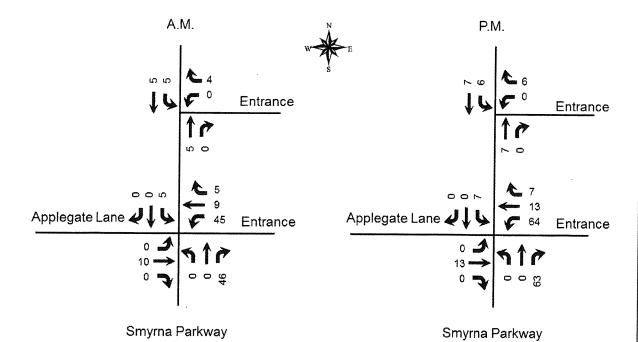


Figure 4
Trip Distribution for Site



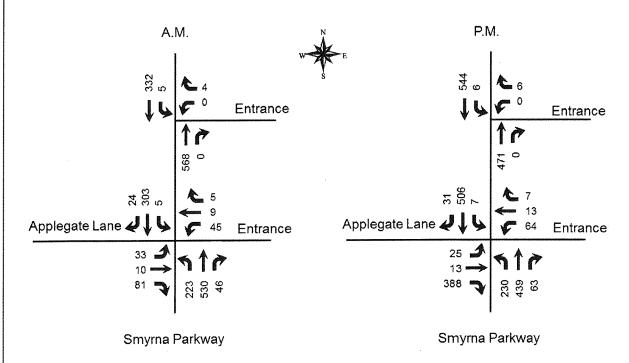


Figure 5 2017 Build Peak Hour Volumes

Analysis

The qualitative measure of operation for a roadway facility or intersection is evaluated by assigning a "Level of Service" or LOS. Level of Service is a ranking scale from A through F with each level representing a range. LOS results depend upon the type of facility that is analyzed. In this case, the LOS is based upon the average vehicle delay each movement experiences at an intersection.

To evaluate the impact of the proposed development, the vehicle delays at the intersection were determined using procedures detailed in the <u>Highway Capacity Manual</u>, 2010 edition. Future delay and Level of Service were determined for the intersection using HCS 2010 TWSC and Streets software (version 6.70). **Table 2** shows the results of the analysis for the three scenarios analyzed. The full printouts are included in Appendix B.



Table 2 - Level of Service Results

		AM Peal	k Hour			PM Pe	ak Hour		1	affic (nal
	2015 Existing	2017 No Build	2017 Build	2017 Build EB R	2015 Existing	2017 No Build	2017 Build	2017 Build EB R	2017 AM Build	2017 PM Build
Smyrna Parkway at									Тc	c
Applegate Lane									25.4	32.8
Applegate Lane	Α	Α	F	F	F	F	F	D	D	D D
Eastbound	9.7	9.7	213.9	87.8	50.7	54.3	158.6	32.0	37.5	39.5
Crossroads IGA			F	F			F	F	D D	55.5 E
Westbound	NA	NA	377.8	377.8	NA	NA	1537.8	1537.8	54.7	55.9
Smyrna Parkway	Α	Α	Α	Α	Α	Α	A	Α	C	C C
Southbound	9.2	9.2	9.2	9.2	9.6	9.6	9.5	9.5	21.9	25.8
Smyrna Parkway	N/A	N1 A	Α	Α			A A	A A	C C	23.8 C
Northbound	NA	NA	9.1	9.1	NA	NA	8.4	8.4	24.2	33.7

Note: Level of Service, delay in seconds

Because the intersection currently experiences Level of Service F during the current p.m. peak hour and during both build peak hours, two options were evaluated. The first option is to construct an eastbound right turn lane and the second was the installation of a traffic signal. The addition of an eastbound right turn lane does not eliminate Level of Service F conditions in both peak hours.

The Manual on Uniform Traffic Control Device Warrants for installing a traffic signal were reviewed. A speed study was conducted on Smyrna Parkway on April 26, 2016. The 85th percentile speed was 46 mph. Therefore, the speed reduction has been applied to the signal warrants. Using only the volumes from the existing count, Warrant 1A is satisfied for all twelve hours. The speed study and warrant chart are included in Appendix B. The full volume on the minor street approach includes the right turn volume due to the single lane approach on Applegate Lane. Additionally, the signal meets the recommendation for installing protected left turn movement for northbound Smyrna Parkway. Installing a traffic signal will improve the overall operation of the intersection.

In order to achieve the level of service results shown in the table above, an eastbound right turn lane will also be constructed on Applegate Lane.

