

2016

Final Technical Report  
US 17 Corridor Study Update  
(Market Street Road Diet)  
Wilmington, NC



Parsons Brinckerhoff  
January 2016

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# 1 INTRODUCTION

## 1.1 Study Purpose

The City of Wilmington and the Wilmington Urban Area Metropolitan Planning Organization (MPO) contracted Parsons Brinckerhoff (PB) to provide an update to the *US 17 Business Corridor Study* (STV/RWA, 2007), which recommended a Road Diet Concept be constructed in two phases along Market Street. The Road Diet would reduce the typical section from 4-lanes to 2-lanes, with a raised, landscaped median, left turn lanes where appropriate, bike lanes and some on-street parking. Phase I would implement a Road Diet from 17<sup>th</sup> Street to Covil Avenue and Phase II would continue the Road Diet from 3<sup>rd</sup> Street to 17<sup>th</sup> Street.

The purpose of this study is to evaluate, and in some cases re-evaluate, affected intersections to guide the decision-making process toward action.

## 1.2 What is a Road Diet?

For corridors that have excess capacity, reconfiguring the roadway with a "diet" can offer a number of benefits. The term "road diet" is a technique in transportation planning that narrows or eliminates travel lanes and utilizes the space for other uses and travel modes. A typical road diet consists of a four-lane or five-lane section converting to a two-lane section with the addition of turn lanes, medians, bike lanes, and sidewalks; creating a "Complete Street". Complete streets provide choices along the corridor to allow for all modes of transportation, including biking, walking, and driving.

**Road Diet Definition**  
A technique in transportation planning that narrows or eliminates travel lanes and utilizes the space for other uses and travel modes.

Road diets and complete streets offer several benefits to all users of the roadway, including:

- An overall crash reduction, specifically to rear-end and left-turn crashes
- Fewer lanes for pedestrians to cross
- Opportunities to install pedestrian refuge islands
- Addition of dedicated bike lanes
- Traffic calming and reduced speed, which reduces number and severity of crashes
- Potential aesthetic improvements, such as street trees, landscape medians, etc.
- Potential for on-street parking

These benefits should be considered along with operational impacts when evaluating potential road diet projects. Additional considerations should be given to daily volume of the roadway, community impacts, and multi-modal and freight users. The Federal Highway Administration (FHWA) advises that roadways with ADT of 20,000 vehicles per day or less are good candidates for road diet projects.

While some agencies have found synergies between travel modes with the implementation of road diets; other agencies have observed negative impacts. It should be noted that any observed impact is dependent on the context and users of the roadway. Some of the negative impacts observed by agencies include:

- Mail trucks and transit vehicles can block traffic when stopped in a singled through lane
- In some jurisdictions, maintenance funding is tied to the number of lane-miles; reducing the number of lanes can have a negative impact on maintenance budgets
- If travel lanes are widened, increased travel speeds can be encouraged
- The introduction of a median island can make it difficult for drivers to access left turn lanes if the demand is high
- Grass and delineator buffers can necessitate ongoing maintenance

### 1.3 Market Street Overview

Market Street, signed as US Highway 17 Business, in Wilmington, NC provides a primary connection from downtown to destinations to the east (e.g. University of North Carolina at Wilmington, Mayfair, Ogden, and Wrightsville Beach via Eastwood Road). In 2013, Market Street had an Annual Average Daily Traffic (AADT) that ranged between roughly 12,000 to 21,345 vehicles west of 16<sup>th</sup> Street and 26,000 to 37,423 vehicles east of 16<sup>th</sup> Street, based on data collected by the North Carolina Department of Transportation (NCDOT) and Wilmington Urban Area Metropolitan Planning Organization (WMPO). Traffic volumes fluctuate based on the daily and seasonal factors.

The geometry of the corridor can currently be divided into three distinct segments. In the downtown area, between 3<sup>rd</sup> Street and 16<sup>th</sup> Street, Market Street has narrow right-of-way that includes a four-lane divided roadway, planting strips (including established tree canopy) and sidewalks. Between 17<sup>th</sup> Street and Colonial Drive the street cross section narrows to 36 feet, four 9-foot lanes with no median or turn lanes. East of Colonial Drive, the right-of-way widens to include a five-lane section (two lanes in each direction and a center two-way, left-turn lane), planting strips and sidewalks.

An analysis was performed considering the traffic impacts of a proposed road diet along Market Street between 3rd Street and Covil Avenue in a future year of 2020. Similar to the cross-section shown in **Figure 1**, the road diet considered reconfiguring the existing roadway by reducing the travel lanes to one in each direction, thus creating space to add planted median, channelized left-turn lanes and bike lanes. The potential road diet would provide “Complete Streets” accommodating multiple travel modes.

**Figure 1: Road Diet Street Typical**



*Image Source: Plant City Times & Observer*

There is another project in the study area planning to extend Independence Blvd to Martin Luther King Jr. Parkway. The new road extension will intersect Market Street at the existing Covil Avenue intersection. The project will provide additional connectivity and capacity for the region. This will likely have a great impact on trip distribution in the study area and relieve traffic from Market Street and the study intersections. Unfortunately, the project is not included in the current NCDOT Transportation Improvement Program (TIP); therefore, it is currently unfunded and has no associated timeline and it was not included as part of this study. If Independence Boulevard Extension were to be constructed, the feasibility of the road diet from 16<sup>th</sup> Street eastward on Market Street would be improved.

## 2 CORRIDOR TRAFFIC ANALYSIS

At the request of the City of Wilmington and the MPO, the nine study area intersections, shown in Figure 2, were analyzed.

Figure 2: Study Area Map



Existing 2015 peak traffic counts were provided by the MPO for the study intersections. The counts were taken between 7:00-9:00 AM and 4:00-6:00 PM and volumes were provided in 15 minute intervals. The total traffic intervals were evaluated to determine the AM and PM peak hour volumes for the study area intersections.

NCDOT 2011 and 2013 traffic volume maps were used to identify the ADT volumes for the study area. These counts were used to calculate the growth rate from 2011 to 2013. That average growth rate was then applied to the 2015 traffic volumes to reach 2020 traffic volumes for each area.

The 2035 Transportation Demand Model was used to forecast future traffic patterns based on the implementation of the proposed road diet. The model was used to establish the trip diversion rates based on reduction of network capacity, trip diversion, and alternative transportation modes. These diversion rates were used to adjust the 2020 traffic volumes used to analyze the operations for the study intersections.

SYNCHRO 9.0 was used to analyze the intersections in the study area for the scenarios. The Synchro results give a level of service (LOS) for the intersections. The LOS is an important measure of roadway congestion. The LOS is determined by calculating the delay for the intersection and converting it to a letter. The LOS ranges from A (insignificant congestion) to F (severe congestion). The LOS criteria for signalized intersections are shown in Table 1.

## 2.1 Intersection Analysis Results

An analysis was performed in the 2020 horizon year under baseline conditions and road diet conditions. This provides a comparison of how the study intersections will operate in the future with existing roadway geometry in place and with the road diet reconfigurations. Signal cycle lengths remained the same between the baseline and road diet scenarios; however the phasing splits were optimized in the road diet scenario to account for the change in geometry. Table 2 summarizes the results for all of the study intersections for each scenario. The results are shown in LOS and delay, measured in seconds. The Synchro reports are included in Appendix A.

Table 1: Level of Service Criteria

Signalized Intersections	
LOS	Delay per Vehicle (seconds)
A	$\leq 10$
B	$> 10 \text{ and } \leq 20$
C	$> 20 \text{ and } \leq 35$
D	$> 35 \text{ and } \leq 55$
E	$> 55 \text{ and } \leq 80$
F	$> 80$

Table 2: Intersection Analysis Results

	2020 AM BASELINE LOS (delay in sec)	2020 PM BASELINE LOS (delay in sec)	2020 AM DIET LOS (delay in sec)	2020 PM DIET LOS (delay in sec)
Market Street & 3rd Street	B (12.4)	B (16.8)	B (13.6)	B (17.8)
Market Street & 5th Street	A (9.2)	B (11.5)	B (10.1)	B (13.2)
Market Street & 10th Street	A (10.0)	B (10.4)	B (10.4)	A (9.7)
Market Street & 16th Street	C (23.3)	C (33.2)	D (51.7)	C (25.7)
Market Street & 17th Street	B (17.1)	C (20.2)	D (53.8)	C (28.9)
Market Street & 23rd Street	B (10.7)	B (11.9)	D (46.2)	D (38.6)
Market Street & Forest Hills Drive	A (9.7)	A (8.2)	C (25.6)	D (40.0)
Market Street & Covil Avenue	E (62.8)	F (304.2)	F (208.2)	F (699.1)

