



ASSOCIATED TRANSPORTATION ENGINEERS

100 N. Hope Avenue, Suite 4, Santa Barbara, CA 93110 • (805) 687-4418 • FAX (805) 682-8509

Since 1978

Richard L. Pool, P.E.
Scott A. Schell, AICP, PTP

October 2, 2017

16019.01L01

Mr. Fred Goldsmith
PGI Management
1606 North Main Street
Salinas, CA

HARDEN RANCH PLAZA TRAFFIC SIGNAL ANALYSIS, CITY OF SALINAS

Associated Transportation Engineers (ATE) is providing the following traffic signal analysis for the Main Street/Harden Ranch Plaza driveway opposite Cherokee Drive.

The existing Main Street/Cherokee Drive-Harden Ranch Plaza intersection is unsignalized with restricted turning movements due to the raised median on Main Street. The raised median restricts the eastbound Cherokee Drive approach to right-turns inbound and outbound only. The westbound Harden Ranch Plaza driveway approach allows left-turns and right-turns inbound and outbound. However no through traffic movements are allowed to or from Cherokee Drive at the intersection.

Main Street is a 6-lane north-south divided arterial roadway with a posted speed of 35 m.p.h. in the study-area. Main Street is a commercial corridor with traffic signals that require coordination in order to provide good progression within the corridor. In the study-area, the Madrid Street/Harden Parkway and Alvin Drive signals are programmed as part of the corridor and the timing set to work with the signals within the corridor.

ATE evaluated the operation of the Main Street/Cherokee Drive-Harden Ranch Plaza intersection with the existing STOP-sign control and with traffic signals installed at the intersection. The existing trips were redistributed through the Main Street corridor assuming full access at the Main Street/Cherokee Drive-Harden Ranch Plaza intersection as shown on the conceptual Improvement Plan illustrated on Figure 1.

The "Synchro" traffic analysis software program was used to review operations of the Main Street corridor from Madrid Street-Harden Parkway to Alvin Drive. "Synchro" is a complete software package for modeling and optimizing traffic signal timings, and is the only interactive software package to model actuated signals. "Synchro" implements the operations methods of the Highway Capacity Manual (Chapter 9) for signalized intersections, performing the

industry standard evaluation of intersection performance based on Webster delays. In addition to calculating capacity, "Synchro" also optimizes cycle lengths, splits and offsets (similar to TRANSYT).

Arterials such as Main Street can be programmed as an actuated-coordinated system to allow "Synchro" to find the optimal timing plan for the corridor. "Synchro" calculates the effects of coordination automatically and accurately. The results not only show intersection levels of service, but other important data such as progression and vehicle platooning within the network as well as queuing at individual intersections within the network.

Table 1 shows the levels of service for the Main Street/Cherokee Drive-Harden Ranch Plaza driveway intersection without and with traffic signals and the adjacent intersections of Madrid Street/Harden Parkway and Alvin Drive. As shown, the Harden Ranch Plaza driveway and the adjacent intersections would operate at LOS "C" or better.

Table 1
Main Street Corridor Intersection LOS

Intersection	Weekday	Weekday w/Signal	Weekend	Weekend w/Signal
Main St./Harden Pkwy.	28.8 sec./LOS C	24.3 sec./LOS C	32.5 sec./LOS C	26.3 sec./LOS C
Main St./Cherokee Dr.	> 50.0 sec./LOS F	15.5 sec./LOS B	> 50.0 sec./LOS F	15.1 sec./LOS B
Main St./Alvin Dr.	24.2 sec./LOS C	22.3 sec./LOS C	20.6 sec./LOS C	18.1 sec./LOS B

The "SimTraffic" model was employed for the Main Street corridor from Madrid Street/Harden Parkway to Alvin Drive, including Cherokee Drive to visually review its operations and affects. The results indicate that there would be adequate gaps in the Main Street through traffic flow. The "Synchro" and the companion "SimTraffic" files are available for review upon request.

ATE also utilized the "Synchro" software to evaluate the queues at the three study-area intersections. Table 2 shows the 95th percentile queue lengths for the northbound left-turn, through and right-turn movements at the Main Street/Madrid Street-Harden Parkway intersection with the weekday and weekend P.M. peak hour volumes. The 95th percentile queue length is the queue that is exceeded 5% of the time during the peak hour. For example, the Main Street/Madrid Street-Harden Parkway intersection runs at a 90-second cycle length, or 40 cycles per hour. The 95th percentile queue length would occur 2 times during the peak hour (40 cycles x 5% = 1.5 cycles) at this location.

Table 2
Storage Requirements at the Main Street/Madrid Street-Harden Parkway Intersection
With Traffic Signal

Movement	Existing Storage	95% Queue Length	
		Weekday P.M. Peak Hour	Weekend P.M. Peak Hour
Northbound Left-Turn	200 feet	130 feet	200 feet
Northbound Through	500 feet	175 feet	90 feet
Northbound Right-Turn	140 feet	65 feet	15 feet

The queuing analysis found that there is sufficient distance northbound between the Madrid Street/Harden Parkway and the Cherokee Drive-Harden Ranch Plaza driveway intersection to store vehicles during red phases. The existing storage provided for left-turns and right-turns was determined to also be sufficient.

Table 3 shows the 95th percentile queue lengths for the northbound, southbound, eastbound and westbound approach movements at the Main Street/Cherokee Drive intersection with the weekday and weekend P.M. peak hour volumes.