Conclusions

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2017, there will be an impact to the existing highway network. Due to the delays currently experienced on Applegate Lane at Smyrna Parkway, a traffic signal with an eastbound right turn lane is recommended for the intersection. The installation of the traffic signal will improve the overall operation of the intersection.



Appendix A
Traffic Counts

Study Name Smyrna Rd & Applegate Ln Start Date 12/17/2015 Start Time 7:00 AM Site Code

		ound Ap outhbour	proach		ound Apporthbour		Mai	nline Hourly	Eastbo	und Ap astbour		Side	street Hourly
Start Time	Right	Thru	U-Turn	Thru		u U-Turn	Total	Total	Right	Left	U-Turn	Total	Total
7:00 AM	3	55	0	140	31	0	229		14	6		20	Jour
7:15 AM	4	67	0	179	58	0	308		20	11		31	
7:30 AM	12	110	0	141	85	0	348		22	9		31	}
7:45 AM	5	68	0	65	47	0	185	1070	24	7		31	11:
8:00 AM	2	51	0	65	33	0	151	11.1	21	5		26	
8:15 AM	1	61	0	76	35	0	173		21	7		28	
8:30 AM	3	70	0	103	40	0	216		31	2		33	
8:45 AM	3	76	0	93	44	0	216	756	26	5		31	118
9:00 AM	4	70	0	69	31	0	174		29	6	0	35	
9:15 AM	5	60	0	69	24	0	158		18	2		20	
9:30 AM	3	39	0	79	35	0	156		21	2		23	
9:45 AM	4	51	0	65	35	0	155	643	26	3		29	107
10:00 AM	3	61	0	73	37	0	174		15	3		18	, , ,
10:15 AM	0	50	0	66	39	0	155		29	1		30	
10:30 AM	6	46	0	63	23	0	138		23	4	0	27	
10:45 AM	3	51	0	53	37	0:	144	611	30	3	0	33	108
11:00 AM	2	44	0	64	35	0	145	٠	23	7	0	30	
11:15 AM	4	60	0	77	43	0	184		21	6	0	27	
11:30 AM	2	67	0	84	45	0	198		27	5	0	32	
11:45 AM	2	73	0	74	35	0	184	711	38	9	0	47	136
12:00 PM	7	55	0	80	33	Ô	175	/ 13:	31	7	0	38	. 100
12:15 PM	4	57	0	72	35	0	168		33	3	0	36	
12:30 PM	6	65	0	80	34	0	185		27	6	0	33	
12:45 PM	6	77	0	90	40	0	213	741	40	5	0	45	152
1:00 PM	0	77	0	97	35	0	209		55	9	0	64	102
1:15 PM	5	89	0	73	48	0	215		50	2	0	52	
:30 PM	5	81	0	91	45	0	222		57	3	0	60	
:45 PM	5	87	0	102	45	0	239	885	60	2	0	62	238
:00 PM	5	58	0	102	41	0	213	000	60	7	0	67	230
2:15 PM	6	94	0	129	55	0	284		57	9	0	66	
::30 PM	10	112	0	106	62	0	290		70	6	0	76	
:45 PM	7	126	0	112	32	0	277	1064	99	6	0	105	314
:00 PM	6	113	0	82	40	0	241	1004	94	5	0	99	314
:15 PM	4	90	0	116	44	0	254		68	10	0	78	
:30 PM	6	120	0	86	45	0	257		68	6	0	74	
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:00 PM				and the second	51	0	258	1010	75	4	0	79	330
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:30 PM		116	0	106	46	0	273		80	5	0	85	
	10	136	0	107	52	0	305	4400	87	5	0	92	
:45 PM	6	124	0	97	64	0	291	1188	90	7	0	97	364
:00 PM	7	135	0	100	57	0	299		80	7	0	87	
:15 PM	6	127	0	100	57	0	290		103	6	0	109	
:30 PM	9	114	0	122	47	0	292		111	7	0	118	
:45 PM	9	125	0	113	67	0	314	1195	90	5	1	96	410
:00 PM	4	116	0	106	56	0	282		96	4	0	100	
:15 PM	10	98	0	115	40	. 0	263		66	6	0	72	
:30 PM	2	104	0	94	53	0	253		75	11	0	86	

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Appendix B HCS Reports

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Delay, Queue Length, and Level of Service

Capacity

95% Queue Length

Control Delay (s/veh)

Level of Service (LOS)

Approach LOS

Approach Delay (s/veh)