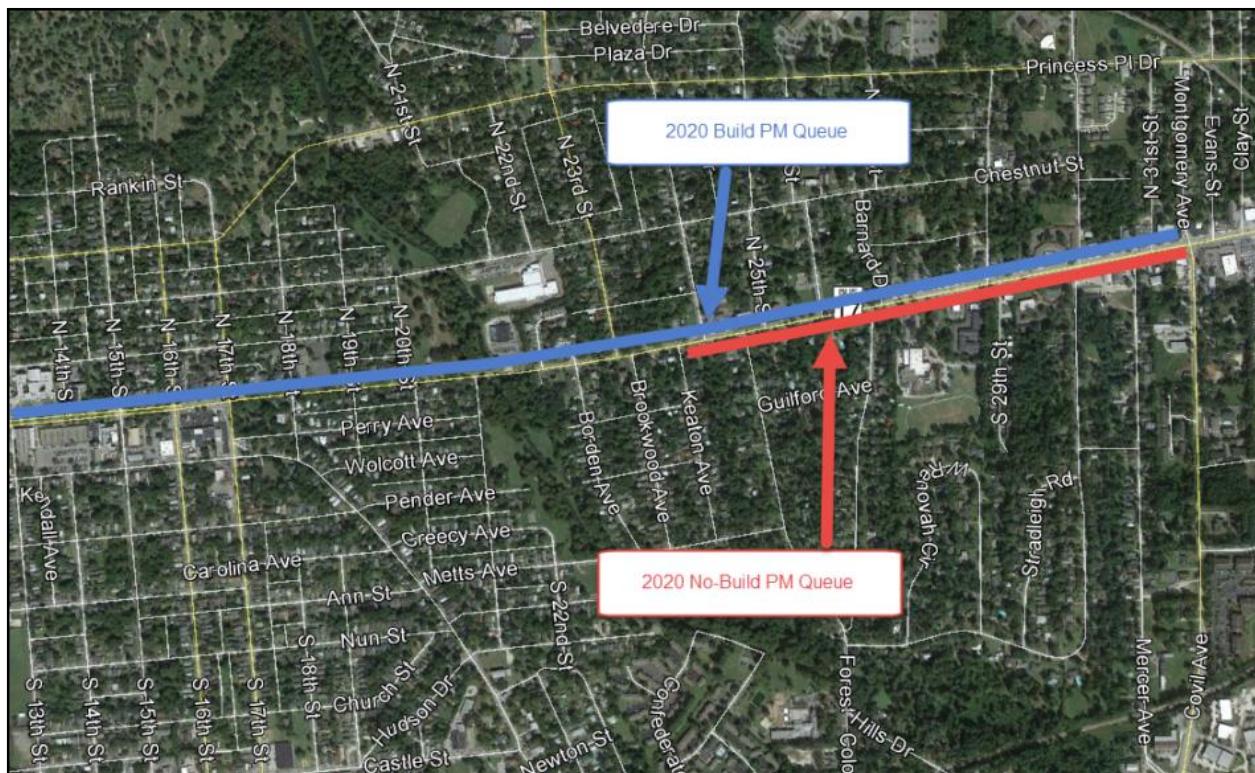
The results of the analysis show that several intersections are expected to experience a significant increase in delay under the road diet conditions. The intersections along Market Street between 16<sup>th</sup> Street and Covil Avenue all are expected to experience a decline of at least one LOS grade, except for the PM peak at 16<sup>th</sup> Street and 17<sup>th</sup> Street which remained at a LOS C. The increase of vehicle delay was more than doubled at the intersections of 23<sup>rd</sup> Street, Forest Hills Drive, and Covil Avenue for all scenarios. The intersections of 16<sup>th</sup> Street and 17<sup>th</sup> Street increased in delay by 120% and 215% for the AM peak, respectively. The intersection of 16<sup>th</sup> Street experienced a decrease in delay of approximately 20% during the PM peak, due to optimizing the phasing splits for the intersection; however 17<sup>th</sup> Street still experienced an increase in delay of approximately 40%.

The intersections along Market Street between 3<sup>rd</sup> Street to 10<sup>th</sup> Street are expected to have little to no impact under road diet conditions. Although some intersections experienced a decline in LOS, the biggest increase in delay for these intersections was less than 2 seconds. The intersection of 10<sup>th</sup> Street actually improved from LOS B to LOS A with a decrease in delay of approximately 7% in the PM peak.

## 2.2 Queuing Analysis Results

In addition to intersection operations, a SimTraffic analysis was performed to understand the queuing impacts along the corridor. Under road diet conditions, significant queue lengths are expected to increase from west of 16<sup>th</sup> Street to Kerr Avenue along Market Street. During the PM peak the eastbound queue from Covil Avenue along Market Street experienced the biggest impact, with the queue length expected to increase from approximately 400 feet west of Forest Hills Drive in the baseline to approximately 1,400 feet west of 16<sup>th</sup> Street with the road diet in place, an increase of approximately 5,200 feet. This impact is shown in Figure 3.

Figure 3: 2020 PM Peak Eastbound Queue on Market Street



The queue lengths along the side streets were also increased as a result of the excessive queuing along Market Street. Turning vehicles are unable to process through the intersection from these streets due to queued vehicles blocking the intersections. Excessive queues were also identified in both scenarios for 17<sup>th</sup> Street, 23<sup>rd</sup> Street, and westbound Market Street from Covil Avenue to Kerr Avenue. The SimTraffic reports are included in Appendix B.

### 3 TRIP DIVERSECTIONS

The impetus of this analysis and re-evaluation was to address the concerns of residents of neighborhoods that abut Market Street, who have expressed concerns about safety issues and vehicular crashes. Some believe that by introducing a road diet on Market Street vehicular capacity would be reduced and some of those vehicles would divert to other roadways. Research was conducted to understand the impacts to driver behavior.

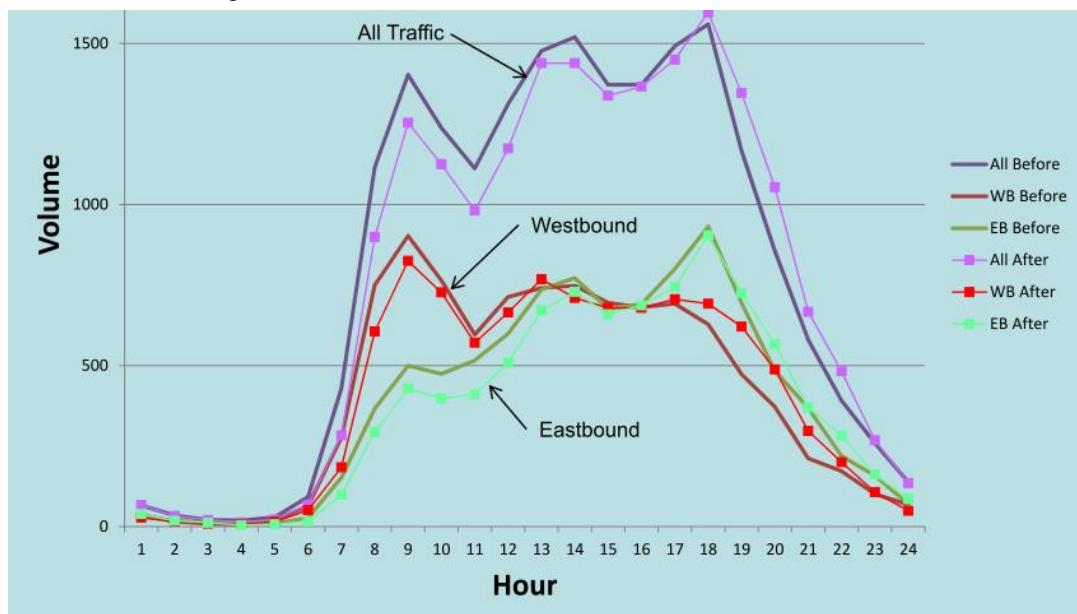
#### 3.1 Case Studies

The FHWA published research that evaluated the before and after impacts of introducing road diets. Based on four cases studies, minimal traffic was diverted over time once a road diet was applied (*Going on a Road Diet*, FHWA-HRT-11-006, 2011).

Edgewater Drive (Orlando, FL)	Stone Way North (Seattle, WA)	Arterial Road (Athens, GA)	Arterial Road (Vancouver, WA)
<ul style="list-style-type: none"> <li>Initial Decrease from 20,500 to 18,100 then Increase to 21,000</li> </ul>	<ul style="list-style-type: none"> <li>ADT Decrease of +/- 6% - Matched City Wide Trend</li> </ul>	<ul style="list-style-type: none"> <li>ADT 20,000 - Decrease of +/- 4%</li> </ul>	<ul style="list-style-type: none"> <li>ADT 17,000 – No Diversion</li> </ul>

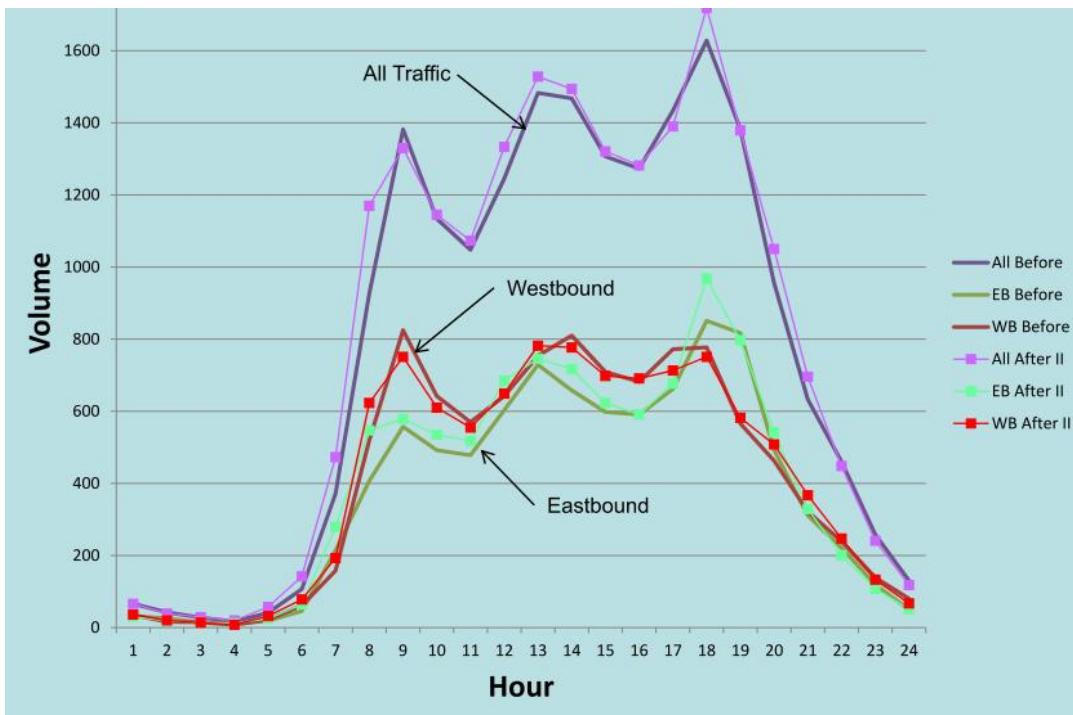
The City of Charlotte published data that was collected on East Boulevard before and after a road diet was introduced over two phases (*Before & After Studies in Charlotte, NC*, City of Charlotte, June 2012). The traffic volume fluctuated some (21,400 ADT before and 18,400 ADT after), but overall, the traffic volumes remained the same with the road diet. The evaluation showed that significant traffic did not divert to the local streets. Figure 4 and Figure 5 show the traffic changes for Phase I and II of the road diet project on East Boulevard, respectively.