Table 3
Storage Requirements at the Main Street/Cherokee Drive Intersection
With Traffic Signal

Movement	Existing Storage	95% Queue Length	
		Weekday P.M. Peak Hour	Weekend P.M. Peak Hour
Northbound Left-Turn	150 feet	45 feet	50 feet
Northbound Through	1,300 feet	75 feet	140 feet
Northbound Right-Turn	100 feet	5 feet	5 feet
Eastbound Through	550 feet	210 feet	250 feet
Westbound Left-Turn	250 feet	75 feet	90 feet
Westbound Through	125 feet	120 feet	100 feet
Southbound Left-Turn	180 feet	60 feet	35 feet
Southbound Through	500 feet	120 feet	95 feet

The queuing analysis found that there is sufficient distance between the Madrid Street/Harden Parkway, Alvin Drive and the Cherokee Drive-Harden Ranch Plaza driveway intersection to store vehicles during red phases. The existing storage provided for left-turns and right-turns was determined to also be sufficient. The westbound approach queue of the shopping center driveway would be accommodated by the existing driveway throat.

Table 4 shows the 95th percentile queue lengths for the southbound left-turn, through and right-turn movements at the Main Street/Alvin Drive intersection with the weekday and weekend P.M. peak hour volumes.

Table 4
Storage Requirements at the Main Street/Alvin Drive Intersection
With Traffic Signal

Movement	Existing Storage	95% Queue Length	
		Weekday P.M. Peak Hour	Weekend P.M. Peak Hour
Southbound Left-Turn	430 feet	80 feet	50 feet
Southbound Through	1,300 feet	220 feet	110 feet
Southbound Right-Turn	215 feet	20 feet	10 feet

The queuing analysis found that there is sufficient distance southbound between the Alvin Drive and the Cherokee Drive-Harden Ranch Plaza driveway intersection to store vehicles during red phases. The existing storage provided for left-turns and right-turns was determined to also be sufficient.

Associated Transportation Engineers



Richard L. Pool, P.E.
President

RLP/DFN

Attachments: Figure 1- Conceptual Improvement Plan



CW INSTALL 12" WHITE CROSSWALK LINES, 10' BETWEEN LINES (11" ON-CENTER), AS SHOWN.



FIGURE 1

DESIGNED BY	DRAWN BY	CHECKED BY	JOB NUMBER	SCALE	SHEET
LRM	LRM	RLP	16019.01	1"=40'	1 OF 6

DESIGNED BY	DRAWN BY	CHECKED BY	JOB NUMBER	SCALE	SHEET
LRM	LRM	RLP	16019.01	1"=40'	1 OF 6

Technical Memorandum

To: File
From: Darryl F. Nelson

October 2, 2017

16019.01MEM.01

Associated Transportation Engineers (ATE) developed trip generation for 704,508 square feet of retail commercial space in the Harden Ranch Plaza shopping center and 1,068 residential dwelling units (single family and townhouse/condominium) west of Main Street that would be served by Cherokee Drive based on rates published in the Institute of Transportation Engineers (ITE), Trip Generation, 9th Edition.

Based on the trip generation for the shopping center and the trip generation for the residential dwelling units approximately 10 percent of the traffic for the Harden Ranch Plaza shopping center would originate in the residential area west of Main Street. These trips from the residential area west of Main Street were redistributed to the Main Street corridor and the Harden Ranch Plaza shopping center via Madrid Street, Alvin Drive and Cherokee Drive with the full access and traffic signals.

Attachments: Synchro LOS Worksheets described in the Harden Ranch Plaza Traffic Signal Analysis

Harden Plaza South Harden Road Parker

SHOPPING CENTER A

		Square Footage	Trips	Entering	Exiting	ITE Book
1	AutoZone	8,004	48	23	24	843
2	Olive Garden	9,000	100	52	48	932
3	Chase Bank	9,500	115	51	65	911
4	Safeway	52,686	553	282	271	850
5	subway	1,100	29	15	14	933
6	Perfect Brow	700	1	0	1	918
7	Dynasty Court	2,200	41	22	19	932
8	Dr. Kristiano	1,200	4	1	3	720
9	Harden Salon & Spa	1,216	3	1	2	814
10	Jewelers	1,549	4	2	2	814
11	Jamba Juice	1,231	32	16	16	933
12	Viva Espresso	1,125	29	15	14	933
13	Little Ceasars	1,200	31	16	15	933
14	Pizza	960	25	13	12	933
15	Nails Sportclips	960	3	1	1	814
16	Tapioca	1,241	32	17	16	933
17	Sees Candies	1,124	29	15	14	933
18	PC Metro	1,060	3	1	2	814
19	Monterrey Credit U	1,655	20	9	11	911
20	Cleaners	1,600	4	2	2	814
21	Taqueria	1,600	42	21	21	933
22	Salon	850	2	1	1	814
23	Discovery Shop	2,325	6	3	4	814
24	Walgreens	14,000	59	59	30	880
25	Pier 1 Imports	8,013	22	10	12	814
26	Ross	25,258	68	30	38	814
27	Factory 2-U	16,000	43	19	24	814
28	In-Shape-Gym	36,000	127	64	64	946
		203,357	1,479	761	747	

Harden Plaza (North)