145

918

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Approach Movement Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles Proportion Time Blocked Right Turn Channelized Median Type Median Storage Delay, Queue Length, as	U	Eastt 1 10 0 0 33 6	T 11 1 LTR 10 0	12 0 81	Major	Westl L 7 1 L 45 0	oound T 8 1 9 0	R 9 0 TR 5 0 Undi	1U Maria de la companio del companio del companio de la companio del la companio de la companio de la companio del la companio de la companio de la companio del la companio de la companio de la companio del la companio d	1 1 1 L 223 1	1 1 530	3 O TR	4U	L 4 1 1 L 5 0	5 1 303	T1
Approach Movement Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles Proportion Time Blocked Right Turn Channelized Median Type Median Storage Delay, Queue Length, and Flow Rate (veh/h) Capacity	U	Eastt 1 10 0 0 33 6	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	12 0 81	Major	Westl: No. 1	oound T 8 1 9 0	R 9 0 TR 5 0 Undi	1U Maria de la companio del companio del companio de la companio del la companio de la companio de la companio del la companio de la companio de la companio del la companio de la companio de la companio del la companio d	1 1 1 L 223 1 N	1 1 530	3 O TR	4U	L 4 1 L 5 0	5 1 303	T1
Approach Movement Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles Proportion Time Blocked Right Turn Channelized Median Type Median Storage Delay, Queue Length, and Flow Rate (veh/h) Capacity v/c Ratio	U	Eastt 1 10 0 0 33 6	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	12 0 81	Major	Westl: No. 1	oound T 8 1 9 0	R 9 0 0 TR 5 0 0 Undi	1U Maria de la companio del companio del companio de la companio del la companio de la companio de la companio del la companio de la companio de la companio del la companio de la companio de la companio del la companio d	1 1 1 223 1 N N 286 1145	1 1 530	3 O TR	4U	L 4 1 1 L 5 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5 1 303	T1
Approach Movement Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles Proportion Time Blocked Right Turn Channelized Median Type Median Storage Delay, Queue Length, ar Flow Rate (veh/h) Capacity v/c Ratio 85% Queue Length	U	Eastt 1 10 0 0 33 6	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	12 0 81	Major	West Nove Nove Nove Nove Nove Nove Nove Nove	oound T 8 1 9 0	R 9 0 0 TR 5 0 0 Undi	1U Maria de la companio del companio del companio de la companio del la companio de la companio de la companio del la companio de la companio de la companio del la companio de la companio de la companio del la companio d	223 1 1 228 1 1 8	1 1 530	3 O TR	4U	6 877 0,01	5 1 303	7
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General Information					A PARTIE AND A PAR		Site	Inforn	nation	l						
Analyst	DBZ	и з при волжения	-	Un monthouse &			Inters	ection		**********	Smyri	na Pkw a	t Appleg	ate		
Agenty/Co.	CDM	Smith				***	Jurisc	liction								
Date Performed	2/17/	2016			and the second second	Translation and the second	East/	West Stre	et		Apple	gate Lar	ie	4		-
Analysis Year	2015						North	1/South S	treet		Smyn	na Pkwy				
Time Analyzed	PM P	eak	<u> </u>	-		n Producero esta esta de la companya de la company	Peak	Hour Fac	tor	ALI ENSVIRADON PERSON	89.0	Gestinisht (continue)	***************************************	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	-	
Intersection Orientation	North	-South					Analy	sis Time	Period (i	ırs)	0.25					
Project Description	Cross	roads IG	A		-daebes (popularistetismo	i processor de la persona per	operation in the same		e de la constantación de la co	***************************************		and the second second	amelika politiki sadia) (b	leant weeks a manufold to	mantalpiositein di America Isti	