Figure 4: Traffic on East Blvd Phase I – Before and After



Source: *Before & After Studies in Charlotte, NC*

Figure 5: Traffic on East Blvd Phase II – Before and After



Source: Before &amp; After Studies in Charlotte, NC

### 3.2 Intersection Analysis of Additional Intersections

A supplemental capacity analysis was performed for five select intersections on Kerr Avenue and Princess Place. Initially, the analysis was performed under the assumption that vehicles that currently utilize Market Street would divert to these streets. After reviewing the previously mentioned case studies, it was determined that there would be little impacts to these additional intersections. Table 3 summarizes the results for the supplemental study intersections.

Table 3: Intersection Analysis Results

	2020 AM BASELINE LOS (delay in sec)	2020 PM BASELINE LOS (delay in sec)
Kerr Avenue & MLK Blvd	E (65.7)	F (106.9)
Kerr Avenue & Randall Pkwy	D (39.5)	F (112.9)
Market Street & Kerr Avenue	F (80.3)	F (110.7)
Princess Place & 16th Street	F (3059.1)	F (1391.5)
Princess Place & 17th Street	D (37.9)	D (53.2)
Princess Place & 23rd Street	F (85.0)	F (399.6)

## 4 CONCLUSION

After evaluating the results, the road diet project is not recommended for the proposed limits of this study due to the negative impacts to Market Street. Additional connectivity and capacity, like what will be provided by the Independence Blvd extension, is needed in the region to redistribute trips from Market Street before the road diet will be viable for the proposed limits from 3<sup>rd</sup> Street to Covil Avenue. This is similar to the 2007 *US 17 Business Corridor Study* results that identified the completion of Independence Blvd extension as a prerequisite to the road diet implementation.

The road diet is not recommended for the proposed limits of this study due to the negative impacts to operations and increased vehicle queuing along Market Street.

The intersections of 23<sup>rd</sup> Street, Forest Hills Drive, and Covil Avenue all experienced significant impacts to delay after implementing the road diet. The intersections of 16<sup>th</sup> Street and 17<sup>th</sup> Street also experienced increases in delay; however not to the extent of the intersections further east. Similarly to delay, vehicle queuing was greatly increased along Market Street in the road diet scenario. Eastbound queuing along Market Street experienced the greatest impact with vehicle queuing increasing from west of Forest Hills Drive to west of 16<sup>th</sup> Street, an increase of approximately one mile.

However, based on the results of this study, the road diet could successfully be implemented between 3<sup>rd</sup> Street and 16<sup>th</sup> Street, with a transition to current geometry west of 16<sup>th</sup> Street. The ADT for this segment of the corridor is under the recommended 20,000 vehicle per day threshold, according to NCDOT traffic maps. The intersections in this segment operate at LOS B or better for the road diet scenarios and the impacts are within an acceptable range to achieve the additional benefits of a road diet conversion.

## **APPENDIX A: SYNCHRO REPORTS**

## Lanes, Volumes, Timings

3: 3rd St &amp; Market St

9/21/2015

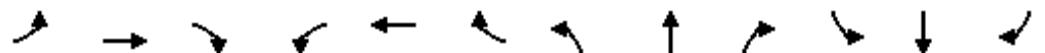


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑			↑↑		↑	↑↑		↑	↑↑	
Traffic Volume (vph)	13	30	13	65	74	90	58	516	86	59	251	69
Future Volume (vph)	13	30	13	65	74	90	58	516	86	59	251	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	95		0	150		0	200		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	100			0			100			100		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00			0.99			1.00			1.00	
Fr <sub>t</sub>		0.955			0.941			0.978			0.968	
Flt Protected	0.950				0.986		0.950			0.950		
Satd. Flow (prot)	1770	3366	0	0	3266	0	1770	3455	0	1770	3416	0
Flt Permitted	0.504				0.853		0.539			0.369		
Satd. Flow (perm)	938	3366	0	0	2825	0	1004	3455	0	687	3416	0
Right Turn on Red			No			No			No		No	
Satd. Flow (RTOR)												
Link Speed (mph)		25			35			35			35	
Link Distance (ft)		656			820			581			760	
Travel Time (s)		17.9			16.0			11.3			14.8	
Confl. Peds. (#/hr)	1		1	1		1			1			1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	14	33	14	72	82	100	64	573	96	66	279	77
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	47	0	0	254	0	64	669	0	66	356	0
Enter Blocked Intersection	No											
Lane Alignment	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	1		1	1		1	0		1	0	
Detector Template												
Leading Detector (ft)	40	40		65	40		57	0		50	0	
Trailing Detector (ft)	0	0		50	0		-3	0		-10	0	
Detector 1 Position(ft)	0	0		50	0		-3	0		-10	0	
Detector 1 Size(ft)	40	40		15	40		60	6		60	0	
Detector 1 Type	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	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	3.0	0.0		0.0	0.0		10.0	0.0		10.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			3	8		5	2		1	6
Permitted Phases		4			8			2			6	
Detector Phase		4	4		3	8		5	2		1	6
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	10.0		7.0	10.0	

# Lanes, Volumes, Timings

3: 3rd St & Market St

9/21/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	24.0	24.0		12.8	21.9		12.5	24.2		12.6	25.8	
Total Split (s)	27.0	27.0		14.0	41.0		15.0	34.0		15.0	34.0	
Total Split (%)	30.0%	30.0%		15.6%	45.6%		16.7%	37.8%		16.7%	37.8%	
Maximum Green (s)	21.0	21.0		8.2	35.1		9.5	27.8		9.4	28.2	
Yellow Time (s)	3.0	3.0		3.0	4.1		3.1	4.2		3.0	3.8	
All-Red Time (s)	3.0	3.0		2.8	1.8		2.4	2.0		2.6	2.0	
Lost Time Adjust (s)	-2.0	-2.0			-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0			3.9		3.5	4.2		3.6	3.8	
Lead/Lag	Lag	Lag		Lead			Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		1.0	0.2		1.0	0.2	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)	4.0	4.0			4.0			4.0			4.0	
Flash Dont Walk (s)	14.0	14.0			12.0			14.0			16.0	
Pedestrian Calls (#/hr)	0	0			0			0			0	
Act Effct Green (s)	14.3	14.3			14.4		65.3	57.4		65.3	57.9	
Actuated g/C Ratio	0.16	0.16			0.16		0.73	0.64		0.73	0.64	
v/c Ratio	0.09	0.09			0.56		0.08	0.30		0.11	0.16	
Control Delay	32.0	31.1			28.5		3.6	8.8		3.8	7.7	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	32.0	31.1			28.5		3.6	8.8		3.8	7.7	
LOS	C	C			C		A	A		A	A	
Approach Delay		31.3			28.5			8.4			7.1	
Approach LOS		C			C			A			A	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 88 (98%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 12.4

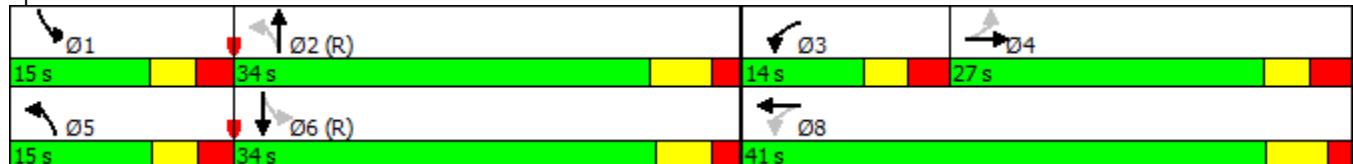
Intersection LOS: B

Intersection Capacity Utilization 44.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: 3rd St & Market St



## Lanes, Volumes, Timings

6: 5th St &amp; Market St

9/21/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	192	10	0	290	36	0	73	38	0	36	7
Future Volume (vph)	0	192	10	0	290	36	0	73	38	0	36	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.993			0.983			0.949			0.975	
Flt Protected												
Satd. Flow (prot)	0	3512	0	0	3474	0	0	3344	0	0	3443	0
Flt Permitted												
Satd. Flow (perm)	0	3512	0	0	3474	0	0	3344	0	0	3443	0
Right Turn on Red				No		No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		820			2009			644			690	
Travel Time (s)		16.0			39.1			17.6			18.8	
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	213	11	0	322	40	0	81	42	0	40	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	224	0	0	362	0	0	123	0	0	48	0
Enter Blocked Intersection	No	No	No									
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			0			0	
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			1			1			1	
Detector Template												
Leading Detector (ft)		206			206			40			40	
Trailing Detector (ft)		200			200			0			0	
Detector 1 Position(ft)		200			200			0			0	
Detector 1 Size(ft)		6			6			40			40	
Detector 1 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0			0.0			0.0	
Detector 1 Queue (s)		0.0			0.0			0.0			0.0	
Detector 1 Delay (s)		0.0			0.0			0.0			0.0	
Turn Type		NA			NA			NA			NA	
Protected Phases		2			6			8			4	
Permitted Phases												
Detector Phase		2			6			8			4	
Switch Phase												
Minimum Initial (s)		10.0			10.0			7.0			7.0	
Minimum Split (s)		25.5			26.6			28.7			28.7	
Total Split (s)		59.0			59.0			31.0			31.0	
Total Split (%)		65.6%			65.6%			34.4%			34.4%	

