



PETERS & ASSOCIATES
ENGINEERS, INC.

August 5, 2020

Mr. George Stem
Construction Network Inc.
6009 Dalton Farmer Drive
Jonesboro, AR 72404

Re: P2052
Addendum to Traffic Impact Study Dated July 27, 2020
Proposed Commercial Development (6 Tracts)
Johnson Avenue (Highway 49)
Jonesboro, Arkansas

Mr. Stem:

Peters & Associates Engineers, Inc. prepared this Addendum to a traffic engineering study report dated July 27, 2020 relating to a commercial development to consist of six tracts and to be located north of Johnson Avenue (Highway 49) and south of Hudson Road in Jonesboro, Arkansas. This addendum addresses projected traffic conditions (with assumed full development of the site) to include the previously studied intersection of Johnson Avenue and the proposed Visions Avenue as well as the coordinated traffic signal operation of the intersections of Johnson Avenue and Old Greensboro Road and Johnson Avenue and Airport Road (Highway 351 South). The additional intersections have been included in the analysis per the request of Mr. Craig Light with the City of Jonesboro. All methodologies and calculations used in the traffic study report dated July 27, 2020 were also utilized as a part of this Addendum and are still valid.

Per the City's request, after review of the traffic study report dated July 27, 2020, capacity and level of service (LOS) analysis was performed for projected traffic conditions for full build-out of the development for the AM and PM peak hours for the study intersections. City-provided traffic signal timing and phasing for the additional intersections has been included in this analysis for projected traffic conditions. Projected traffic volumes are depicted on the following figures:

- Figure A, "Projected Traffic Volumes - AM Peak Hour."
- Figure B, "Projected Traffic Volumes - PM Peak Hour."

Traffic volumes shown on Figures A and B are the values used in capacity and level of service calculations conducted as a part of this Addendum. The effect of existing background traffic (i.e. the adjacent street non-site traffic which exists) and projected traffic associated with the site development has thus been accounted for in this analysis for each of the study intersections.