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Approach Movement		Eastb	ŢŢ		Major	T P Y Street: No West	bound	R		L	T			Lι	Ţ	6
Approach Movement Priority		Eastl L 10	11	12	Major	Street: No West	bound T	R	10	1	7 2	3	4U	L 4	T 5	6
Approach Movement Priority Number of Lanes		Eastl L 10	11 0	12	Major	Street: No West	bound T	R	10	1 1	7 2 1	3	4U	L 4	T 5	6 0 TF
Approach Movement Priority Number of Lanes Configuration		Eastl L 10 0	11 0	12 0	Major	Street: No West	bound T	R	10	L	T 2 2 2 2 2 1 1 1 2 4 4 4 4 4 4 4 4 4 4 4 4	3	4U	L 4	5	6 0 TF
Approach Movement Priority Number of Lanes Configuration Volume (veh/h)		Easti L 10 0	11 0	12 0 384	Major	Street: No West	bound T	R	10	1 1 L 228	T 2 2 2 2 2 1 1 1 2 4 4 4 4 4 4 4 4 4 4 4 4	3	4U	L 4	5	R 6 0 0 TR 31
Approach Movement Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles		Eastl 10 0 0 25 6	11 0	12 0 384	Major	West 1 7 0	bound T	R	10	1 1 L 228	1 1 1 435	3	4U	1 4 0	5	6 0 TR
Approach Movement Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles Proportion Time Blocked		Eastl 10 0 0 25 6	11 0 ER	12 0 384	Major	West 1 7 0	bound T 8	R 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	10	1 1 1 L 228 3	1 1 1 435	3	4U	1 4 0	5 1 501	6 0 TF
Approach Movement Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles Proportion Time Blocked Right Turn Channelized		Eastl 10 0 0 25 6	11 C	12 0 384	Major	West 1 7 0	bound T 8	R 9 0	1U C	1 1 1 L 228 3	1 1 1 435	3	4U	1 4 0	5 1 501	6 0 TI
Approach Movement Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles Proportion Time Blocked Right Turn Channelized Median Type	Ü	Eastt	T 11 0 LR	12 0 384	Major	West 1 7 0	bound T 8	R 9 0	1U 0	1 1 1 L 228 3	1 1 1 435	3	4U	1 4 0	5 1 501	6 0 TI
Approach Movement Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles Proportion Time Blocked Right Turn Channelized Median Type Median Storage	Ü	Eastt	T 11 0 LR	12 0 384	Major	West 1 7 0	bound T 8	R 9 0	1U 0	1 1 1 L 228 3	1 1 1 435	3	4U	1 4 0	5 1 501	6 0 TI
Approach Movement Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles Proportion Time Blocked Right Turn Channelized Median Type Median Storage Delay, Queue Length, al	Ü	Eastt	TVICE	12 0 384	Major	West 1 7 0	bound T 8	R 9 0	1U 0	1 1 1 L Z28 3	1 1 1 435	3	4U	1 4 0	5 1 501	6 0 TI
Approach Movement Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles Proportion Time Blocked Right Turn Channelized Median Type Median Storage Delay, Queue Length, all	Ü	Eastt	11 0 LR	12 0 384	Major	West 1 7 0	bound T 8	R 9 0	1U 0	1 1 1 L 228 3 N	1 1 1 435	3	4U	1 4 0	5 1 501	6 0 TI
Approach Movement Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles Proportion Time Blocked Right Turn Channelized Median Type Median Storage Delay, Queue Length, all Flow Rate (veh/h) Capacity v/c Ratio	Ü	Eastt	11 0 LR CVICE 418 464	12 0 384	Major	West 1 7 0	bound T 8	R 9 0	1U 0	L 1 1 1 L 228 3 N N	1 1 1 435	3	4U	1 4 0	5 1 501	6 0 TI
Approach Movement Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles Proportion Time Blocked Right Turn Channelized Median Type Median Storage Delay, Queue Length, all Flow Rate (veh/h) Capacity	Ü	Eastt	11 0 LR	12 0 384	Major	West 1 7 0	bound T 8	R 9 0	1U 0	L 1 1 1 L 228 3 N N N N N N N N N N N N N N N N N N	1 1 1 435	3	4U	1 4 0	5 1 501	6 0 TI
Approach Movement Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles Proportion Time Blocked Right Turn Channelized Median Type Median Storage Delay, Queue Length, all Flow Rate (veh/h) Capacity v/c Ratio 95% Queue Length	Ü	Eastt	111 0 LR	12 0 384	Major	West 1 7 0	bound T 8	R 9 0	1U 0	1 1 1 228 3 3 N N 233 1020 0.23 0.9	1 1 1 435	3	4U	1 4 0	5 1 501	6 0