SHOPPING CENTER B

		Square Footage	Trips	Entering	Exiting	ITE Book
1	TARGET	115,300	2,306	1,222	1,084	869
2	Chef Lees Rest.	5,000	56	29	27	932
3	Optometry	1,400	5	1	4	720
4	Available	1,086				
5	Spa	3,114	8	4	5	814
6	AT&T	3,750	10	4	6	814
7	Career Center	3,300	9	4	5	814
8	Tyllys	8,750	24	10	13	814
9	Shoe Store	7,000	19	8	11	814
10	Gamestop	1,524	9	5	5	896
11	Salon	1,600	4	2	2	814
12	Beauty Supply	1,600	4	2	2	814
13	Shoe Store	3,200	9	4	5	814
14	Pizza	2,000	52	27	26	933
15	Weight Watchers	1,600	42	21	21	933
16	Ciaoi	1,600	4	2	2	814
17	Marshalls	27,000	73	32	41	814
18	One Main Financial	1,600	2	1	1	814
19	Styles for Less	3,200	9	4	5	814
20	Party City	12,000	75	34	40	879
21	Furniture Store	56,098	25	12	13	890
22	Tech Guys	1,197	3	1	2	814
23	On Q Financial	1,156	3	1	2	814
24	Michaels	24,113	150	69	81	879
25	Tire Co.	8,700	31	13	18	848
26	Pet Fun	6,286	21	11	11	866
27	USA Career Center	2,394	6	3	4	814
28	Pinnacle Tax	1,057	3	1	2	814
29	Outdoor Garden	28,328	291	131	160	417
30	Walmart	102,180	2,044	1,083	960	869
31	Sprint	2,794	8	3	4	814
32	Ikes Lair	1,129	30	15	14	933
33	Insurance	1,587	4	2	2	814
34	Available	1,539				
35	Pizza	2,900	76	39	37	933
36	Jack In the Box	2,625	89	46	43	934
37	Foot Mart	2,000	28	14	14	946
38	Physical Therapy	3,200	11	3	8	720
39	Urgent Care	3,200	11	3	8	720
40	Dentist	1,600	6	1	4	720
41	Chipotle	2,520	66	34	32	933
42	Total Nutrition	1,260	3	2	2	814
43	Yogurt Land	1540	40	21	20	933
44	Five Burgers	3014	79	40	39	933

45	Sushi	3490	39	20	19	932
46	Bjs	8686	97	50	46	932
47	Red Lobster	7300	81	42	39	932
48	European Wax	1400	4	2	2	814
49	Available	5600				
50	PGI Management	1555	4	2	2	814
51	Sleep Train	7625	3	2	2	890
		503,697	5,976	3,083	2,893	

Existing Conditions Weekday

1: N. Main Street & Madrid Street/Harden Parkway

9/27/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	128	134	150	307	128	143	160	607	244	260	754	137
Future Volume (vph)	128	134	150	307	128	143	160	607	244	260	754	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	130		125	240		0	200		140	230		150
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	5085	1583	1770	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	5085	1583	1770	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			182			182			265			149
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		499			545			600			293	
Travel Time (s)		11.3			12.4			11.7			5.7	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	139	146	163	334	139	155	174	660	265	283	820	149
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5

Existing Conditions Weekday

1: N. Main Street & Madrid Street/Harden Parkway

9/27/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	18.1	22.5	22.5	23.0	27.4	27.4	16.8	23.5	23.5	21.0	27.7	27.7
Total Split (%)	20.1%	25.0%	25.0%	25.6%	30.4%	30.4%	18.7%	26.1%	26.1%	23.3%	30.8%	30.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	11.5	12.5	12.5	21.0	21.9	21.9	11.7	22.1	22.1	16.5	26.9	26.9
Actuated g/C Ratio	0.13	0.14	0.14	0.23	0.24	0.24	0.13	0.25	0.25	0.18	0.30	0.30
v/c Ratio	0.62	0.57	0.43	0.81	0.31	0.30	0.76	0.53	0.45	0.87	0.54	0.26
Control Delay	48.9	44.2	7.8	41.8	21.4	5.1	48.6	21.6	4.0	63.8	29.0	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.9	44.2	7.8	41.8	21.4	5.1	48.6	21.6	4.0	63.8	29.0	6.0
LOS	D	D	A	D	C	A	D	C	A	E	C	A
Approach Delay		32.4			28.3			21.7			34.2	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	75	79	0	193	49	8	96	131	24	158	151	0
Queue Length 95th (ft)	133	130	41	#358	82	30	#181	115	10	#299	194	45
Internal Link Dist (ft)		419			465			520			213	
Turn Bay Length (ft)	130		125	240			200		140	230		150
Base Capacity (vph)	267	372	462	415	479	542	241	1246	588	324	1517	576
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.39	0.35	0.80	0.29	0.29	0.72	0.53	0.45	0.87	0.54	0.26

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 28.8

Intersection LOS: C

Intersection Capacity Utilization 65.2%

ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: N. Main Street & Madrid Street/Harden Parkway

 Ø2 (R)	 Ø1	 Ø4	 Ø3
23.5 s	21 s	22.5 s	23 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
16.8 s	27.7 s	18.1 s	27.4 s