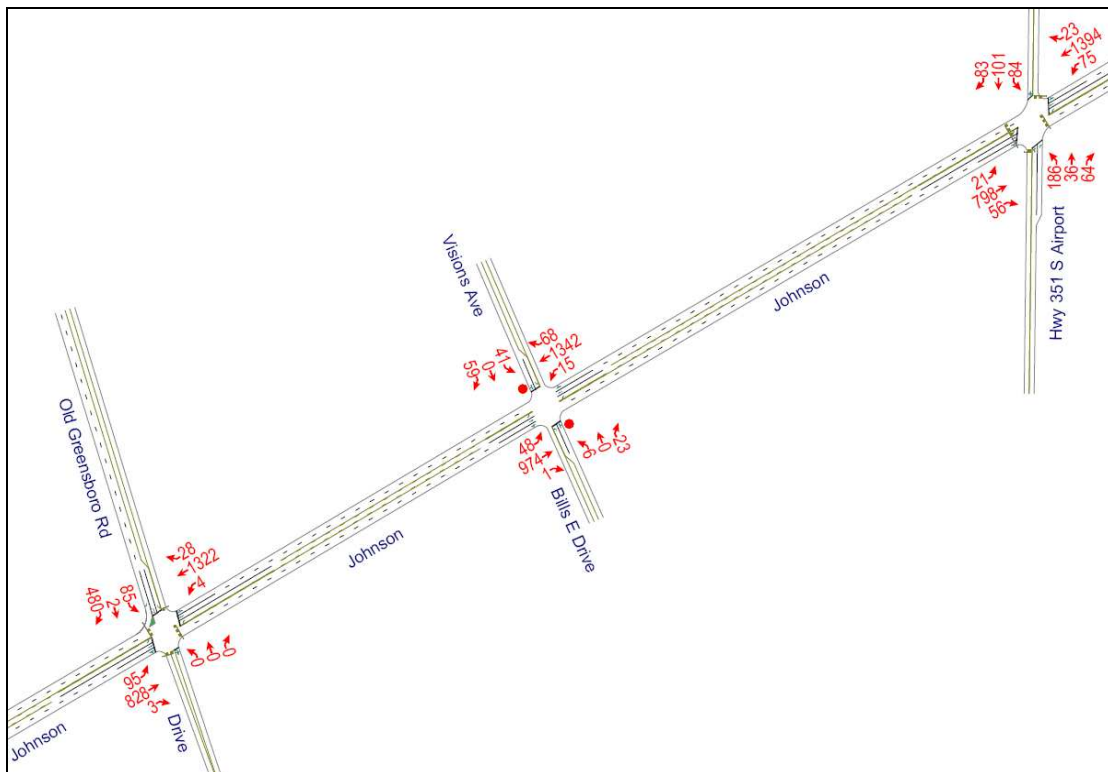


Figure A - Projected Traffic Volumes - AM Peak Hour

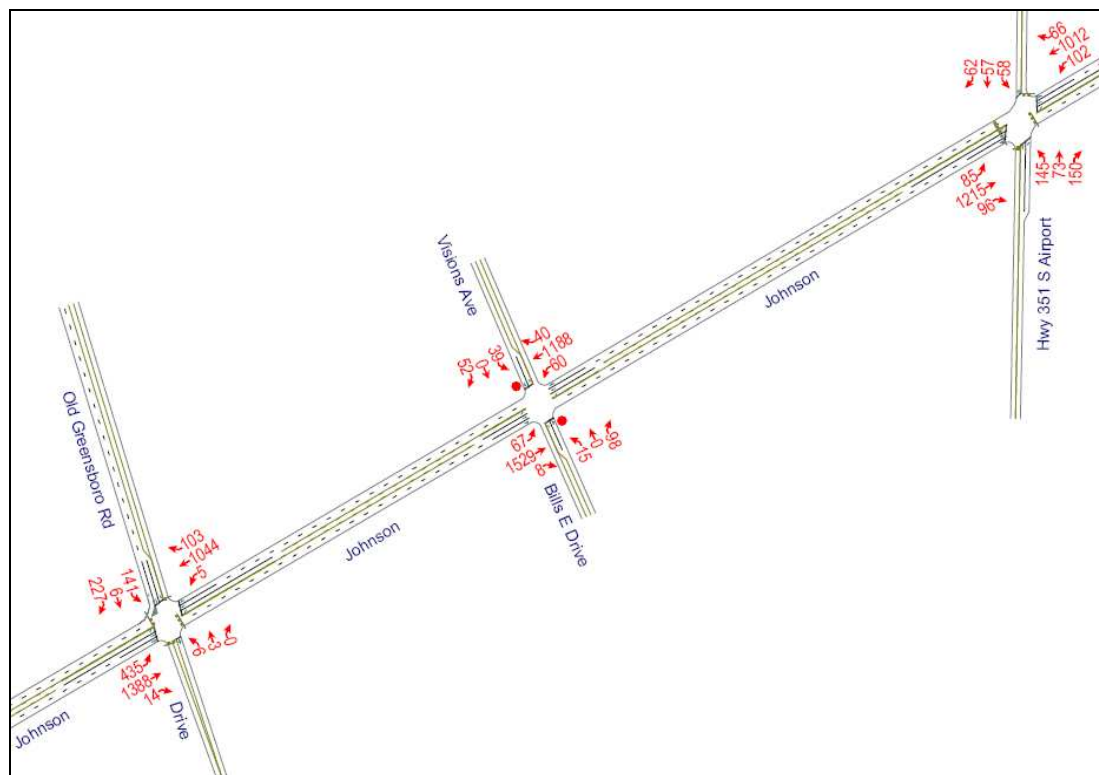


Figure B - Projected Traffic Volumes - PM Peak Hour

The operating conditions projected to exist at the study intersections are summarized in Table A, "Level of Service Summary - Projected Traffic Conditions." Detailed results for these capacity calculations are included with this Addendum.

PROJECTED TRAFFIC CONDITIONS		Traffic Control	Eastbound Left-Turn	Eastbound Thru	Eastbound Right-Turn	Westbound Left-Turn	Westbound Thru	Westbound Right-Turn	Northbound Left-Turn	Northbound Thru	Northbound Right-Turn	Southbound Left-Turn	Southbound Thru	Southbound Right-Turn	Overall Intersection	Avg. Control Delay Seconds / Vehicle	Intersection Capacity Utilization (%)
INTERSECTION	PEAK HR		PEAK HOUR - LEVEL OF SERVICE														
Johnson Avenue and Visions Avenue / Bill's East Access Drive	AM	"STOP" SIGN	B	A	A	A	D	A	E	C	n/a	1.5	57.8%				
	PM		B	A	B	A	E	B	E	B	n/a	1.8	67.3%				
Johnson Avenue and Old Greensboro Road	AM	SIGNAL	A	B	A	B	A	D	D	C	B	16.6	80.6%				
	PM		D	F	D	D	E	E	D	B	F	123.2	85.0%				
Johnson Avenue and Airport Road / Hwy351 South	AM	SIGNAL	B	C	B	C	F	A	E	C	34.9	91.2%					
	PM		B	C	B	C	E	A	D	C	29.0	80.6%					

Table A - Level of Service Summary - Projected Traffic Conditions

As indicated in Table A, at the study intersection of Johnson Avenue and the proposed Visions Avenue / Bill's Cost-Plus Supermarket east drive, it appears that including analysis for the coordination of the adjacent traffic signalized intersections provides some measure of vehicle platooning on Johnson Avenue by virtue of the coordinated operation which in turn reflects greater vehicle gaps in the Johnson Avenue traffic stream. This has resulted in reduced delay, reduced queues, and better LOS for both the north and south approaches on Visions Avenue than what was found in the analysis of the previous traffic study. Both northbound and southbound vehicle queues and vehicle delays at the intersection of Johnson Avenue and the proposed Visions Avenue / Bill's Cost-Plus Supermarket east drive are calculated to be less than two vehicles / delayed less than 30 seconds.