Approach LOS

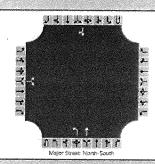
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	HCS 2010 Two-Wa	y Stop Control Summary F	Report
General Information		Site Information	
Analyst	DEZ	Intersection	Smyrna Pkw at Applegate
Agency/Co.	CDM Smith	Jurisdiction	
Date Performed	2/17/2016	East/West Street	Applegate Lane
Analysis Year	2017	North/South Street	Smyrna Pkwy
Time Analyzed	PM Peak No Build	Peak Hour Factor	0.98
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Crossroads IGA		
1555			

Lanes



Vehic	le Vo	umes and	Adine	mente
AND DIVINOUS			Subjects in agrange	00000000000000000000000000000000000000

Approach		Easti	oound			West	bound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	7	R	U	L	Ť	F	U	L	T	l R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	1	1	0	0	0	1	0
Configuration		Town Management	LR				Ī			L	T	-	adiana na waxaan	-	1	TR
Volume (veh/h)		25	-	388						230	439				506	31
Percent Heavy Vehicles	l	6	<u> </u>	1						3			e es cion pientificacio	<u> </u>	1	
Proportion Time Blocked									***************************************							
Right Turn Channelized	No				Company of the Compan	k	io		reimpensionateur		lo			<u> </u>	l lo	Lamenton
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Delay, Queue Length, and Level of Service

Delay, Queue Length,	and Leve	i ot Serv	ice.													
Flow Rate (veh/h)	ACTION DESCRIPTION OF THE PERSON OF THE PERS		422		ogistor/subrycoming	T	T	T	The state of the s	235	-	-	-	T	1	1
Capacity			459							1015						
v/c Ratio			0.92						T	0.23	1	Training to the party of the pa	1	1	***************************************	-
95% Queue Length			10,5							0.9						
Control Delay (s/veh)			54.3							9.6			-	1		-
Level of Service (LOS)			F							А			1			
Approach Delay (s/veh)		54.3		Mine material parameters (mine)	-	officer-street constraint contra	rith and an arrival purceion.	PRODUCTION OF THE PROPERTY OF	I	3	.3	Antonius prose		dispussion.	Annone	Accessoration
Approach LOS		- F									4					