Existing Conditions Weekday
2: N. Main Street & Cherokee Drive

9/29/2017

Intersection												
Int Delay, s/veh	55.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	0	29	183	0	155	0	925	301	82	1124	70
Future Vol, veh/h	0	0	29	183	0	155	0	925	301	82	1124	70
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	0	-	0	-	-	100	180	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	32	199	0	168	0	1005	327	89	1222	76
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1840	2443	649	1672	2481	503	1298	0	0	1005	0	0
Stage 1	1438	1438	-	1005	1005	-	-	-	-	-	-	-
Stage 2	402	1005	-	667	1476	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.14	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.92	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	80	31	354	~ 101	29	440	280	-	-	389	-	-
Stage 1	98	197	-	~ 197	317	-	-	-	-	-	-	-
Stage 2	545	317	-	377	189	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	41	24	354	~ 76	22	440	280	-	-	389	-	-
Mov Cap-2 Maneuver	41	24	-	~ 76	22	-	-	-	-	-	-	-
Stage 1	98	152	-	~ 197	317	-	-	-	-	-	-	-
Stage 2	336	317	-	265	146	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	16.2			\$ 468.6			0			1.1		
HCM LOS	C			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR			
Capacity (veh/h)	280	-	-	354	76	440	389	-	-			
HCM Lane V/C Ratio	-	-	-	0.089	2.617	0.383	0.229	-	-			
HCM Control Delay (s)	0	-	-	16.2	850.1	18.2	17	-	-			
HCM Lane LOS	A	-	-	C	F	C	C	-	-			
HCM 95th %tile Q(veh)	0	-	-	0.3	19.2	1.8	0.9	-	-			
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Existing Conditions Weekday
3: N. Main Street & W. Alvin Drive

9/27/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	192	192	65	178	205	194	87	772	212	199	850	172
Future Volume (vph)	192	192	65	178	205	194	87	772	212	199	850	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		120	190		198	100		0	215		215
Storage Lanes	1		1	1		0	1		0	2		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1770	3539	1583	1770	3281	0	1770	4923	0	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	1770	3281	0	1770	4923	0	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127		211			79				187
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1060			1052			368			1380	
Travel Time (s)		24.1			23.9			7.2			26.9	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	209	209	71	193	434	0	95	1069	0	216	924	187
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	22.5

Existing Conditions Weekday
3: N. Main Street & W. Alvin Drive

9/27/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	21.0	22.6	22.6	22.0	23.6		14.8	31.4		14.0	30.6	30.6
Total Split (%)	23.3%	25.1%	25.1%	24.4%	26.2%		16.4%	34.9%		15.6%	34.0%	34.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lag	Lead	Lead		Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	15.1	12.9	12.9	14.4	12.2		9.5	35.6		9.2	37.4	37.4
Actuated g/C Ratio	0.17	0.14	0.14	0.16	0.14		0.11	0.40		0.10	0.42	0.42
v/c Ratio	0.71	0.41	0.21	0.68	0.69		0.51	0.54		0.62	0.44	0.24
Control Delay	48.2	36.6	2.4	48.0	24.4		47.8	21.8		41.3	13.3	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	48.2	36.6	2.4	48.0	24.4		47.8	21.8		41.3	13.3	2.2
LOS	D	D	A	D	C		D	C		D	B	A
Approach Delay		36.6			31.6			24.0			16.3	
Approach LOS		D			C			C			B	
Queue Length 50th (ft)	112	57	0	104	63		51	156		67	88	6
Queue Length 95th (ft)	181	85	7	170	105		100	231		m97	117	m16
Internal Link Dist (ft)		980			972			288			1300	
Turn Bay Length (ft)	115		120	190			100			215		215
Base Capacity (vph)	336	711	419	344	862		202	1992		362	2113	767
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.62	0.29	0.17	0.56	0.50		0.47	0.54		0.60	0.44	0.24

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 31 (34%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 24.2

Intersection LOS: C

Intersection Capacity Utilization 62.9%

ICU Level of Service B

Analysis Period (min) 15

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

Splits and Phases: 3: N. Main Street & W. Alvin Drive

 Ø2 (R)	 Ø1	 Ø3	 Ø4
31.4 s	14 s	22 s	22.6 s
 Ø6 (R)	 Ø5	 Ø8	 Ø7
30.6 s	14.8 s	23.6 s	21 s

Existing Conditions Weekend
1: N. Main Street & Madrid Street/Harden Parkway

9/27/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	149	224	341	111	196	203	719	224	225	835	92
Future Volume (vph)	163	149	224	341	111	196	203	719	224	225	835	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	130		125	240		0	200		140	230		150
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	5085	1583	1770	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	5085	1583	1770	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			243			213			243			127
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		499			545			600			293	
Travel Time (s)		11.3			12.4			11.7			5.7	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	177	162	243	371	121	213	221	782	243	245	908	100
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5

Existing Conditions Weekend
1: N. Main Street & Madrid Street/Harden Parkway

9/27/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	21.0	22.5	22.5	25.0	26.5	26.5	17.0	23.5	23.5	19.0	25.5	25.5
Total Split (%)	23.3%	25.0%	25.0%	27.8%	29.4%	29.4%	18.9%	26.1%	26.1%	21.1%	28.3%	28.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	13.6	13.3	13.3	22.3	21.9	21.9	13.3	22.0	22.0	14.5	23.1	23.1
Actuated g/C Ratio	0.15	0.15	0.15	0.25	0.24	0.24	0.15	0.24	0.24	0.16	0.26	0.26
v/c Ratio	0.66	0.59	0.55	0.85	0.27	0.39	0.84	0.63	0.43	0.86	0.69	0.20
Control Delay	48.0	44.1	9.6	48.4	26.8	6.5	58.1	26.5	5.1	65.7	34.3	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.0	44.1	9.6	48.4	26.8	6.5	58.1	26.5	5.1	65.7	34.3	4.2
LOS	D	D	A	D	C	A	E	C	A	E	C	A
Approach Delay	30.9			32.0			27.9			38.0		
Approach LOS	C			C			C			D		
Queue Length 50th (ft)	95	87	0	124	39	7	127	157	30	137	176	0
Queue Length 95th (ft)	159	142	61	#383	76	40	m#259	202	m34	#268	225	26
Internal Link Dist (ft)	419			465			520			213		
Turn Bay Length (ft)	130	125		240	200		140	230	150			
Base Capacity (vph)	324	372	511	443	468	557	262	1241	570	285	1307	501
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.44	0.48	0.84	0.26	0.38	0.84	0.63	0.43	0.86	0.69	0.20