There are vehicle movements which operate at what calculates as worse than LOS "D" for the AM and PM peak hours at the coordinated traffic signal operations at the intersections of Johnson Avenue and Old Greensboro Road and Johnson Avenue and Airport Road (Highway 351 South) utilizing City-provided traffic signal timing and phasing. However, Arkansas Department of Transportation (ARDOT) has intersection improvement plans (ARDOT Job 100875) in the vicinity of the study area that includes these two intersections. Once these ARDOT planned intersection improvements are completed at these two intersections, there is expected to be an increase in operational capacity at both intersections, thereby resulting in improved LOS. The ARDOT Job 100875 has funding in place and is scheduled for bid letting by ARDOT in April 2021.

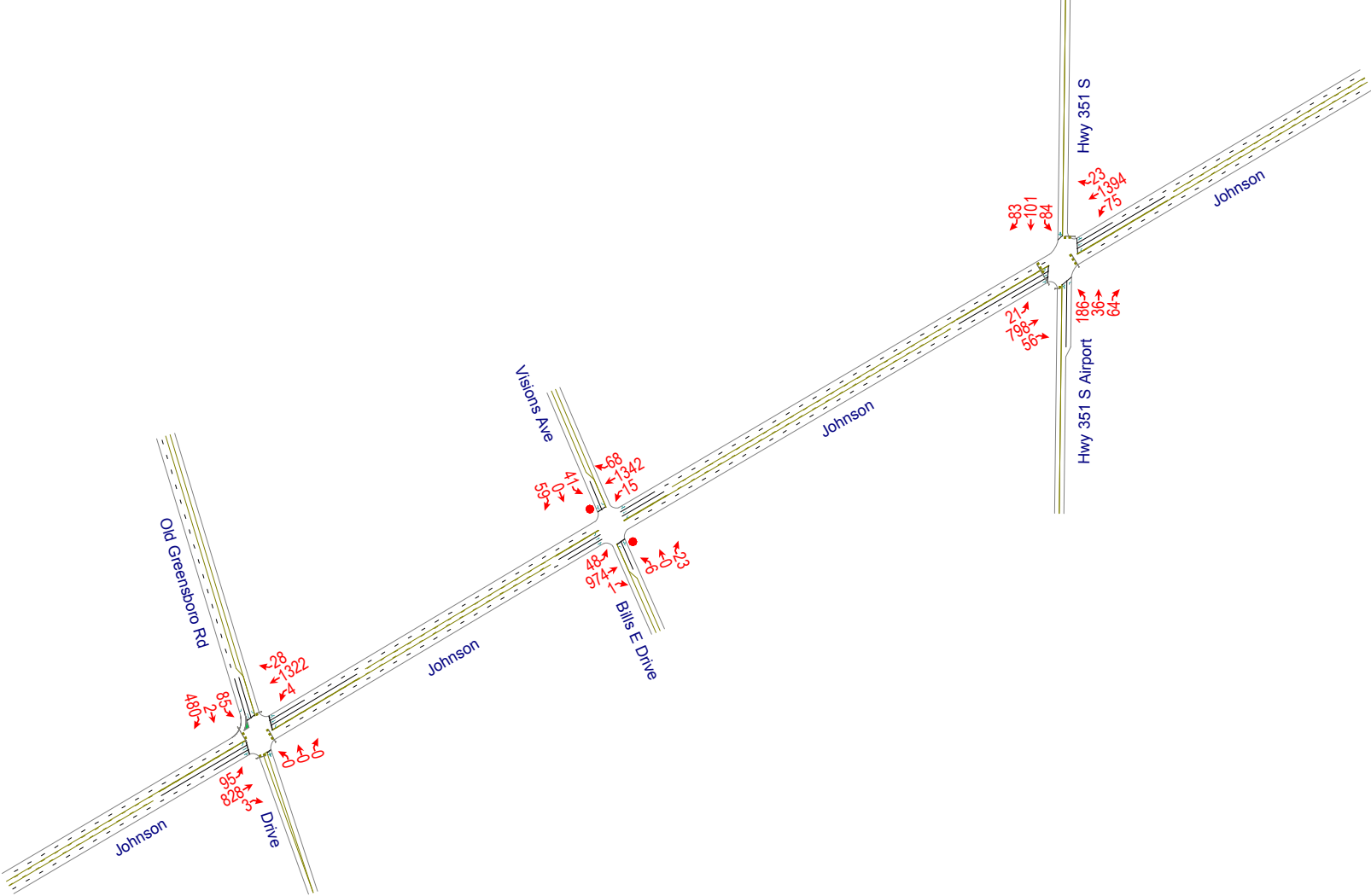
The conclusion of traffic operational findings associated with this Addendum is that additional traffic expected to be generated by the development as proposed or assumed can be accommodated by the existing adjacent Johnson Avenue lane geometry and Visions Avenue, as proposed, to consist of a southbound left-turn lane, a southbound thru/right-turn lane and a northbound receiving lane at Johnson Avenue, without discernable impact on traffic flow along Johnson Avenue in the vicinity. Access to the six tracts via Visions Avenue is better than multiple access points along Johnson Avenue. Other findings and recommendations included in the traffic study report dated July 27, 2020 are still valid for projected traffic conditions.