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General Information	1900						Site	Inforn	nation	ı								
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Agency/Co.	CDM:	Smith					Jurisc	liction										
Date Performed	2/17/2	2016	-	nus destination de la company de la comp	virginiae veto dear	and the second s	East/	West Stre	et		Applegate Lane							
Analysis Year	2017					North/South Street					Smyrna Parkway							
Time Analyzed	PM Pe	ak Build					Peak	Hour Fac	tor		0.98							
Intersection Orientation	North	-South			Analysis Time Period (hrs) 0.25													
Project Description	Senyrn	a Pkway	Crossro	ads IGA						***************	ernineerinahtesilvairee			***************************************		eprosectory)		
Lanes																		
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and the state of t	djustmen	-	and a			Street, Nor	th-South		I	North	hound		l	South	bound			
Approach		Eastb	oound		Major	r Street: Nor Westb	th-South			y	bound	l p		_	bound	T 6		
Approach Movement	djustmen	Eastb L	T	R		West	oound	R	U	L	Т	R	Ų	ι	T	-		
Approach Movement Priority		Eastb L 10	T 11	12	Major	Westb	oound T 8	R 9	10	L 1	T 2	3	4U	L 4	T 5	6		
Approach Movement		Eastb L	11 1		Major	Westb	oound	R 9		1 1	Т	3	-	L 4 1	T	6		
Approach Movement Priority Number of Lanes Configuration		Eastb t 10 0	T 11 L LTR	12 0	Major	Westb	oound 7 8 1	R 9 0	10	L 1	1 2 1	3 O TR	4U	4 1 L	T 5	6 0 TI		
Approach Movement Priority Number of Lanes		Eastb L 10	11 1 LTR 13	12 0 388	Major	Westli L 7 1 L 64	oound T 8 1	R 9 0 TR	10	1 1 L 230	T 2	3	4U	4 1 L	T 5	6 0 TI		
Approach Movement Priority Number of Lanes Configuration		Eastb t 10 0	T 11 L LTR	12 0	Major	Westb	oound 7 8 1	R 9 0	10	L 1	1 2 1	3 O TR	4U	4 1 L	T 5	6 0 TI		
Approach Movement Priority Number of Lanes Configuration Volume (veh/h)		Eastb t 10 0	11 1 LTR 13	12 0 388	Major	Westli L 7 1 L 64	oound T 8 1	R 9 0 TR	10	1 1 L 230	1 2 1	3 O TR	4U	4 1 L	T 5	6 0 TI		
Approach Movement Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles		Eastb £ 10 0 0 25 6	11 1 LTR 13	12 0 388	Major	Westli L 7 1 L 64	re-South	R 9 0 TR	10	1 1 1 L 230 1	1 2 1	3 O TR	4U	L 4 1 L 7	T 5	6 0 TI		
Approach Movement Priority Number of Lanes Configuration Yolume (veh/h) Percent Heavy Vehicles Proportion Time Blocked		Eastb £ 10 0 0 25 6	11 1 LTR 13 0	12 0 388	Major	Westb	re-South	R 9 0 TR 7 0	10	1 1 1 L 230 1	1 1 439	3 O TR	4U	L 4 1 L 7	5 1	7		
Approach Movement Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles Proportion Time Blocked Right Turn Channelized		Eastb £ 10 0 0 25 6	11 1 LTR 13 0	12 0 388	Major	Westb	re-South	R 9 0 TR 7 0	TU O O O O O O O O O O O O O	1 1 1 L 230 1	1 1 439	3 O TR	4U	L 4 1 L 7	5 1	6 0 TI		
Approach Movement Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles Proportion Time Blocked Right Turn Channelized Median Type Median Storage	U	Eastb L 10 O O O O O O O O O O O O O O O O O O	T 11 1 LTR 13 C	12 0 388	Major	Westb	re-South	R 9 0 TR 7 0	TU O O O O O O O O O O O O O	1 1 1 L 230 1	1 1 439	3 O TR	4U	L 4 1 L 7	5 1	R 6 0 TIF		
Approach Movement Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles Proportion Time Blocked Right Turn Channelized Median Type Median Storage	U	Eastb L 10 O O O O O O O O O O O O O O O O O O	T 11 1 LTR 13 C	12 0 388	Major	Westb	re-South	R 9 0 TR 7 0	TU O O O O O O O O O O O O O	1 1 1 L 230 1	1 1 439	3 O TR	4U	L 4 1 L 7	5 1	6 0 TI		
Approach Movement Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles Proportion Time Blocked Right Turn Channelized Median Type Median Storage Delay, Queue Length, a	U	Eastb L 10 O O O O O O O O O O O O O O O O O O	T 11 1 LTR 13 C	12 0 388	Major	Westh T T L 64 O N	re-South	R 9 0 TR 7 0	TU O O O O O O O O O O O O O	1 1 1 L 230 1	1 1 439	3 O TR	4U	1 1 1 7 0	5 1	6 0 TI		
Movement Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles Proportion Time Blocked Right Turn Channelized Median Type Median Storage Delay, Queue Length, a	U	Eastb L 10 O O O O O O O O O O O O O O O O O O	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	12 0 388	Major	Westt L 7 1 L 64 0 N	re-South	R 9 0 0 TR 7 0 0 Undi	TU O O O O O O O O O O O O O	1 1 1 L 230 1	1 1 439	3 O TR	4U	1 L 7 0 0 N	5 1	6 0 TI		
Approach Movement Priority Number of Lanes Configuration Yolume (veh/h) Percent Heavy Vehicles Proportion Time Blocked Right Turn Channelized Median Type Median Storage Delay, Queue Length, a Flow Rate (veh/h) Capacity v/c Ratio	U	Eastb L 10 O O O O O O O O O O O O O O O O O O	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	12 0 388	Major	Westb L 7 1 L 64 0 N N	re-South	R 9 0 0 TR 7 0 0 Undi	TU O O O O O O O O O O O O O	1 1 1 1 230 1	1 1 439	3 O TR	4U	L 4 1 L 7 0 N N	5 1	7		
Approach Movement Priority Number of Lanes Configuration Volume (veh/h) Percent Heavy Vehicles Proportion Time Blocked Right Turn Channelized Median Type Median Storage Delay, Queue Length, a Flow Rate (veh/h) Capacity	U	Eastb L 10 O O O O O O O O O O O O O O O O O O	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	12 0 388	Major	Westb	re-South	R 9 0 TR 7 0 0 Undi	TU O O O O O O O O O O O O O	1 1 1 L 230 1 1 N N N N N N N N N N N N N N N N N	1 1 439	3 O TR	4U	1 1 L 7 O O O O O O O O O O O O O O O O O O	5 1	7		

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Level of Service (LOS)

Approach Delay (s/veh)

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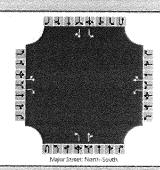
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	HCS 2010 Two-Way	Stop Control Summary F	leport
General Information	And the second s	Site Information	
Analyst	DBZ	Intersection	Smyrna Pkwy at Applegate
Agency/Co.	CDM Smith	Jurisdiction	The second secon
Date Performed	2/17/2016	East/West Street	Applegate Lane
Analysis Year	2017	North/South Street	Smyrna Parkway
Time Analyzed	AM Peak Build E8 right	Peak Hour Factor	0.78
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Smyrna Pkway Crossroads IGA		