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 32.5
 Intersection LOS: C
 Intersection Capacity Utilization 69.1%
 ICU Level of Service C
 Analysis Period (min) 15
 # 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: 1: N. Main Street & Madrid Street/Harden Parkway

					
23.5 s	19 s	22.5 s	25 s		
					
17 s	25.5 s	21 s	26.5 s		

Existing Conditions Weekend
2: Cherokee Drive & N. Main Street

9/29/2017

Intersection												
Int Delay, s/veh	102.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	0	0	26	221	0	154	0	1032	275	78	1126	35
Future Vol, veh/h	0	0	26	221	0	154	0	1032	275	78	1126	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	0	-	0	-	-	100	180	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	28	240	0	167	0	1122	299	85	1224	38
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1861	2534	631	1781	2554	561	1262	0	0	1122	0	0
Stage 1	1412	1412	-	1122	1122	-	-	-	-	-	-	-
Stage 2	449	1122	-	659	1432	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.14	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.92	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	77	27	363	~ 87	26	403	292	-	-	342	-	-
Stage 1	102	203	-	~ 164	279	-	-	-	-	-	-	-
Stage 2	511	279	-	381	198	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	36	20	363	~ 65	20	403	292	-	-	342	-	-
Mov Cap-2 Maneuver	36	20	-	~ 65	20	-	-	-	-	-	-	-
Stage 1	102	153	-	~ 164	279	-	-	-	-	-	-	-
Stage 2	299	279	-	264	149	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	15.8			\$ 801			0			1.2		
HCM LOS	C			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR			
Capacity (veh/h)	292	-	-	363	65	403	342	-	-			
HCM Lane V/C Ratio	-	-	-	0.078	3.696	0.415	0.248	-	-			
HCM Control Delay (s)	0	-	-	15.8	1345.1	20.1	19	-	-			
HCM Lane LOS	A	-	-	C	F	C	C	-	-			
HCM 95th %tile Q(veh)	0	-	-	0.3	25.4	2	1	-	-			
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Existing Conditions Weekend
3: N. Main Street & W. Alvin Drive

9/27/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	124	84	198	135	155	62	807	150	124	1100	218
Future Volume (vph)	170	124	84	198	135	155	62	807	150	124	1100	218
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		120	190		198	100		0	215		215
Storage Lanes	1		1	1		0	1		0	2		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1770	3539	1583	1770	3256	0	1770	4963	0	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	1770	3256	0	1770	4963	0	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127		168			44				237
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1060			1052			368			1380	
Travel Time (s)		24.1			23.9			7.2			26.9	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	185	135	91	215	315	0	67	1040	0	135	1196	237
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	22.5

Existing Conditions Weekend

3: N. Main Street & W. Alvin Drive

9/27/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	17.9	22.5	22.5	22.0	26.6		12.0	33.6		11.9	33.5	33.5
Total Split (%)	19.9%	25.0%	25.0%	24.4%	29.6%		13.3%	37.3%		13.2%	37.2%	37.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	12.5	8.8	8.8	15.0	11.3		7.1	41.0		7.2	43.1	43.1
Actuated g/C Ratio	0.14	0.10	0.10	0.17	0.13		0.08	0.46		0.08	0.48	0.48
v/c Ratio	0.76	0.39	0.34	0.73	0.57		0.48	0.46		0.49	0.49	0.27
Control Delay	57.3	41.0	6.6	50.1	20.5		51.5	17.6		39.8	10.8	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	57.3	41.0	6.6	50.1	20.5		51.5	17.6		39.8	10.8	1.6
LOS	E	D	A	D	C		D	B		D	B	A
Approach Delay		40.7			32.5			19.7			11.9	
Approach LOS		D			C			B			B	
Queue Length 50th (ft)	101	38	0	115	41		37	141		42	107	5
Queue Length 95th (ft)	#194	65	23	188	77		79	193		m60	137	m16
Internal Link Dist (ft)		980			972			288			1300	
Turn Bay Length (ft)	115		120	190			100			215		215
Base Capacity (vph)	263	707	418	344	926		147	2283		282	2435	881
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.70	0.19	0.22	0.63	0.34		0.46	0.46		0.48	0.49	0.27

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 31 (34%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 20.6

Intersection LOS: C

Intersection Capacity Utilization 58.6%

ICU Level of Service B

Analysis Period (min) 15

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: 3: N. Main Street & W. Alvin Drive

↑ Ø2 (R)	↘ Ø1	↙ Ø3	→ Ø4
33.6 s	11.9 s	22 s	22.5 s
↓ Ø6 (R)	↙ Ø5	↘ Ø7	← Ø8
33.5 s	12 s	17.9 s	26.6 s