# Lanes, Volumes, Timings

6: 5th St & Market St

9/21/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	53.5			53.4			25.3			25.3		
Yellow Time (s)	3.8			3.9			3.2			3.1		
All-Red Time (s)	1.7			1.7			2.5			2.6		
Lost Time Adjust (s)	-2.0			-2.0			-2.0			-2.0		
Total Lost Time (s)	3.5			3.6			3.7			3.7		
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.5			4.5			2.0			2.0		
Minimum Gap (s)	3.0			3.0			3.0			3.0		
Time Before Reduce (s)	10.0			10.0			0.0			0.0		
Time To Reduce (s)	10.0			10.0			0.0			0.0		
Recall Mode	C-Max			C-Max			None			None		
Walk Time (s)	4.0			4.0			4.0			4.0		
Flash Dont Walk (s)	16.0			17.0			19.0			19.0		
Pedestrian Calls (#/hr)	0			0			0			0		
Act Effct Green (s)	72.7			72.6			10.1			10.1		
Actuated g/C Ratio	0.81			0.81			0.11			0.11		
v/c Ratio	0.08			0.13			0.33			0.12		
Control Delay	0.9			0.7			39.0			36.2		
Queue Delay	0.0			0.0			0.0			0.0		
Total Delay	0.9			0.7			39.0			36.2		
LOS	A			A			D			D		
Approach Delay	0.9			0.7			39.0			36.2		
Approach LOS	A			A			D			D		

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 88 (98%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.33

Intersection Signal Delay: 9.2

Intersection LOS: A

Intersection Capacity Utilization 30.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: 5th St & Market St



## Lanes, Volumes, Timings

9: 10th St &amp; Market St

9/21/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	182	9	38	326	15	12	67	26	18	51	4
Future Volume (vph)	7	182	9	38	326	15	12	67	26	18	51	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	100	0	
Storage Lanes	0		0	0		0	0		0	1	0	
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>					0.993			0.994			0.966	
Flt Protected						0.995			0.994		0.950	
Satd. Flow (prot)	0	3507	0	0	3500	0	0	1789	0	1770	1844	0
Flt Permitted						0.907			0.960		0.531	
Satd. Flow (perm)	0	3311	0	0	3191	0	0	1727	0	989	1844	0
Right Turn on Red				No			No			No		No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		2009			900			828			513	
Travel Time (s)		39.1			17.5			22.6			14.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	8	202	10	42	362	17	13	74	29	20	57	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	220	0	0	421	0	0	116	0	20	61	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			0			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	1		1	1		1	1		1	1	
Detector Template	Left			Left			Left					
Leading Detector (ft)	20	76		20	76		20	33		55	55	
Trailing Detector (ft)	0	70		0	70		0	-2		-5	-5	
Detector 1 Position(ft)	0	70		0	70		0	-2		-5	-5	
Detector 1 Size(ft)	20	6		20	6		20	35		60	60	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
Turn Type	Perm	NA										
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	15.6	15.6		15.4	15.4		12.9	12.9		13.0	13.0	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	54.4	54.4		54.6	54.6		24.1	24.1		24.0	24.0	
Yellow Time (s)	4.1	4.1		3.6	3.6		3.1	3.1		3.2	3.2	
All-Red Time (s)	1.5	1.5		1.8	1.8		2.8	2.8		2.8	2.8	
Lost Time Adjust (s)		-2.0			-2.0			-2.0		-2.0	-2.0	
Total Lost Time (s)		3.6			3.4			3.9		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)		73.2			73.3			12.6		12.6	12.6	
Actuated g/C Ratio	0.81			0.81			0.14		0.14	0.14		
v/c Ratio	0.08			0.16			0.48		0.14	0.24		
Control Delay	2.2			0.4			41.7		34.8	35.5		
Queue Delay	0.0			0.0			0.0		0.0	0.0		
Total Delay	2.2			0.4			41.7		34.8	35.5		
LOS	A			A			D		C	D		
Approach Delay	2.2			0.4			41.7			35.3		
Approach LOS	A			A			D			D		

**Intersection Summary**

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 46 (51%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.48

Intersection Signal Delay: 10.0

Intersection LOS: A

Intersection Capacity Utilization 41.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 9: 10th St &amp; Market St



Lanes, Volumes, Timings  
14: 16th St & Market St

9/21/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	347	78	649	872	0	0	0	0	87	779	41
Future Volume (vph)	0	347	78	649	872	0	0	0	0	87	779	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		0	0		0	0	0	0
Storage Lanes	0		0	1		0	0		0	0	0	0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor		1.00									1.00	
Fr <sub>t</sub>		0.972									0.993	
Flt Protected				0.950							0.995	
Satd. Flow (prot)	0	3431	0	1770	3539	0	0	0	0	0	3495	0
Flt Permitted				0.282							0.995	
Satd. Flow (perm)	0	3431	0	525	3539	0	0	0	0	0	3494	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1473			369			549			1165	
Travel Time (s)		28.7			7.2			10.7			22.7	
Confl. Peds. (#/hr)	1		1			1	1		1	1		1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	386	87	721	969	0	0	0	0	97	866	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	473	0	721	969	0	0	0	0	0	1009	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)		12			12			0			0	
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		1	1					1	1	
Detector Template										Left		
Leading Detector (ft)		206			40	206				20	40	
Trailing Detector (ft)		200			0	200				0	0	
Detector 1 Position(ft)		200			0	200				0	0	
Detector 1 Size(ft)		6			40	6				20	40	
Detector 1 Type		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	
Detector 1 Queue (s)		0.0			0.0	0.0				0.0	0.0	
Detector 1 Delay (s)		0.0			15.0	0.0				0.0	5.0	
Turn Type	NA		pm+pt		NA				Perm	NA		
Protected Phases		2		1	6						4	
Permitted Phases				6						4		
Detector Phase		2		1	6					4	4	
Switch Phase												
Minimum Initial (s)		10.0			7.0	8.0				7.0	7.0	

## Lanes, Volumes, Timings

14: 16th St &amp; Market St

9/21/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	17.1			12.1	13.3					23.7	23.7	
Total Split (s)	20.0			35.0	55.0					35.0	35.0	
Total Split (%)	22.2%			38.9%	61.1%					38.9%	38.9%	
Maximum Green (s)	14.9			29.9	49.7					29.3	29.3	
Yellow Time (s)	3.8			3.0	4.0					3.8	3.8	
All-Red Time (s)	1.3			2.1	1.3					1.9	1.9	
Lost Time Adjust (s)	-2.0			-2.0	-2.0					-2.0		
Total Lost Time (s)	3.1			3.1	3.3					3.7		
Lead/Lag	Lead			Lag								
Lead-Lag Optimize?	Yes			Yes								
Vehicle Extension (s)	6.0			2.0	6.0					5.0	5.0	
Minimum Gap (s)	2.5			3.0	2.5					2.5	2.5	
Time Before Reduce (s)	10.0			0.0	10.0					0.0	0.0	
Time To Reduce (s)	15.0			0.0	15.0					10.0	10.0	
Recall Mode	C-Max			None	C-Max					None	None	
Walk Time (s)	4.0				4.0					4.0	4.0	
Flash Dont Walk (s)	8.0				4.0					14.0	14.0	
Pedestrian Calls (#/hr)	0				0					0	0	
Act Effct Green (s)	17.5			52.5	52.3					30.7		
Actuated g/C Ratio	0.19			0.58	0.58					0.34		
v/c Ratio	0.71			0.97	0.47					0.85		
Control Delay	36.3			39.9	7.8					20.0		
Queue Delay	0.0			0.0	0.3					0.0		
Total Delay	36.3			39.9	8.1					20.0		
LOS	D			D	A					B		
Approach Delay	36.3				21.7					20.0		
Approach LOS		D			C					B		

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 80 (89%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 23.3

Intersection LOS: C

Intersection Capacity Utilization 86.7%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 14: 16th St &amp; Market St