Please let me know if you need additional information or comment.

Sincerely,
PETERS & ASSOCIATES, ENGINEERS, INC.



Ernest J. Peters, P.E.
President



AM w/ site volumes
AM w/ coordinated signals

Lanes, Volumes, Timings

1: Bills E Drive/Visions Ave & Johnson

8/5/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	48	974	1	15	1342	68	6	0	23	41	0	59
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	120		0	120		0	75		0	75		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1660	3320	0	1660	3297	0	1660	1485	0	1660	1485	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1660	3320	0	1660	3297	0	1660	1485	0	1660	1485	0
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		1051			1341			297			377	
Travel Time (s)		15.9			20.3			8.1			10.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	48	974	1	15	1342	68	6	0	23	41	0	59
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	975	0	15	1410	0	6	23	0	41	59	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 57.8%	ICU Level of Service B											
Analysis Period (min) 60												

HCM Unsignalized Intersection Capacity Analysis

1: Bills E Drive/Visions Ave & Johnson

8/5/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	48	974	1	15	1342	68	6	0	23	41	0	59
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	48	974	1	15	1342	68	6	0	23	41	0	59
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL			TWLTL								
Median storage veh	2			2								
Upstream signal (ft)	1051											
pX, platoon unblocked				0.88			0.88			0.88		
vC, conflicting volume	1410			975			1830			2510		
vC1, stage 1 conf vol							1070			1406		
vC2, stage 2 conf vol							760			606		
vCu, unblocked vol	1410			708			1676			1882		
tC, single (s)	4.2			4.2			7.6			7.6		
tC, 2 stage (s)							6.6			6.6		
tF (s)	2.2			2.2			3.5			3.5		
p0 queue free %	90			98			97			70		
cM capacity (veh/h)	475			778			182			135		
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2		
Volume Total	48	649	326	15	895	515	6	23	41	59		
Volume Left	48	0	0	15	0	0	6	0	41	0		
Volume Right	0	0	1	0	0	68	0	23	0	59		
cSH	475	1700	1700	778	1700	1700	182	759	135	377		
Volume to Capacity	0.10	0.38	0.19	0.02	0.53	0.30	0.03	0.03	0.30	0.16		
Queue Length 95th (ft)	8	0	0	1	0	0	3	2	32	14		
Control Delay (s)	13.4	0.0	0.0	9.7	0.0	0.0	25.5	9.9	43.4	16.3		
Lane LOS	B			A			D	A	E	C		
Approach Delay (s)	0.6			0.1			13.1		27.4			
Approach LOS							B		D			
Intersection Summary												
Average Delay				1.5								
Intersection Capacity Utilization				57.8%			ICU Level of Service			B		
Analysis Period (min)				60								