Weekend with Traffic Signal

1: N. Main Street & Madrid Street/Harden Parkway

9/28/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	134	190	291	75	196	169	859	224	225	835	92
Future Volume (vph)	78	134	190	291	75	196	169	859	224	225	835	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	130		125	240		0	200		140	230		150
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	5085	1583	1770	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	5085	1583	1770	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			207			213			243			182
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		499			550			600			293	
Travel Time (s)		11.3			12.5			11.7			5.7	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	85	146	207	316	82	213	184	934	243	245	908	100
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	14.4	22.5	22.5	23.0	31.1	31.1	17.6	25.5	25.5	19.0	26.9	26.9
Total Split (%)	16.0%	25.0%	25.0%	25.6%	34.6%	34.6%	19.6%	28.3%	28.3%	21.1%	29.9%	29.9%
Maximum Green (s)	9.9	18.0	18.0	18.5	26.6	26.6	13.1	21.0	21.0	14.5	22.4	22.4
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	8.7	12.5	12.5	19.9	25.7	25.7	12.8	25.5	25.5	14.2	26.9	26.9
Actuated g/C Ratio	0.10	0.14	0.14	0.22	0.29	0.29	0.14	0.28	0.28	0.16	0.30	0.30

Weekend with Traffic Signal

1: N. Main Street & Madrid Street/Harden Parkway

9/28/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.50	0.57	0.52	0.81	0.15	0.35	0.73	0.65	0.39	0.88	0.60	0.17
Control Delay	48.6	44.2	9.9	42.4	17.5	5.4	45.0	15.8	1.9	69.0	30.0	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.6	44.2	9.9	42.4	17.5	5.4	45.0	15.8	1.9	69.0	30.0	0.6
LOS	D	D	A	D	B	A	D	B	A	E	C	A
Approach Delay	28.9			26.2			17.2			35.3		
Approach LOS	C			C			B			D		
Queue Length 50th (ft)	46	79	0	187	27	11	113	63	0	137	168	0
Queue Length 95th (ft)	92	130	57	#331	52	42	m#201	91	m13	#268	220	1
Internal Link Dist (ft)	419			470			520			213		
Turn Bay Length (ft)	130	125		240	200		140	230	150		600	
Base Capacity (vph)	194	372	482	401	556	621	257	1439	622	285	1518	600
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.39	0.43	0.79	0.15	0.34	0.72	0.65	0.39	0.86	0.60	0.17

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 26.3

Intersection LOS: C

Intersection Capacity Utilization 67.2%

ICU Level of Service C

Analysis Period (min) 15

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: 1: N. Main Street & Madrid Street/Harden Parkway

 Ø2 (R)	 Ø1	 Ø4	 Ø3
25.5 s	19 s	22.5 s	23 s
 Ø6 (R)	 Ø5	 Ø7	 Ø8
26.9 s	17.6 s	14.4 s	31.1 s

Weekend with Traffic Signal

2: Cherokee Drive & N. Main Street

9/28/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	84	26	180	89	150	44	972	245	44	1076	121
Future Volume (vph)	140	84	26	180	89	150	44	972	245	44	1076	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		100	180		0
Storage Lanes	0		0	2		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1787	0	3433	1688	0	1770	5085	1583	1770	5009	0
Flt Permitted		0.689		0.950			0.950			0.950		
Satd. Flow (perm)	0	1265	0	3433	1688	0	1770	5085	1583	1770	5009	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			120				208		24	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		406			172			1380			600	
Travel Time (s)		9.2			3.9			26.9			11.7	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	271	0	196	260	0	48	1057	266	48	1302	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			36			36	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4								2			
Detector Phase	4	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		9.5	22.5		9.5	22.5	22.5	9.5	22.5	
Total Split (s)	31.0	31.0		13.0	44.0		10.0	34.9	34.9	11.1	36.0	
Total Split (%)	34.4%	34.4%		14.4%	48.9%		11.1%	38.8%	38.8%	12.3%	40.0%	
Maximum Green (s)	26.5	26.5		8.5	39.5		5.5	30.4	30.4	6.6	31.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lag	Lag		Lead			Lead	Lead	Lead	Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	
Walk Time (s)	7.0	7.0			7.0			7.0	7.0		7.0	
Flash Dont Walk (s)	11.0	11.0			11.0			11.0	11.0		11.0	
Pedestrian Calls (#/hr)	0	0			0			0	0		0	
Act Effct Green (s)		22.6		8.3	35.4		6.2	38.9	38.9	6.4	39.2	
Actuated g/C Ratio		0.25		0.09	0.39		0.07	0.43	0.43	0.07	0.44	

Weekend with Traffic Signal

2: Cherokee Drive & N. Main Street

9/28/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.84		0.62	0.35		0.40	0.48	0.33	0.38	0.59	
Control Delay		53.4		48.4	10.5		50.5	12.7	2.2	26.5	5.9	
Queue Delay		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		53.4		48.4	10.5		50.5	12.7	2.2	26.5	5.9	
LOS		D		D	B		D	B	A	C	A	
Approach Delay		53.4			26.8			12.0			6.7	
Approach LOS		D			C			B			A	
Queue Length 50th (ft)		139		56	49		16	185	2	24	95	
Queue Length 95th (ft)		#248		91	100		m48	137	3	m34	95	
Internal Link Dist (ft)		326			92			1300			520	
Turn Bay Length (ft)									100	180		
Base Capacity (vph)		377		324	808		121	2199	802	129	2192	
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		0.72		0.60	0.32		0.40	0.48	0.33	0.37	0.59	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 15.1

Intersection LOS: B

Intersection Capacity Utilization 70.3%

ICU Level of Service C

Analysis Period (min) 15

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: 2: Cherokee Drive & N. Main Street