Lanes



Vehicle Volumes and Adjustmen	

Approach		Eastl	ound			West	bound			North	bound			South	bound	
Movement	U	L	Τ	R	U	L	Т	R	U	L	т	R	U	L	Т	R
Priority		10	11	12		7	8	ç	10	1	2	3	4U	4	5	6
Number of Lanes		0		1		1	1	0	0	1	1	0	С	1	1	0
Configuration	-	LT		R		L	-	TR		L		TR		L		TR
Volume (veh/h)		33	10	81		45	9	5		223	530	46		5	303	24
Percent Heavy Vehicles		6	О	1	NAME OF TAXABLE PARTY.	0	0	0		1		-interpretation		0	-	- Contraction of the Contraction
Proportion Time Blocked	-	Control of the Contro	Octobrodi (Senorismo)						***************************************	NCOCKERNIA PROPERTY	CORPORADA (ANTIQUADA)	AND SOME SECTIONS OF	COMMONS COMMON	CONTRACTOR CONTRACTOR		-
Right Turn Channelized	O THE SECRET OF THE SECRET OF THE SECRET	N	0	Tadigaty) mpikasi kaca	THE STATE OF THE PARTY OF THE P	A.	o		a construction of	N	0	Communicación de la commun	MARKET STATE OF THE STATE OF TH	h N	D	Accordance or the colorest
Median Type	responsive and a second	***************************************	CANCEL MANAGEMENT	SALARON/ORMANISTER	home armot a constrain	Nijolio ilerideli (interne	THE PERSON NAMED IN COLUMN	Undi	nded	NIA VII DANKSONIANO		THE STREET, ST	etreservor a toposteros	PHOTOGRAPH COS		Militarion California

Delay, Queue Length, and Level of Service

Median Storage

Flow Rate (veh/h)	55	104	58	18	286		6	A SALAN CONTRACTOR SALAN CONTRACTOR CONTRACT
Capacity	52	649	39	95	1145		877	
v/c Ratio	1.06	0.16	1.49	0.19	0.25		0.01	antinistrativa kantinina edistrita (angusus muju
95% Queue Length	4.7	0.6	6,0	0.7	1.0		0.0	
Control Delay (s/veh)	269.0	11.6	479.0	51.6	9.2		9.1	***************************************
Level of Service (LOS)	F	В	F	F	Α		A	
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Approach LOS	F		F		Α		- 1	ĺ.

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	HC	S 20	10 Ti	NO V	Jay S	top (onti	ol Su	imm.	ary R	epor	l					
General Information							Site	Infor	matio	n							
Analyst	DBZ				-		Inter	section			Smyr	na Pkwy	at Apple	egate			
Agency/Co.	CDM	Smith					Juris	diction	***************************************								
Date Performed	2/17.	/2016			entre de la majorio	***************************************	East	West St	eet		Applegate Lane						
Analysis Year	2017						Nort	h/South	Street		Smyrna Parkway						
Time Analyzed	PM F	eak Build	i eb righ	1t	March Control (Method Control		ļ	And an annual speciment of the	-		0.98						
Intersection Orientation	Nort	h-South					Peak Hour Factor 0.98 Analysis Time Period (hrs) 0.25										
Project Description	Smyr	na Pkwa	y Crossri	oads IGA		*******	A		alakini de ani da ka		America				THE STATE OF THE S	estate esta	
Lanes														N-Unversion			
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Approach LOS

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TRAFFIC SIGNAL WARRANT ANALYSIS