Lanes, Volumes, Timings
41: Drive/Old Greensboro Rd & Johnson

8/5/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	95	828	3	4	1322	28	0	0	0	85	2	480
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	250		0	250		0	0		0	100		0
Storage Lanes	1		0	1		0	0		0	1		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1660	3317	0	1660	3310	0	0	1748	0	1660	1748	1485
Flt Permitted	0.133			0.297						0.950		
Satd. Flow (perm)	232	3317	0	519	3310	0	0	1748	0	1660	1748	1485
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					2							348
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		747			1051			426			804	
Travel Time (s)		11.3			15.9			9.7			18.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	95	828	3	4	1322	28	0	0	0	85	2	480
Shared Lane Traffic (%)												
Lane Group Flow (vph)	95	831	0	4	1350	0	0	0	0	85	2	480
Turn Type	pm+pt	NA		Perm	NA		Split			Split	NA	Perm
Protected Phases	1	2			2		4	4		3	3	
Permitted Phases	2			2								3
Detector Phase	1	2		2	2		4	4		3	3	3
Switch Phase												
Minimum Initial (s)	6.0	12.0		12.0	12.0		5.0	5.0		8.0	8.0	8.0
Minimum Split (s)	11.6	21.5		21.5	21.5		21.5	21.5		21.5	21.5	21.5
Total Split (s)	11.8	55.7		55.7	55.7		21.5	21.5		26.0	26.0	26.0
Total Split (%)	10.3%	48.4%		48.4%	48.4%		18.7%	18.7%		22.6%	22.6%	22.6%
Maximum Green (s)	6.2	49.6		49.6	49.6		15.9	15.9		20.4	20.4	20.4
Yellow Time (s)	3.5	4.3		4.3	4.3		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	2.1	1.8		1.8	1.8		2.1	2.1		2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Total Lost Time (s)	5.6	6.1		6.1	6.1			5.6		5.6	5.6	5.6
Lead/Lag	Lead	Lag		Lag	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	3.8		3.8	3.8		1.2	1.2		4.5	4.5	4.5
Recall Mode	None	C-Max		C-Max	C-Max		None	None		Max	Max	Max
Act Effct Green (s)	77.8	69.5		69.5	69.5					20.4	20.4	20.4
Actuated g/C Ratio	0.68	0.60		0.60	0.60					0.18	0.18	0.18
v/c Ratio	0.38	0.41		0.01	0.67					0.29	0.01	0.87
Control Delay	9.2	13.1		10.0	11.2					44.1	39.0	34.5
Queue Delay	0.0	0.0		0.0	0.0					0.0	0.0	0.0
Total Delay	9.2	13.1		10.0	11.2					44.1	39.0	34.5
LOS	A	B		A	B					D	D	C
Approach Delay		12.7			11.2						35.9	
Approach LOS		B			B						D	
Queue Length 50th (ft)	18	156		1	156					55	1	99
Queue Length 95th (ft)	37	257		m1	m270					116	9	#403
Internal Link Dist (ft)		667			971			346			724	
Turn Bay Length (ft)	250			250						100		

Lanes, Volumes, Timings

41: Drive/Old Greensboro Rd & Johnson

8/5/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	255	2004		313	2001					294	310	549
Starvation Cap Reductn	0	0		0	0					0	0	0
Spillback Cap Reductn	0	0		0	0					0	0	0
Storage Cap Reductn	0	0		0	0					0	0	0
Reduced v/c Ratio	0.37	0.41		0.01	0.67					0.29	0.01	0.87

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 115

Offset: 0 (0%), Referenced to phase 2:EBWB, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 16.6

Intersection LOS: B

Intersection Capacity Utilization 80.6%

ICU Level of Service D

Analysis Period (min) 60

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 41: Drive/Old Greensboro Rd & Johnson

											
ø1	ø2 (R)		ø3			ø4					
11.8 s	55.7 s		26 s			21.5 s					

Lanes, Volumes, Timings

42: Hwy 351 S Airport/Hwy 351 S & Johnson

8/5/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	798	56	75	1394	23	186	36	64	84	101	83
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	250		0	250		0	0		150	0		150
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1660	3287	0	1660	3314	0	0	1678	1485	0	1649	0
Flt Permitted	0.103			0.247				0.508			0.658	
Satd. Flow (perm)	180	3287	0	432	3314	0	0	888	1485	0	1102	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			2				106		19	
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1341			905			649			667	
Travel Time (s)		20.3			13.7			14.8			15.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	21	798	56	75	1394	23	186	36	64	84	101	83
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	854	0	75	1417	0	0	222	64	0	268	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6			2			8		8	4		
Detector Phase	1	6		5	2		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	4.0	12.0		4.0	12.0		8.0	8.0	8.0	8.0	8.0	
Minimum Split (s)	22.8	23.4		22.8	23.4		21.9	21.9	21.9	21.9	21.9	
Total Split (s)	22.9	55.8		23.0	55.9		36.2	36.2	36.2	36.2	36.2	
Total Split (%)	19.9%	48.5%		20.0%	48.6%		31.5%	31.5%	31.5%	31.5%	31.5%	
Maximum Green (s)	16.1	48.4		16.2	48.5		30.3	30.3	30.3	30.3	30.3	
Yellow Time (s)	3.5	4.7		3.5	4.7		3.2	3.2	3.2	3.2	3.2	
All-Red Time (s)	3.3	2.7		3.3	2.7		2.7	2.7	2.7	2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	6.8	7.4		6.8	7.4			5.9	5.9		5.9	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.5	3.8		3.5	3.8		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None	None	Max	Max	
Act Effct Green (s)	65.2	59.2		70.1	65.8			30.3	30.3		30.3	
Actuated g/C Ratio	0.57	0.51		0.61	0.57			0.26	0.26		0.26	
v/c Ratio	0.11	0.50		0.22	0.75			0.95	0.14		0.88	
Control Delay	14.1	24.0		10.0	22.9			123.2	2.1		76.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	14.1	24.0		10.0	22.9			123.2	2.1		76.4	
LOS	B	C		B	C			F	A		E	
Approach Delay		23.8			22.3			96.1			76.4	
Approach LOS		C			C			F			E	
Queue Length 50th (ft)	5	208		20	339			162	0		179	
Queue Length 95th (ft)	m21	364		44	#763			#373	18		#404	
Internal Link Dist (ft)		1261			825			569			587	
Turn Bay Length (ft)	250			250					150			