 Ø2 (R)		 Ø1	 Ø3	 Ø4
34.9 s		11.1 s	13 s	31 s
 Ø5	 Ø6 (R)		 Ø8	
10 s	36 s		44 s	

Weekend with Traffic Signal
3: N. Main Street & W. Alvin Drive

9/28/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	124	84	198	135	155	62	851	150	124	1100	133
Future Volume (vph)	80	124	84	198	135	155	62	851	150	124	1100	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		120	190		198	100		0	215		215
Storage Lanes	1		1	1		0	1		0	2		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1770	3539	1583	1770	3256	0	1770	4973	0	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	1770	3256	0	1770	4973	0	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			236		168			41				182
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1060			1052			368			1380	
Travel Time (s)		24.1			23.9			7.2			26.9	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	135	91	215	315	0	67	1088	0	135	1196	145
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	22.5
Total Split (s)	14.5	22.5	22.5	22.0	30.0		12.0	34.5		11.0	33.5	33.5
Total Split (%)	16.1%	25.0%	25.0%	24.4%	33.3%		13.3%	38.3%		12.2%	37.2%	37.2%
Maximum Green (s)	10.0	18.0	18.0	17.5	25.5		7.5	30.0		6.5	29.0	29.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Walk Time (s)		7.0	7.0		7.0			7.0			7.0	7.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effct Green (s)	8.8	8.8	8.8	15.0	17.1		7.1	39.3		8.9	43.1	43.1
Actuated g/C Ratio	0.10	0.10	0.10	0.17	0.19		0.08	0.44		0.10	0.48	0.48

Weekend with Traffic Signal

3: N. Main Street & W. Alvin Drive

9/28/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.51	0.39	0.25	0.73	0.42		0.48	0.50		0.40	0.49	0.17
Control Delay	48.7	41.0	1.6	50.1	16.6		51.5	19.5		42.2	5.4	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	48.7	41.0	1.6	50.1	16.6		51.5	19.5		42.2	5.4	1.0
LOS	D	D	A	D	B		D	B		D	A	A
Approach Delay		31.7			30.2			21.4			8.3	
Approach LOS		C			C			C			A	
Queue Length 50th (ft)	47	38	0	115	38		37	155		28	15	0
Queue Length 95th (ft)	94	65	0	188	74		79	220		m51	109	m9
Internal Link Dist (ft)		980			972			288			1300	
Turn Bay Length (ft)	115		120	190			100			215		215
Base Capacity (vph)	196	707	505	344	1042		147	2195		338	2435	852
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.44	0.19	0.18	0.63	0.30		0.46	0.50		0.40	0.49	0.17

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 53 (59%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 18.1

Intersection LOS: B

Intersection Capacity Utilization 55.6%

ICU Level of Service B

Analysis Period (min) 15

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

Splits and Phases: 3: N. Main Street & W. Alvin Drive

											
Ø1	Ø2 (R)		Ø3		Ø4						
11 s	34.5 s		22 s		22.5 s						
											
Ø6 (R)			Ø5		Ø7		Ø8				
33.5 s			12 s		14.5 s		30 s				

Weekday with Traffic Signal

1: N. Main Street & Madrid Street/Harden Parkway

9/28/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	119	120	247	92	143	130	707	244	260	754	137
Future Volume (vph)	84	119	120	247	92	143	130	707	244	260	754	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	130		125	240		0	200		140	230		150
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	5085	1583	1770	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	5085	1583	1770	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			130			155			265			182
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		499			550			600			293	
Travel Time (s)		11.3			12.5			11.7			5.7	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	129	130	268	100	155	141	768	265	283	820	149
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5

Weekday with Traffic Signal

1: N. Main Street & Madrid Street/Harden Parkway

9/28/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	14.7	22.5	22.5	22.0	29.8	29.8	19.2	23.5	23.5	22.0	26.3	26.3
Total Split (%)	16.3%	25.0%	25.0%	24.4%	33.1%	33.1%	21.3%	26.1%	26.1%	24.4%	29.2%	29.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Act Effct Green (s)	16.2	11.5	11.5	16.4	13.8	13.8	14.7	25.3	25.3	18.8	29.4	29.4
Actuated g/C Ratio	0.18	0.13	0.13	0.18	0.15	0.15	0.16	0.28	0.28	0.21	0.33	0.33
v/c Ratio	0.29	0.54	0.41	0.83	0.35	0.42	0.49	0.54	0.42	0.76	0.49	0.23
Control Delay	32.7	44.7	10.5	47.1	25.4	8.6	25.1	16.7	5.3	47.9	26.5	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.7	44.7	10.5	47.1	25.4	8.6	25.1	16.7	5.3	47.9	26.5	3.3
LOS	C	D	B	D	C	A	C	B	A	D	C	A
Approach Delay		28.9			31.6			15.1			28.6	
Approach LOS		C			C			B			C	
Queue Length 50th (ft)	44	70	0	162	34	11	78	153	44	149	138	0
Queue Length 95th (ft)	85	119	47	#275	72	33	m120	173	66	#261	191	29
Internal Link Dist (ft)		419			470			520			213	
Turn Bay Length (ft)	130		125	240			200		140	230		150
Base Capacity (vph)	335	372	420	344	523	556	289	1428	635	384	1661	639
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.35	0.31	0.78	0.19	0.28	0.49	0.54	0.42	0.74	0.49	0.23

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green, Master Intersection

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 24.3

Intersection LOS: C

Intersection Capacity Utilization 59.7%

ICU Level of Service B

Analysis Period (min) 15

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: 1: N. Main Street & Madrid Street/Harden Parkway

Ø1	Ø2 (R)	Ø3	Ø4
22 s	23.5 s	22 s	22.5 s
Ø6 (R)	Ø5	Ø8	Ø7
26.3 s	19.2 s	29.8 s	14.7 s