Lanes, Volumes, Timings  
17: 17th St & Market St

9/21/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑		↑	↑↑	↑			
Traffic Volume (vph)	14	397	0	0	1267	43	252	690	357	0	0	0
Future Volume (vph)	14	397	0	0	1267	43	252	690	357	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor					1.00		1.00		0.99			
Frt					0.995				0.850			
Flt Protected		0.998					0.950					
Satd. Flow (prot)	0	3532	0	0	3520	0	1770	3539	1583	0	0	0
Flt Permitted		0.885					0.950					
Satd. Flow (perm)	0	3132	0	0	3520	0	1767	3539	1562	0	0	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35		35		35			
Link Distance (ft)		369			1854		597		1164			
Travel Time (s)		7.2			36.1		11.6		22.7			
Confl. Peds. (#/hr)	1		1	1		1	1		1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	16	441	0	0	1408	48	280	767	397	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	457	0	0	1456	0	280	767	397	0	0	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)		12			0			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	0			0		1	1	1			
Detector Template	Left											
Leading Detector (ft)	20	0			0		40	40	40			
Trailing Detector (ft)	0	0			0		0	0	0			
Detector 1 Position(ft)	0	0			0		0	0	0			
Detector 1 Size(ft)	20	6			6		40	40	40			
Detector 1 Type	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			
Detector 1 Queue (s)	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	15.0			
Turn Type	Perm	NA			NA		Perm	NA	Perm			
Protected Phases		2			6			8				
Permitted Phases	2						8		8			
Detector Phase	2	2			6		8	8	8			
Switch Phase												
Minimum Initial (s)	10.0	10.0			10.0		7.0	7.0	7.0			
Minimum Split (s)	21.4	21.4			21.2		26.4	26.4	26.4			
Total Split (s)	50.0	50.0			50.0		40.0	40.0	40.0			
Total Split (%)	55.6%	55.6%			55.6%		44.4%	44.4%	44.4%			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	44.6	44.6			44.8		34.6	34.6	34.6			
Yellow Time (s)	3.8	3.8			3.8		3.9	3.9	3.9			
All-Red Time (s)	1.6	1.6			1.4		1.5	1.5	1.5			
Lost Time Adjust (s)		-2.0			-2.0		-2.0	-2.0	-2.0			
Total Lost Time (s)		3.4			3.2		3.4	3.4	3.4			
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	0.2	0.2			0.2		2.0	2.0	2.0			
Recall Mode	C-Max	C-Max			C-Max		None	None	None			
Walk Time (s)	4.0	4.0			4.0		4.0	4.0	4.0			
Flash Dont Walk (s)	12.0	12.0			12.0		17.0	17.0	17.0			
Pedestrian Calls (#/hr)	0	0			0		0	0	0			
Act Effct Green (s)	53.1				53.3		30.1	30.1	30.1			
Actuated g/C Ratio	0.59				0.59		0.33	0.33	0.33			
v/c Ratio	0.25				0.70		0.47	0.65	0.76			
Control Delay	6.1				8.0		25.4	27.6	36.0			
Queue Delay	0.0				0.3		0.0	0.0	0.0			
Total Delay	6.1				8.3		25.4	27.6	36.0			
LOS	A				A		C	C	D			
Approach Delay	6.1				8.3				29.5			
Approach LOS	A				A				C			

#### Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 17.1

Intersection LOS: B

Intersection Capacity Utilization 62.1%

ICU Level of Service B

Analysis Period (min) 15

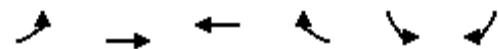
Splits and Phases: 17: 17th St & Market St



## Lanes, Volumes, Timings

23: Market St &amp; 23rd St

9/21/2015



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↖	
Traffic Volume (vph)	66	724	1218	141	194	87
Future Volume (vph)	66	724	1218	141	194	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor					1.00	
Frt			0.984		0.958	
Flt Protected		0.996			0.967	
Satd. Flow (prot)	0	3525	3483	0	1718	0
Flt Permitted		0.685			0.967	
Satd. Flow (perm)	0	2424	3483	0	1718	0
Right Turn on Red				No	No	
Satd. Flow (RTOR)						
Link Speed (mph)		35	35		35	
Link Distance (ft)		993	944		1214	
Travel Time (s)		19.3	18.4		23.6	
Confl. Peds. (#/hr)					1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	73	804	1353	157	216	97
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	877	1510	0	313	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	1	1		1	
Detector Template	Left					
Leading Detector (ft)	20	76	81		68	
Trailing Detector (ft)	0	70	75		-2	
Detector 1 Position(ft)	0	70	75		-2	
Detector 1 Size(ft)	20	6	6		70	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		10.0	
Turn Type	Perm	NA	NA		Prot	
Protected Phases		2	6		4	
Permitted Phases	2					
Detector Phase	2	2	6		4	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		7.0	
Minimum Split (s)	14.9	14.9	15.1		15.8	
Total Split (s)	60.0	60.0	60.0		30.0	
Total Split (%)	66.7%	66.7%	66.7%		33.3%	



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Maximum Green (s)	55.1	55.1	54.9		25.2	
Yellow Time (s)	3.7	3.7	3.9		3.0	
All-Red Time (s)	1.2	1.2	1.2		1.8	
Lost Time Adjust (s)		-2.0	-2.0		-2.0	
Total Lost Time (s)		2.9	3.1		2.8	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		2.0	
Recall Mode	C-Max	C-Max	C-Max		None	
Walk Time (s)					4.0	
Flash Dont Walk (s)					7.0	
Pedestrian Calls (#/hr)					0	
Act Effct Green (s)	62.1	61.9		22.2		
Actuated g/C Ratio	0.69	0.69		0.25		
v/c Ratio	0.52	0.63		0.74		
Control Delay	4.8	7.7		41.8		
Queue Delay	0.0	0.0		0.0		
Total Delay	4.8	7.7		41.8		
LOS	A	A		D		
Approach Delay	4.8	7.7		41.8		
Approach LOS	A	A		D		

**Intersection Summary**

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 36 (40%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 10.7

Intersection LOS: B

Intersection Capacity Utilization 86.2%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 23: Market St &amp; 23rd St





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	806	72	48	1140	146	38
Future Volume (vph)	806	72	48	1140	146	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor					1.00	
Frt	0.988				0.972	
Flt Protected				0.998	0.962	
Satd. Flow (prot)	3497	0	0	3532	1737	0
Flt Permitted				0.868	0.962	
Satd. Flow (perm)	3497	0	0	3072	1737	0
Right Turn on Red		No			No	
Satd. Flow (RTOR)						
Link Speed (mph)	35			35	25	
Link Distance (ft)	944			866	959	
Travel Time (s)	18.4			16.9	26.2	
Confl. Peds. (#/hr)					1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	896	80	53	1267	162	42
Shared Lane Traffic (%)						
Lane Group Flow (vph)	976	0	0	1320	204	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	1		1	1	1	
Detector Template			Left			
Leading Detector (ft)	76		20	76	40	
Trailing Detector (ft)	70		0	70	0	
Detector 1 Position(ft)	70		0	70	0	
Detector 1 Size(ft)	6		20	6	40	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	5.0	
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Detector Phase	2		6	6	8	
Switch Phase						
Minimum Initial (s)	9.0		8.0	8.0	7.0	
Minimum Split (s)	14.4		12.8	12.8	20.3	
Total Split (s)	67.0		67.0	67.0	23.0	
Total Split (%)	74.4%		74.4%	74.4%	25.6%	



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Maximum Green (s)	61.6		62.2	62.2	17.7	
Yellow Time (s)	3.8		3.8	3.8	3.0	
All-Red Time (s)	1.6		1.0	1.0	2.3	
Lost Time Adjust (s)	-2.0			-2.0	-2.0	
Total Lost Time (s)	3.4			2.8	3.3	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	2.0	
Recall Mode	C-Max		C-Max	C-Max	None	
Walk Time (s)					4.0	
Flash Dont Walk (s)					11.0	
Pedestrian Calls (#/hr)					0	
Act Effct Green (s)	67.1		67.7	16.2		
Actuated g/C Ratio	0.75		0.75	0.18		
v/c Ratio	0.37		0.57	0.65		
Control Delay	6.9		6.5	44.0		
Queue Delay	0.0		0.0	0.0		
Total Delay	6.9		6.5	44.0		
LOS	A		A	D		
Approach Delay	6.9		6.5	44.0		
Approach LOS	A		A	D		

#### Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 16 (18%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 9.7

Intersection LOS: A

Intersection Capacity Utilization 78.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 25: Forest Hills Dr & Market St



	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑		↑	↑	↑	↑	↑		↑	↑	↑
Traffic Volume (vph)	405	165	9	15	223	102	3	205	9	51	206	413
Future Volume (vph)	405	165	9	15	223	102	3	205	9	51	206	413
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	275		0	160		100	50		0	180		160
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. 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
Frt			0.992			0.850			0.994			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1848	0	1770	1863	1583	1770	1852	0	1770	1863	1583
Flt Permitted	0.133			0.636			0.550			0.197		
Satd. Flow (perm)	248	1848	0	1185	1863	1583	1025	1852	0	367	1863	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1312			1183			857			783	
Travel Time (s)		25.6			23.0			16.7			15.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	450	183	10	17	248	113	3	228	10	57	229	459
Shared Lane Traffic (%)												
Lane Group Flow (vph)	450	193	0	17	248	113	3	238	0	57	229	459
Enter Blocked Intersection	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	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	pm+ov
Protected Phases	5	2			6			8		7	4	5
Permitted Phases	2			6		6	8			4		4
Minimum Split (s)	12.4	15.4		15.8	15.8	15.8	12.1	12.1		12.8	12.5	12.4
Total Split (s)	140.0	30.0		30.0	30.0	30.0	20.0	20.0		20.0	20.0	140.0
Total Split (%)	66.7%	14.3%		14.3%	14.3%	14.3%	9.5%	9.5%		9.5%	9.5%	66.7%
Maximum Green (s)	134.6	24.6		24.2	24.2	24.2	14.9	14.9		14.2	14.5	134.6
Yellow Time (s)	3.0	3.8		4.0	4.0	4.0	3.8	3.8		3.0	4.0	3.0
All-Red Time (s)	2.4	1.6		1.8	1.8	1.8	1.3	1.3		2.8	1.5	2.4
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	3.4	3.4		3.8	3.8	3.8	3.1	3.1		3.8	3.5	3.4
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lag		Lead		Lead
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes		Yes		Yes
Act Effct Green (s)	166.6	166.6		26.2	26.2	26.2	16.9	16.9		36.2	36.5	176.6
Actuated g/C Ratio	0.79	0.79		0.12	0.12	0.12	0.08	0.08		0.17	0.17	0.84
v/c Ratio	0.38	0.13		0.12	1.07	0.57	0.04	1.60		0.33	0.71	0.34
Control Delay	12.0	5.2		84.0	159.9	99.0	90.3	349.8		80.0	94.8	4.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	12.0	5.2		84.0	159.9	99.0	90.3	349.8		80.0	94.8	4.5



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	A		F	F	F	F	F		F	F	A
Approach Delay			10.0			138.3			346.6			38.1
Approach LOS			A			F			F			D