Lanes, Volumes, Timings

42: Hwy 351 S Airport/Hwy 351 S & Johnson

8/5/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	319	1695		443	1898			233	469		304	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.07	0.50		0.17	0.75			0.95	0.14		0.88	

Intersection Summary

Area Type: Other

Cycle Length: 115

Actuated Cycle Length: 115

Offset: 95 (83%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 34.9

Intersection LOS: C

Intersection Capacity Utilization 91.2%

ICU Level of Service F

Analysis Period (min) 60

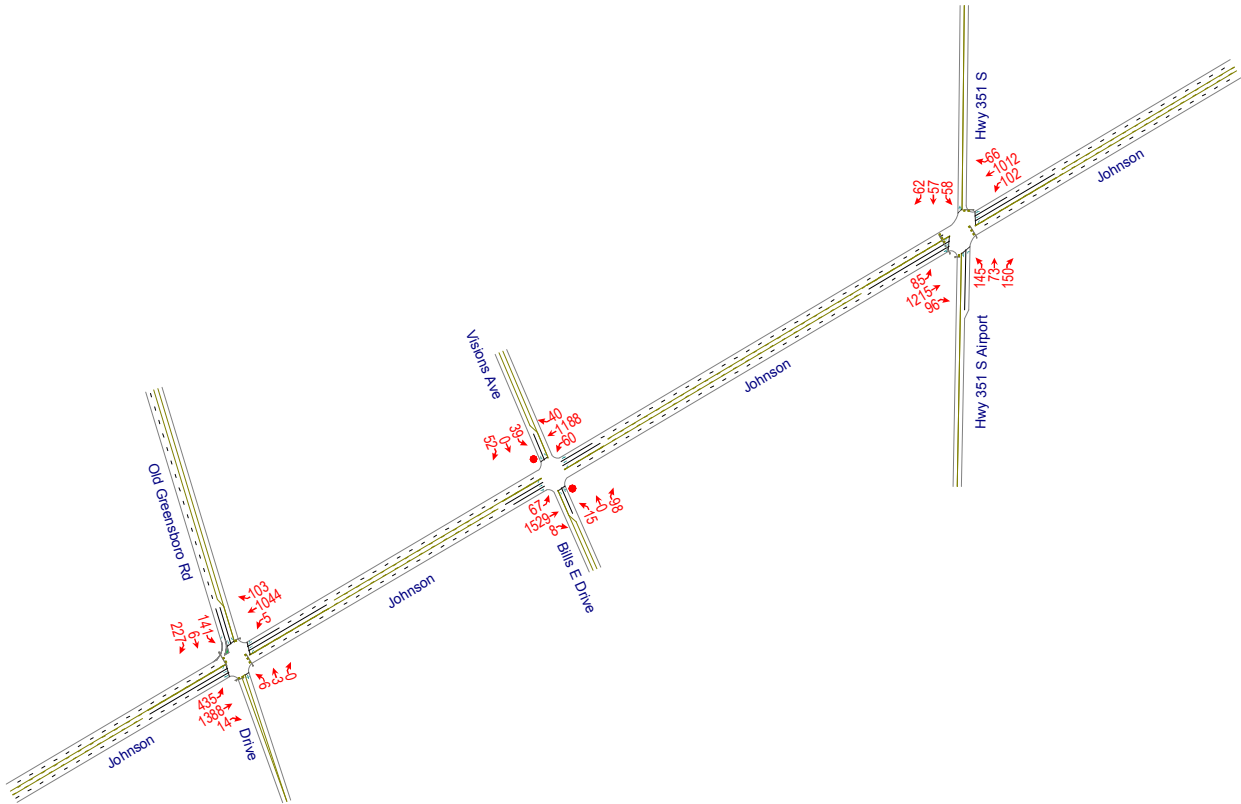
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 42: Hwy 351 S Airport/Hwy 351 S & Johnson