Weekday with Traffic Signal
2: Cherokee Drive & N. Main Street

9/28/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	124	81	29	147	102	149	37	875	262	46	1064	166
Future Volume (vph)	124	81	29	147	102	149	37	875	262	46	1064	166
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		100	180		0
Storage Lanes	0		0	2		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1783	0	3433	1697	0	1770	5085	1583	1770	4984	0
Flt Permitted		0.695		0.950			0.950			0.950		
Satd. Flow (perm)	0	1273	0	3433	1697	0	1770	5085	1583	1770	4984	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			102				250		36	
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		406			172			1380			600	
Travel Time (s)		9.2			3.9			26.9			11.7	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	255	0	160	273	0	40	951	285	50	1337	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			36			36	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4								2			
Detector Phase	4	4		3	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		9.5	22.5		9.5	22.5	22.5	9.5	22.5	

Weekday with Traffic Signal
2: Cherokee Drive & N. Main Street

9/28/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	31.0	31.0		12.0	43.0		10.0	35.6	35.6	11.4	37.0	
Total Split (%)	34.4%	34.4%		13.3%	47.8%		11.1%	39.6%	39.6%	12.7%	41.1%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lag	Lag		Lead			Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)		21.7		7.6	33.7		5.5	40.4	40.4	6.6	41.3	
Actuated g/C Ratio		0.24		0.08	0.37		0.06	0.45	0.45	0.07	0.46	
v/c Ratio		0.82		0.56	0.39		0.37	0.42	0.34	0.39	0.58	
Control Delay		51.4		47.5	13.3		42.0	11.8	1.6	42.3	9.2	
Queue Delay		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		51.4		47.5	13.3		42.0	11.8	1.6	42.3	9.2	
LOS		D		D	B		D	B	A	D	A	
Approach Delay		51.4			25.9			10.4			10.4	
Approach LOS		D			C			B			B	
Queue Length 50th (ft)		131		45	65		22	93	0	31	94	
Queue Length 95th (ft)		211		77	118		m46	77	6	m59	119	
Internal Link Dist (ft)		326			92			1300			520	
Turn Bay Length (ft)									100	180		
Base Capacity (vph)		380		293	784		108	2284	848	135	2305	
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		0.67		0.55	0.35		0.37	0.42	0.34	0.37	0.58	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 69 (77%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 15.5

Intersection LOS: B

Intersection Capacity Utilization 70.8%

ICU Level of Service C

Analysis Period (min) 15

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

Splits and Phases: 2: Cherokee Drive & N. Main Street

			
Ø2 (R)	Ø1	Ø3	Ø4
35.6 s	11.4 s	12 s	31 s
			
Ø6 (R)	Ø5	Ø8	
37 s	10 s	43 s	

Weekday with Traffic Signal
3: N. Main Street & W. Alvin Drive

9/28/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	103	192	65	178	205	194	50	809	212	199	850	76
Future Volume (vph)	103	192	65	178	205	194	50	809	212	199	850	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	115		120	190		198	100		0	215		215
Storage Lanes	1		1	1		0	1		0	2		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1770	3539	1583	1770	3281	0	1770	4928	0	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	1770	3281	0	1770	4928	0	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			236		211			75				182
Link Speed (mph)		30			30			35			35	
Link Distance (ft)		1060			1052			368			1380	
Travel Time (s)		24.1			23.9			7.2			26.9	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	112	209	71	193	434	0	54	1109	0	216	924	83
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway 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
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	20
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	22.5

Weekday with Traffic Signal
3: N. Main Street & W. Alvin Drive

9/28/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	16.8	22.6	22.6	22.0	27.8		11.6	31.4		14.0	33.8	33.8
Total Split (%)	18.7%	25.1%	25.1%	24.4%	30.9%		12.9%	34.9%		15.6%	37.6%	37.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	10.3	10.6	10.6	14.4	16.9		6.8	36.1		10.9	42.3	42.3
Actuated g/C Ratio	0.11	0.12	0.12	0.16	0.19		0.08	0.40		0.12	0.47	0.47
v/c Ratio	0.55	0.50	0.18	0.68	0.55		0.41	0.55		0.52	0.39	0.10
Control Delay	47.9	41.1	1.0	48.0	19.7		49.1	21.8		24.1	12.9	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	47.9	41.1	1.0	48.0	19.7		49.1	21.8		24.1	12.9	2.7
LOS	D	D	A	D	B		D	C		C	B	A
Approach Delay		35.8			28.4			23.1			14.2	
Approach LOS		D			C			C			B	
Queue Length 50th (ft)	61	59	0	104	61		30	163		55	166	5
Queue Length 95th (ft)	112	91	0	170	103		67	242		m78	222	m21
Internal Link Dist (ft)		980			972			288			1300	
Turn Bay Length (ft)	115		120	190			100			215		215
Base Capacity (vph)	241	711	506	344	1005		139	2022		428	2387	839
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.46	0.29	0.14	0.56	0.43		0.39	0.55		0.50	0.39	0.10

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 44 (49%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 22.3

Intersection LOS: C

Intersection Capacity Utilization 58.6%

ICU Level of Service B

Analysis Period (min) 15

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

Splits and Phases: 3: N. Main Street & W. Alvin Drive

 Ø1	 Ø2 (R)	 Ø3	 Ø4
14 s	31.4 s	22 s	22.6 s
 Ø6 (R)	 Ø5	 Ø7	 Ø8
33.8 s	11.6 s	16.8 s	27.8 s