**Intersection Summary**

Area Type: Other

Cycle Length: 210

Actuated Cycle Length: 210

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

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 1.60

Intersection Signal Delay: 85.0

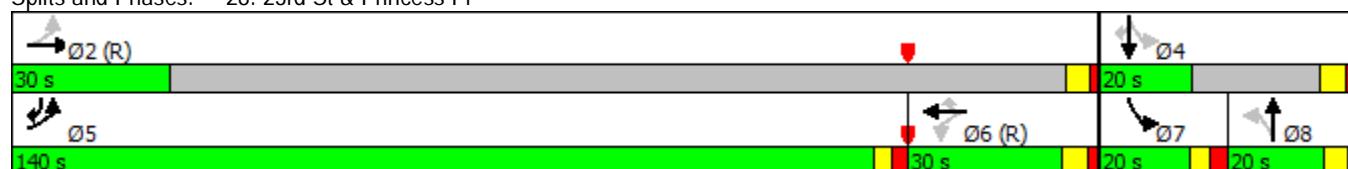
Intersection LOS: F

Intersection Capacity Utilization 64.7%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 28: 23rd St &amp; Princess Pl



## Lanes, Volumes, Timings

33: Covil Ave/Montgomery Ave &amp; Market St

9/21/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↓		↑	↑↓			↑	↑	↑	↑↓	
Traffic Volume (vph)	77	1042	266	362	1591	49	252	207	337	54	86	20
Future Volume (vph)	77	1042	266	362	1591	49	252	207	337	54	86	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	600		0	0		0	0	0	0
Storage Lanes	1		0	1		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.969			0.996				0.850		0.972	
Flt Protected	0.950			0.950				0.973		0.950		
Satd. Flow (prot)	1770	3429	0	1770	3525	0	0	1812	1583	1770	1811	0
Flt Permitted	0.093			0.056				0.697		0.098		
Satd. Flow (perm)	173	3429	0	104	3525	0	0	1298	1583	183	1811	0
Right Turn on Red			No			No			No		No	
Satd. Flow (RTOR)												
Link Speed (mph)		40			40			35			25	
Link Distance (ft)		2438			3526			759			597	
Travel Time (s)		41.6			60.1			14.8			16.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	86	1158	296	402	1768	54	280	230	374	60	96	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	1454	0	402	1822	0	0	510	374	60	118	0
Enter Blocked Intersection	No											
Lane Alignment	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		Yes			Yes							
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	1	1	1	1	1
Detector Template							Left					
Leading Detector (ft)	60	256		60	256		20	35	60	35	55	
Trailing Detector (ft)	0	80		0	80		0	-5	0	-5	-5	
Detector 1 Position(ft)	0	80		0	80		0	-5	0	-5	-5	
Detector 1 Size(ft)	60	6		60	6		20	40	60	40	60	
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		15.0	0.0		0.0	3.0	15.0	3.0	15.0	
Detector 2 Position(ft)		250			250							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		1.3			1.3							
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases		2			1	6		8		8	4	4
Permitted Phases	2			6			8		8	4		

## Lanes, Volumes, Timings

33: Covil Ave/Montgomery Ave &amp; Market St

9/21/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		1	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	16.0	16.0		12.3	15.8		12.8	12.8	12.3	13.1	13.1	
Total Split (s)	72.0	72.0		35.0	107.0		45.0	45.0	35.0	45.0	45.0	
Total Split (%)	47.4%	47.4%		23.0%	70.4%		29.6%	29.6%	23.0%	29.6%	29.6%	
Maximum Green (s)	66.0	66.0		29.7	101.2		39.2	39.2	29.7	38.9	38.9	
Yellow Time (s)	4.2	4.2		3.0	4.2		3.8	3.8	3.0	3.6	3.6	
All-Red Time (s)	1.8	1.8		2.3	1.6		2.0	2.0	2.3	2.5	2.5	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		3.3	3.8		3.8	3.3	4.1	4.1	4.1	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?	Yes	Yes		Yes					Yes			
Vehicle Extension (s)	3.0	3.0		1.0	3.0		1.0	1.0	1.0	1.0	1.0	
Recall Mode	C-Max	C-Max		None	C-Max		None	None	None	None	None	
Act Effct Green (s)	68.3	68.3		103.7	103.2		41.2	76.4	40.9	40.9		
Actuated g/C Ratio	0.45	0.45		0.68	0.68		0.27	0.50	0.27	0.27		
v/c Ratio	1.12	0.94		0.97	0.76		1.45	0.47	1.22	0.24		
Control Delay	175.8	53.0		81.0	9.0		258.2	27.0	247.2	45.1		
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		
Total Delay	175.8	53.0		81.0	9.0		258.2	27.0	247.2	45.1		
LOS	F	D		F	A			F	C	F	D	
Approach Delay		59.9			22.0			160.4			113.2	
Approach LOS		E			C			F			F	

## Intersection Summary

Area Type: Other

Cycle Length: 152

Actuated Cycle Length: 152

Offset: 135 (89%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.45

Intersection Signal Delay: 62.8

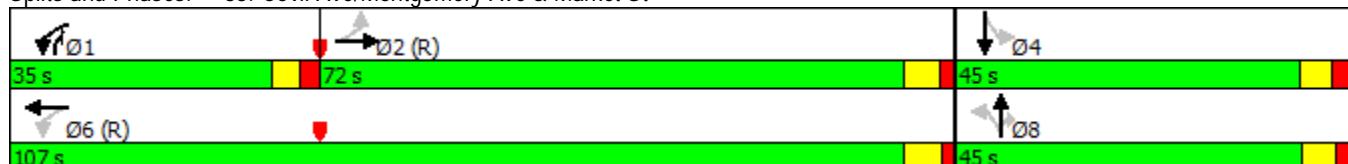
Intersection LOS: E

Intersection Capacity Utilization 101.4%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 33: Covil Ave/Montgomery Ave &amp; Market St



## Lanes, Volumes, Timings

38: 16th St &amp; Grace St

9/21/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	42	59	764	0	0	0	0	0	80	113	0
Future Volume (vph)	0	42	59	764	0	0	0	0	0	80	113	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		150	0		0	0		0	0	0	0
Storage Lanes	0		1	1		0	0		0	0	0	0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Fr <sub>t</sub>				0.850								
Flt Protected				0.950							0.980	
Satd. Flow (prot)	0	1863	1583	1770	0	0	0	0	0	0	3468	0
Flt Permitted				0.077							0.980	
Satd. Flow (perm)	0	1863	1583	143	0	0	0	0	0	0	3468	0
Right Turn on Red			No		No		No		No		No	
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		511			350			1165			463	
Travel Time (s)		10.0			6.8			22.7			9.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	47	66	849	0	0	0	0	0	89	126	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	47	66	849	0	0	0	0	0	0	215	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)		12			12			0			0	
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	1	0						1	1	
Detector Template										Left		
Leading Detector (ft)		40	40	0						20	40	
Trailing Detector (ft)		0	0	0						0	0	
Detector 1 Position(ft)		0	0	0						0	0	
Detector 1 Size(ft)		40	40	20						20	40	
Detector 1 Type		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	
Detector 1 Queue (s)		0.0	0.0	0.0						0.0	0.0	
Detector 1 Delay (s)		0.0	15.0	0.0						0.0	0.0	
Turn Type	NA	Perm	Perm							Perm	NA	
Protected Phases		4									6	
Permitted Phases			4	3						6		
Detector Phase		4	4	3						6	6	
Switch Phase												
Minimum Initial (s)		7.0	7.0	7.0						7.0	7.0	
Minimum Split (s)		11.8	11.8	11.8						11.8	11.8	
Total Split (s)		18.0	18.0	55.0						17.0	17.0	

## Lanes, Volumes, Timings

38: 16th St &amp; Grace St

9/21/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	20.0%	20.0%	61.1%							18.9%	18.9%	
Maximum Green (s)	13.2	13.2	50.2							12.2	12.2	
Yellow Time (s)	3.8	3.8	3.0							3.8	3.8	
All-Red Time (s)	1.0	1.0	1.8							1.0	1.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0							-2.0		
Total Lost Time (s)	2.8	2.8	2.8								2.8	
Lead/Lag	Lag	Lag	Lead									
Lead-Lag Optimize?	Yes	Yes	Yes									
Vehicle Extension (s)	3.0	3.0	3.0							3.0	3.0	
Recall Mode	None	None	Max							C-Max	C-Max	
Act Effct Green (s)	11.4	11.4	52.2								20.4	
Actuated g/C Ratio	0.13	0.13	0.58								0.23	
v/c Ratio	0.20	0.33	10.35								0.27	
Control Delay	36.3	39.6	4227.8								31.8	
Queue Delay	0.0	0.0	0.0								0.0	
Total Delay	36.3	39.6	4227.8								31.8	
LOS	D	D	F								C	
Approach Delay	38.2										31.8	
Approach LOS	D										C	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 73 (81%), Referenced to phase 6:SBTL, Start of Green

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 10.35

Intersection Signal Delay: 3059.1

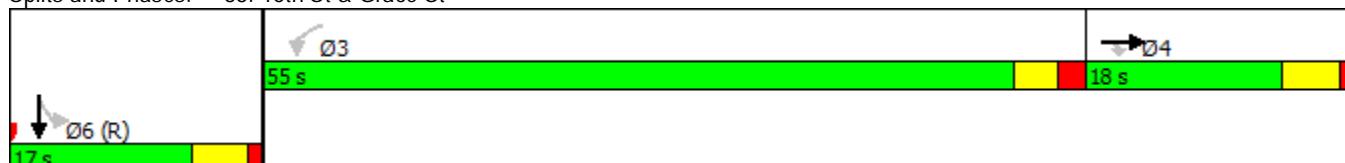
Intersection LOS: F

Intersection Capacity Utilization 64.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 38: 16th St &amp; Grace St