		
ø1	ø2 (R)	ø4
22.9 s	55.9 s	36.2 s
		
ø5	ø6 (R)	ø8
23 s	55.8 s	36.2 s



Lanes, Volumes, Timings

1: Bills E Drive/Visions Ave & Johnson

7/30/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	67	1529	8	60	1188	40	15	0	98	39	0	52
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	120		0	120		0	75		0	75		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1660	3317	0	1660	3304	0	1660	1485	0	1660	1485	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1660	3317	0	1660	3304	0	1660	1485	0	1660	1485	0
Link Speed (mph)		45			45			25			25	
Link Distance (ft)		1040			1352			297			377	
Travel Time (s)		15.8			20.5			8.1			10.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	67	1529	8	60	1188	40	15	0	98	39	0	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	67	1537	0	60	1228	0	15	98	0	39	52	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 67.3%	ICU Level of Service C											
Analysis Period (min) 60												

HCM Unsignalized Intersection Capacity Analysis

1: Bills E Drive/Visions Ave & Johnson

7/30/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	67	1529	8	60	1188	40	15	0	98	39	0	52
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	67	1529	8	60	1188	40	15	0	98	39	0	52
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL			TWLTL								
Median storage veh	2			2								
Upstream signal (ft)	1040											
pX, platoon unblocked				0.67			0.67	0.67	0.67	0.67	0.67	
vC, conflicting volume	1228			1537			2433	3015	768	2324	2999	614
vC1, stage 1 conf vol							1667	1667		1328	1328	
vC2, stage 2 conf vol							766	1348		996	1671	
vCu, unblocked vol	1228			817			2154	3022	0	1992	2999	614
tC, single (s)	4.2			4.2			7.6	6.6	7.0	7.6	6.6	7.0
tC, 2 stage (s)							6.6	5.6		6.6	5.6	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	88			89			87	100	86	71	100	88
cM capacity (veh/h)	558			536			118	98	724	133	99	432
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2		
Volume Total	67	1019	518	60	792	436	15	98	39	52		
Volume Left	67	0	0	60	0	0	15	0	39	0		
Volume Right	0	0	8	0	0	40	0	98	0	52		
cSH	558	1700	1700	536	1700	1700	118	724	133	432		
Volume to Capacity	0.12	0.60	0.30	0.11	0.47	0.26	0.13	0.14	0.29	0.12		
Queue Length 95th (ft)	10	0	0	9	0	0	11	12	30	10		
Control Delay (s)	12.3	0.0	0.0	12.6	0.0	0.0	40.1	10.7	43.2	14.5		
Lane LOS	B			B			E	B	E	B		
Approach Delay (s)	0.5			0.6			14.6		26.8			
Approach LOS							B		D			
Intersection Summary												
Average Delay			1.8									
Intersection Capacity Utilization			67.3%			ICU Level of Service				C		
Analysis Period (min)			60									

Lanes, Volumes, Timings
41: Drive/Old Greensboro Rd & Johnson

7/30/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	435	1388	14	5	1044	103	6	3	0	141	6	227
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	250		0	250		0	0		0	100		0
Storage Lanes	1		0	1		0	0		0	1		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1660	3317	0	1660	3277	0	0	1692	0	1660	1748	1485
Flt Permitted	0.096			0.096				0.968		0.950		
Satd. Flow (perm)	168	3317	0	168	3277	0	0	1692	0	1660	1748	1485
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			10							227
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		747			1040			426			804	
Travel Time (s)		11.3			15.8			9.7			18.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	435	1388	14	5	1044	103	6	3	0	141	6	227
Shared Lane Traffic (%)												
Lane Group Flow (vph)	435	1402	0	5	1147	0	0	9	0	141	6	227
Turn Type	pm+pt	NA		Perm	NA		Split	NA		Split	NA	Perm
Protected Phases	1	2			2		4	4		3	3	
Permitted Phases	2			2								3
Detector Phase	1	2		2	2		4	4		3	3	3
Switch Phase												
Minimum Initial (s)	6.0	12.0		12.0	12.0		5.0	5.0		8.0	8.0	8.0
Minimum Split (s)	11.6	21.5		21.5	21.5		21.5	21.5		21.5	21.5	21.5
Total Split (s)	28.0	49.0		49.0	49.0		21.5	21.5		21.5	21.5	21.5
Total Split (%)	23.3%	40.8%		40.8%	40.8%		17.9%	17.9%		17.9%	17.9%	17.9%
Maximum Green (s)	22.4	42.9		42.9	42.9		15.9	15.9		15.9	15.9	15.9
Yellow Time (s)	3.5	4.3		4.3	4.3		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	2.1	1.8		1.8	1.8		2.1	2.1		2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Total Lost Time (s)	5.6	6.1		6.1	6.1			5.6		5.6	5.6	5.6
Lead/Lag	Lead	Lag		Lag	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	3.8		3.8	3.8		1.2	1.2		4.5	4.5	4.5
Recall Mode	None	C-Max		C-Max	C-Max		None	None		Max	Max	Max
Act Effct Green (s)	85.0	46.1		46.1	46.1			5.2		15.9	15.9	15.9
Actuated g/C Ratio	0.71	0.38		0.38	0.38			0.04		0.13	0.13	0.13
v/c Ratio	0.73	1.10		0.08	0.91			0.12		0.64	0.03	0.58
Control Delay	35.6	231.7		42.6	54.2			59.0		64.7	45.8	12.6
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Total Delay	35.6	231.7		42.6	54.2			59.0		64.7	45.8	12.6
LOS	D	F		D	D			E		E	D	B
Approach Delay		185.3			54.1			59.0			32.8	
Approach LOS		F			D			E			C	
Queue Length 50th (ft)	234	~613		3	390			7		105	4	0
Queue Length 95th (ft)	#545	#979		m6	#713			28		#222	19	110
Internal Link Dist (ft)		667			960			346			724	
Turn Bay Length (ft)	250			250						100		