COUNTY	Jeff	erson			DATE	Decem	ber 17, 2015	DAY	F WEEK	Thurs	
CITY	Lou	isville	MILEPOST			NO. OF C	ORRECTIBLE CR	ASHES IN 12 M	ONTH PERIOD	NA	
MAJOR STRE	ETNAME		Smyrna	Parkway		•	NO. OF MAJOR	STREET APPR	OACH LANES	1	
VIINOR STREE	ET NAME		Applegate	Lane (west)		•	NO. OF MINOR	STREET APPR	DACH LANES	1	
POSTED SPE	ED LIMIT MAJO	R SREET	45	MPH	POPULATION	< 10,000	-	ARRANTS BASE	D UPON		
POSTED SPE	ED LIMIT MINO	R SREET	35	мрн	YES	X NO		X SPEED		POPULATIO	
				ant 1 Ition A	Warr Condi		(Warrant	1 Condition A	SH EXPERIE or B 80% Satis ashes in 12 Mo	fied) AND	
	MAJOR STREET	VOLUME APPROACH		mum r Volume		otion of us Traffic	Warr Condition	ant 1 n A - 80%	Warr Conditio		
TIME	TWO	A-FROMEN	MAJOR	MINOR	MAJOR	MINOR	MAJOR	MINOR	MAJOR	MINOR	
	WAY	Are Side Street	500 (1) 600 (2)	150 (1) 200 (2)	750 (1) 900 (2)	75 (1) 100 (2)	400 (1) 480 (2)	120 (1)	600 (1) 720 (2)	60 (1) 80 (2)	
	WAY Are Side Street VOLUME Rights Included?		· · · · · · · · · · · · · · · · · · ·	WARRANTS	DEDUCED MARBANTO						
		Yes ☑ No □	350 (1) 420 (2)	105 (1) 140 (2)	525 (1) 630 (2)	53 (1) 70 (2)	280 (1) 338 (2)	84 (1) 112 (2)	4/20 (1) 504 (2)	42 (1) 56 (2)	
7-8 am	1,070	113	V		(1) = ONE LANE		(2) = TWO LAN				
	756	4	X	X	X	X	<u> </u>	X	X	Х	
8-9 am	 	118	X	X	X	X	X	X	X	X	
9-10 am	643	107	X	X	X	X	X	X	X	X	
10-11 am	611	108	X	X	Х	X	X	Х	Х	Х	
11-12 am	711	136	X	X	X	X	X	Χ	X	Х	
12-1 pm	741	152	X	X	X	X	X	X	X	X	
1-2 pm	885	238	X	X	X	X	X	X	X	X	
2-3 pm	1,064	314	X	Χ	X	Х	X	Х	X	X	
3-4 pm	1,010	330	X	X	X	<u> </u>	X	<u> </u>	X	X	
4-5 pm	1,188	364	Χ	X	X	Х	Х	X	X	X	
5-6 pm	1,195	410	X	<u> </u>	X	X	Х	X	X	X	
6-7 pm	1,052	343	X	X	X	X	<u> </u>	Х	Х	Х	
N	JMBER OF HOL		1		1:		1:	2	1:	2	
	COMPLIANCE		YE	S	YE	S		YE	S		

Volumes are the existing count. Speed reduction due to speed study on the next page.



Date: <u>4/26/2016</u>

Start Time: 3:10

Name: <u>DBZ JW</u> Location: Smyrna Pkwy End Time: 3:40
Weather: 81° Cloudy

Speed Limit: 35 mph

Speed Lil	IIII. 33 III	γn								
		Car		Вι	ıs	Tru	ıck			
	mph for								Cumm	Cummul
Seconds	176	Record	Number	Record	Number	Record	Number	TOTAL	ulative	ative %
4.0	29.9						1	1	1	1%
3.9	30.7							0	1	1%
3.8	31.5							0	1	1%
3.7	32.4	-						0	1	1%
3.6	33.3							0	1	1%
3.5	34.2							0	1	1%
3.4	35.2		1					1	2	2%
3.3	36.3		1					1	3	3%
3.2	37.4		5					5	8	8%
3.1	38.6		8		1			9	17	17%
3.0	39.9		10				1	11	28	28%
2.9	41.3		12				1	13	41	41%
2.8	42.8		10		1			11	52	52%
2.7	44.3		20		1			21	73	73%
2.6	46.0		7					7	80	80%
2.5	47.9		7					7	87	87%
2.4	49.9		12					12	99	99%
2.2	54.4		1					1	100	100%
2.0	59.9								100	100%
	TOTAL		94		3		3	100		



General Inform	nation		TO COLUMN CONTRACTOR	A DESCRIPTION OF THE PARTY OF T	(50) (10) (10) (10) (10) (10)		ALCCUPATION OF THE OWNER.		Interse	ction In	format	ion		2 4 1	
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Analyst	Marine walke releiteren	DBZ	Manual State Andrews of State	Anah	sis Dat	e Feb	17, 201	6	Area Ty	rpe	Othe				
Jurisdiction	of Manufactor Color (Manufactor)		unumerikalenia endeta	and)-examinamental	Period	AM F	Winds Charles	การสาราธาการสร้าน	PHF	ingovs-p-r-reeness	0.78	Start Legislander-legisland		4.	
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Intersection		Applegate Lane		File N	THE PERSON NAMED IN COLUMN TWO	АМг	U COLUMN DE STATE DE	one and the second	-contrates and physics of						
Project Descrip	otion	Crossroads IGA	September 1-200-1-2009 September 200	- Contractors	TO SERVICE THE SERVICE	man diament to trans	ASSERVAÇÃO PROCESSOR A A SE	ning and the second distances	el campa de président marie	Aligna Selection of the	Carrier Control Control	ATSTOCK SCHOOL SCHOOL	455000	5 4 5 4 7	
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Approach Move	ement			L	T	R	L	T	R	L	T	R	L	T	in the same of
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Offset, s	0	Reference Point	End	Cree	1 0.0	100	0.0	0.0	0.0	100			1		
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Intersection		Applegate Lane		File N	lame	PM w	rt lane	pleft.xu	S					5.1	
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