	→	→	→	←	←	↑	↑	↑	↓	↓	←	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	128	0	0	731	132	3	143	538	0	0	0
Future Volume (vph)	1	128	0	0	731	132	3	143	538	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		225	0		0	0	0	0
Storage Lanes	0		0	0		1	0		1	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. 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
Fr <sub>t</sub>						0.850				0.850		
Flt Protected									0.999			
Satd. Flow (prot)	0	1863	0	0	1863	1583	0	1861	1583	0	0	0
Flt Permitted		0.997							0.999			
Satd. Flow (perm)	0	1857	0	0	1863	1583	0	1861	1583	0	0	0
Right Turn on Red			No			No			No		No	
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		350			720			1164			324	
Travel Time (s)		6.8			14.0			22.7			6.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1	142	0	0	812	147	3	159	598	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	143	0	0	812	147	0	162	598	0	0	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)		0			0			0			0	
Link Offset(ft)		0			-12			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	1			1	0	1	1	1			
Detector Template	Left					Left						
Leading Detector (ft)	20	40			40	0	20	40	40			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Detector 1 Position(ft)	0	0			0	0	0	0	0			
Detector 1 Size(ft)	20	40			40	20	20	40	40			
Detector 1 Type	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			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Detector 1 Delay (s)	0.0	3.0			0.0	0.0	0.0	0.0	0.0			
Turn Type	Perm	NA			NA	Perm	Perm	NA	Perm			
Protected Phases		4			8			2				
Permitted Phases	4					8	2		2			
Detector Phase	4	4			8	8	2	2	2			
Switch Phase												
Minimum Initial (s)	7.0	7.0			7.0	7.0	7.0	7.0	7.0			
Minimum Split (s)	12.4	12.4			12.0	12.0	12.2	12.2	12.2			
Total Split (s)	49.0	49.0			49.0	49.0	41.0	41.0	41.0			



Lane Group	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	54.4%	54.4%		54.4%	54.4%	45.6%	45.6%	45.6%			
Maximum Green (s)	43.6	43.6		44.0	44.0	35.8	35.8	35.8			
Yellow Time (s)	3.8	3.8		3.7	3.7	3.8	3.8	3.8			
All-Red Time (s)	1.6	1.6		1.3	1.3	1.4	1.4	1.4			
Lost Time Adjust (s)	-2.0			-2.0	-2.0		-2.0	-2.0			
Total Lost Time (s)	3.4			3.0	3.0		3.2	3.2			
Lead/Lag											
Lead-Lag Optimize?											
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0			
Recall Mode	None	None		Max	Max	C-Max	C-Max	C-Max			
Act Effct Green (s)	45.6			46.0	46.0		37.8	37.8			
Actuated g/C Ratio	0.51			0.51	0.51		0.42	0.42			
v/c Ratio	0.15			0.85	0.18		0.21	0.90			
Control Delay	10.9			29.9	12.6		33.5	62.7			
Queue Delay	0.0			0.0	0.0		0.0	0.0			
Total Delay	10.9			29.9	12.6		33.5	62.7			
LOS	B			C	B		C	E			
Approach Delay	10.9			27.2			56.5				
Approach LOS	B			C			E				

#### Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 40 (44%), Referenced to phase 2:NBTL, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 37.9

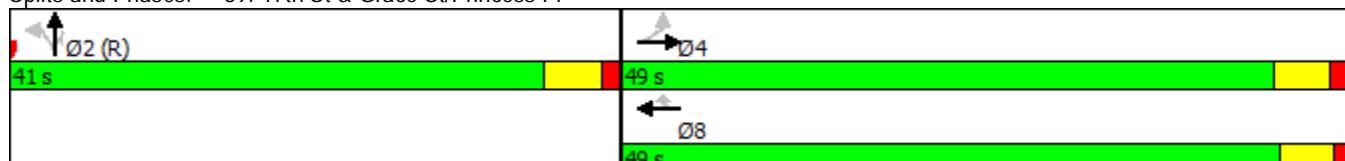
Intersection LOS: D

Intersection Capacity Utilization 52.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 39: 17th St & Grace St/Princess Pl



Lanes, Volumes, Timings  
44: Kerr Ave & MLK Blvd

9/21/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑	↑	↑	↑↑↑	↑	↑	↑↑↑	↑	↑	↑↑↑	↑
Traffic Volume (vph)	210	1151	363	191	1447	139	364	490	174	119	653	584
Future Volume (vph)	210	1151	363	191	1447	139	364	490	174	119	653	584
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		360	365		200	270		130	280		125
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.950			0.147			0.299		
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	274	3539	1583	557	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		55			55			45			45	
Link Distance (ft)		1466			1826			427			690	
Travel Time (s)		18.2			22.6			6.5			10.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	233	1279	403	212	1608	154	404	544	193	132	726	649
Shared Lane Traffic (%)												
Lane Group Flow (vph)	233	1279	403	212	1608	154	404	544	193	132	726	649
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		28			28			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane							Yes					
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	1	0	1	1	0	1	1	1	1	1	1
Detector Template												
Leading Detector (ft)	40	426	0	40	426	0	40	40	40	40	40	40
Trailing Detector (ft)	0	420	0	0	420	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	420	0	0	420	0	0	0	0	0	0	0
Detector 1 Size(ft)	40	6	20	40	6	20	40	40	40	40	40	40
Detector 1 Type	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	15.0	0.0	15.0	15.0	0.0	15.0
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8	1	7	4	5
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	3	1	6	7	3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	14.0	7.0	7.0	14.0	7.0	7.0	12.0	7.0	7.0	12.0	7.0
Minimum Split (s)	13.3	20.3	12.9	13.3	20.3	12.9	12.9	18.5	13.3	12.9	18.3	13.3
Total Split (s)	30.0	42.0	18.0	30.0	42.0	18.0	18.0	54.0	30.0	18.0	54.0	30.0



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	20.8%	29.2%	12.5%	20.8%	29.2%	12.5%	12.5%	37.5%	20.8%	12.5%	37.5%	20.8%
Maximum Green (s)	23.7	35.7	12.1	23.7	35.7	12.1	12.1	47.5	23.7	12.1	47.7	23.7
Yellow Time (s)	3.0	5.2	3.0	3.0	5.2	3.0	3.0	4.6	3.0	3.0	4.3	3.0
All-Red Time (s)	3.3	1.1	2.9	3.3	1.1	2.9	2.9	1.9	3.3	2.9	2.0	3.3
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.3	4.3	3.9	4.3	4.3	3.9	3.9	4.5	4.3	3.9	4.3	4.3
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes											
Vehicle Extension (s)	2.0	6.0	2.0	2.0	6.0	2.0	2.0	6.0	2.0	2.0	6.0	2.0
Minimum Gap (s)	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Time Before Reduce (s)	0.0	15.0	0.0	0.0	15.0	0.0	0.0	15.0	0.0	0.0	15.0	0.0
Time To Reduce (s)	0.0	50.0	0.0	0.0	50.0	0.0	0.0	30.0	0.0	0.0	30.0	0.0
Recall Mode	None	C-Max	None	None	C-Max	None						
Act Effct Green (s)	25.7	50.1	68.5	22.9	47.3	60.3	56.0	41.4	68.9	53.1	40.1	65.8
Actuated g/C Ratio	0.18	0.35	0.48	0.16	0.33	0.42	0.39	0.29	0.48	0.37	0.28	0.46
v/c Ratio	0.74	0.72	0.54	0.75	0.96	0.23	1.60	0.53	0.25	0.42	0.74	0.90
Control Delay	71.0	45.1	32.2	74.3	62.1	15.6	313.6	44.9	22.1	30.9	51.6	42.5
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	71.0	45.1	32.2	74.3	62.1	15.6	313.6	44.9	22.1	30.9	51.6	42.5
LOS	E	D	C	E	E	B	F	D	C	C	D	D
Approach Delay		45.5				59.8			136.2			45.9
Approach LOS		D				E			F			D

**Intersection Summary**

Area Type: Other

Cycle Length: 144

Actuated Cycle Length: 144

Offset: 125 (87%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.60

Intersection Signal Delay: 65.7

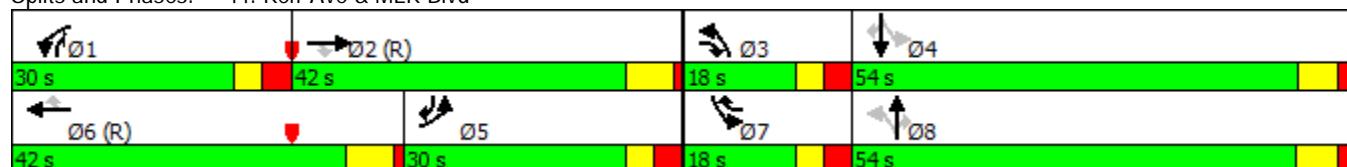
Intersection LOS: E

Intersection Capacity Utilization 94.8%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 44: Kerr Ave &amp; MLK Blvd