Lanes, Volumes, Timings

41: Drive/Old Greensboro Rd & Johnson

7/30/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	597	1273		64	1263			224		219	231	393
Starvation Cap Reductn	0	0		0	0			0		0	0	0
Spillback Cap Reductn	0	0		0	0			0		0	0	0
Storage Cap Reductn	0	0		0	0			0		0	0	0
Reduced v/c Ratio	0.73	1.10		0.08	0.91			0.04		0.64	0.03	0.58

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 106 (88%), Referenced to phase 2:EBWB, Start of Green

Natural Cycle: 130

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 123.2

Intersection LOS: F

Intersection Capacity Utilization 85.0%

ICU Level of Service E

Analysis Period (min) 60

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 41: Drive/Old Greensboro Rd & Johnson

				
ø1	ø2 (R)		ø3	ø4
28 s	49 s		21.5 s	21.5 s

Lanes, Volumes, Timings

42: Hwy 351 S Airport/Hwy 351 S & Johnson

7/30/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	1215	96	102	1012	66	145	73	150	58	57	62
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (ft)	250		0	250		0	0		150	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1660	3284	0	1660	3291	0	0	1692	1485	0	1639	0
Flt Permitted	0.193			0.103				0.645			0.709	
Satd. Flow (perm)	337	3284	0	180	3291	0	0	1127	1485	0	1181	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			7				150		22	
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1352			905			726			642	
Travel Time (s)		20.5			13.7			11.0			9.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	85	1215	96	102	1012	66	145	73	150	58	57	62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	85	1311	0	102	1078	0	0	218	150	0	177	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases	6			2			8		8	4		
Detector Phase	1	6		5	2		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	4.0	12.0		4.0	12.0		8.0	8.0	8.0	8.0	8.0	
Minimum Split (s)	22.8	23.4		22.8	23.4		21.9	21.9	21.9	21.9	21.9	
Total Split (s)	23.0	61.0		23.0	61.0		36.0	36.0	36.0	36.0	36.0	
Total Split (%)	19.2%	50.8%		19.2%	50.8%		30.0%	30.0%	30.0%	30.0%	30.0%	
Maximum Green (s)	16.2	53.6		16.2	53.6		30.1	30.1	30.1	30.1	30.1	
Yellow Time (s)	3.5	4.7		3.5	4.7		3.2	3.2	3.2	3.2	3.2	
All-Red Time (s)	3.3	2.7		3.3	2.7		2.7	2.7	2.7	2.7	2.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	6.8	7.4		6.8	7.4			5.9	5.9		5.9	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.5	3.8		3.5	3.8		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None	None	Max	Max	
Act Effct Green (s)	69.3	60.4		72.8	64.2			30.1	30.1		30.1	
Actuated g/C Ratio	0.58	0.50		0.61	0.54			0.25	0.25		0.25	
v/c Ratio	0.30	0.79		0.46	0.61			0.77	0.31		0.57	
Control Delay	15.8	31.5		15.8	22.0			63.7	7.4		42.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	15.8	31.5		15.8	22.0			63.7	7.4		42.5	
LOS	B	C		B	C			E	A		D	
Approach Delay		30.5			21.5			40.7			42.5	
Approach LOS		C			C			D			D	
Queue Length 50th (ft)	33	292		28	305			158	0		105	
Queue Length 95th (ft)	m39	m317		68	466			#338	70		213	
Internal Link Dist (ft)		1272			825			646			562	
Turn Bay Length (ft)	250			250					150			

Lanes, Volumes, Timings

42: Hwy 351 S Airport/Hwy 351 S & Johnson

7/30/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	392	1658		315	1762			282	484		312	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.22	0.79		0.32	0.61			0.77	0.31		0.57	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 110 (92%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 29.0

Intersection LOS: C

Intersection Capacity Utilization 80.6%

ICU Level of Service D

Analysis Period (min) 60

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 42: Hwy 351 S Airport/Hwy 351 S & Johnson

		
ø1	ø2 (R)	ø4
23 s	61 s	36 s
		
ø5	ø6 (R)	ø8
23 s	61 s	36 s