## Lanes, Volumes, Timings

49: Market St &amp; Kerr Ave

9/21/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	177	976	277	321	1519	122	278	390	124	167	454	308
Future Volume (vph)	177	976	277	321	1519	122	278	390	124	167	454	308
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	70		0	225		0	0		0	420		375
Storage Lanes	1		1	1		1	2		1	1		1
Taper Length (ft)	70			180			100			100		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	1863	1583	1770	1863	1583
Flt Permitted	0.070			0.172			0.950			0.317		
Satd. Flow (perm)	130	3539	1583	320	3539	1583	3433	1863	1583	590	1863	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		40			40			35			45	
Link Distance (ft)		905			1376			407			2922	
Travel Time (s)		15.4			23.5			7.9			44.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	197	1084	308	357	1688	136	309	433	138	186	504	342
Shared Lane Traffic (%)												
Lane Group Flow (vph)	197	1084	308	357	1688	136	309	433	138	186	504	342
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			24			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane	Yes			Yes						Yes		
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	1	0	1	1	0	1	1	1	1	1	1
Detector Template												
Leading Detector (ft)	40	306	0	40	306	0	40	40	40	35	40	40
Trailing Detector (ft)	0	300	0	0	300	0	0	0	0	-5	0	0
Detector 1 Position(ft)	0	300	0	0	300	0	0	0	0	-5	0	0
Detector 1 Size(ft)	40	6	20	40	6	20	40	40	40	40	40	40
Detector 1 Type	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)	10.0	0.0	0.0	10.0	0.0	0.0	3.0	0.0	15.0	10.0	0.0	15.0
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8	1	7	4	5
Permitted Phases	2		2	6		6			8	4		4
Detector Phase	5	2	3	1	6	7	3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	12.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.2	18.2	13.1	13.1	18.2	12.8	13.1	13.5	13.1	12.8	13.5	13.2
Total Split (s)	15.0	72.0	22.0	25.0	82.0	20.0	22.0	35.0	25.0	20.0	33.0	15.0

## Lanes, Volumes, Timings

49: Market St &amp; Kerr Ave

9/21/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	9.9%	47.4%	14.5%	16.4%	53.9%	13.2%	14.5%	23.0%	16.4%	13.2%	21.7%	9.9%
Maximum Green (s)	8.8	65.8	15.9	18.9	75.8	14.2	15.9	28.5	18.9	14.2	26.5	8.8
Yellow Time (s)	3.0	4.5	3.0	3.0	4.5	3.0	3.0	4.5	3.0	3.0	4.5	3.0
All-Red Time (s)	3.2	1.7	3.1	3.1	1.7	2.8	3.1	2.0	3.1	2.8	2.0	3.2
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.2	4.2	4.1	4.1	4.2	3.8	4.1	4.5	4.1	3.8	4.5	4.2
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes										
Vehicle Extension (s)	2.0	5.0	1.0	2.0	4.5	2.0	1.0	2.0	2.0	2.0	2.0	2.0
Minimum Gap (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
Time Before Reduce (s)	0.0	15.0	0.0	0.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0	0.0	0.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	None	None	Max	None	None	None	None	None	None	None
Act Effct Green (s)	67.8	67.8	89.9	77.9	77.8	97.9	17.9	30.8	52.1	29.2	28.5	39.6
Actuated g/C Ratio	0.45	0.45	0.59	0.51	0.51	0.64	0.12	0.20	0.34	0.19	0.19	0.26
v/c Ratio	1.13	0.69	0.33	0.98	0.93	0.13	0.76	1.15	0.25	0.78	1.44	0.83
Control Delay	136.2	51.6	28.5	94.7	45.1	10.9	78.2	145.7	24.4	78.7	257.8	52.6
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	136.2	51.6	28.5	94.7	45.1	10.9	78.2	145.7	24.4	78.7	257.8	52.6
LOS	F	D	C	F	D	B	E	F	C	E	F	D
Approach Delay		57.6			51.1			103.0			157.5	
Approach LOS		E			D			F			F	

## Intersection Summary

Area Type: Other

Cycle Length: 152

Actuated Cycle Length: 152

Offset: 25 (16%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.44

Intersection Signal Delay: 80.3

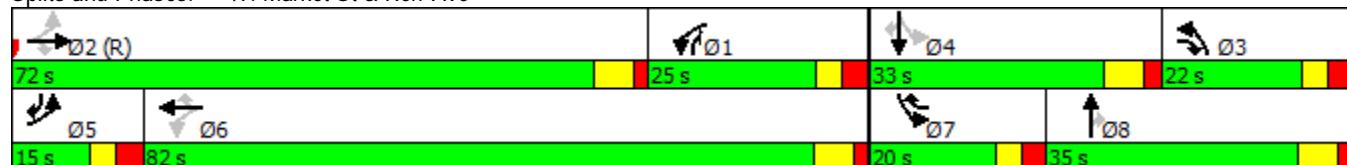
Intersection LOS: F

Intersection Capacity Utilization 97.8%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 49: Market St &amp; Kerr Ave



Lanes, Volumes, Timings  
56: Kerr Ave & Randall Pkwy

9/21/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↓		↑	↑↓		↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	216	603	41	81	425	118	50	467	159	207	496	288
Future Volume (vph)	216	603	41	81	425	118	50	467	159	207	496	288
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	200		0	90		150	150		160
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990			0.967				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3504	0	1770	3422	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.138			0.149			0.440			0.244		
Satd. Flow (perm)	257	3504	0	278	3422	0	820	1863	1583	455	1863	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		892			741			556			3064	
Travel Time (s)		17.4			14.4			8.4			46.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	240	670	46	90	472	131	56	519	177	230	551	320
Shared Lane Traffic (%)												
Lane Group Flow (vph)	240	716	0	90	603	0	56	519	177	230	551	320
Enter Blocked Intersection	No											
Lane Alignment	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							Yes			Yes		
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	1		1	1		1	1	0	1	1	0
Detector Template												
Leading Detector (ft)	40	40		40	40		55	306	0	55	306	0
Trailing Detector (ft)	0	0		0	0		-5	300	0	-5	300	0
Detector 1 Position(ft)	0	0		0	0		-5	300	0	-5	300	0
Detector 1 Size(ft)	40	40		40	40		60	6	20	60	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)	15.0	0.0		15.0	0.0		3.0	0.0	0.0	15.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	7	4		3	8			2	3	1	6	7
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		12.0	12.0	7.0	7.0	12.0	7.0
Minimum Split (s)	12.8	12.8		12.6	12.6		18.1	18.1	12.6	12.9	17.9	12.8
Total Split (s)	20.0	45.0		20.0	45.0		65.0	65.0	20.0	25.0	65.0	20.0



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	12.9%	29.0%		12.9%	29.0%		41.9%	41.9%	12.9%	16.1%	41.9%	12.9%
Maximum Green (s)	14.2	39.2		14.4	39.4		58.9	58.9	14.4	19.1	59.1	14.2
Yellow Time (s)	3.0	3.8		3.0	3.8		4.5	4.5	3.0	3.0	4.5	3.0
All-Red Time (s)	2.8	2.0		2.6	1.8		1.6	1.6	2.6	2.9	1.4	2.8
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	3.8	3.8		3.6	3.6		4.1	4.1	3.6	3.9	3.9	3.8
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lead	Lead		Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		6.0	6.0	2.0	2.0	6.0	2.0
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		10.0	10.0	0.0	0.0	10.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		25.0	25.0	0.0	0.0	25.0	0.0
Recall Mode	None	None		None	None		Max	Max	None	None	Max	None
Act Effct Green (s)	50.4	35.7		42.5	31.1		61.2	61.2	76.8	80.9	80.9	101.0
Actuated g/C Ratio	0.36	0.26		0.30	0.22		0.44	0.44	0.55	0.58	0.58	0.72
v/c Ratio	0.90	0.80		0.43	0.79		0.16	0.64	0.20	0.56	0.51	0.28
Control Delay	69.2	56.5		36.8	59.6		28.1	36.5	17.8	20.5	20.3	8.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.2	56.5		36.8	59.6		28.1	36.5	17.8	20.5	20.3	8.0
LOS	E	E		D	E		C	D	B	C	C	A
Approach Delay		59.7			56.6			31.5			16.8	
Approach LOS		E			E			C			B	

#### Intersection Summary

Area Type: Other

Cycle Length: 155

Actuated Cycle Length: 139.5

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 39.5

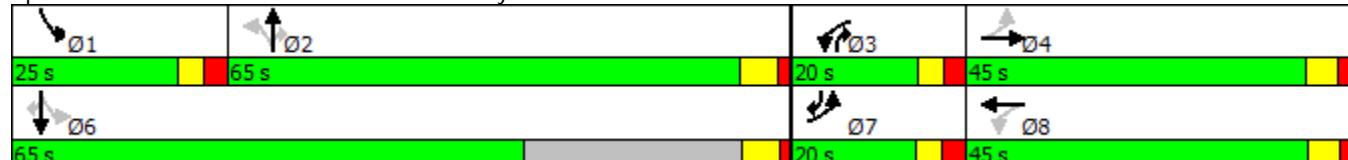
Intersection LOS: D

Intersection Capacity Utilization 77.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 56: Kerr Ave & Randall Pkwy



## Lanes, Volumes, Timings

3: 3rd St &amp; Market St

9/9/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑			↑↑		↑	↑↑		↑	↑↑	
Traffic Volume (vph)	46	131	47	123	77	59	40	380	48	108	600	29
Future Volume (vph)	46	131	47	123	77	59	40	380	48	108	600	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	95		0	150		0	200		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	100			0			100			100		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.961			0.966			0.983			0.993	
Flt Protected	0.950				0.977			0.950			0.950	
Satd. Flow (prot)	1770	3389	0	0	3330	0	1770	3474	0	1770	3512	0
Flt Permitted	0.483				0.732		0.369			0.437		
Satd. Flow (perm)	899	3389	0	0	2494	0	687	3474	0	814	3512	0
Right Turn on Red			No			No			No		No	
Satd. Flow (RTOR)												
Link Speed (mph)		25			35			35			35	
Link Distance (ft)		656			820			581			760	
Travel Time (s)		17.9			16.0			11.3			14.8	
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	51	146	52	137	86	66	44	422	53	120	667	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	198	0	0	289	0	44	475	0	120	699	0
Enter Blocked Intersection	No											
Lane Alignment	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	1		1	1		1	0		1	0	
Detector Template												
Leading Detector (ft)	40	40		65	40		57	0		50	0	
Trailing Detector (ft)	0	0		50	0		-3	0		-10	0	
Detector 1 Position(ft)	0	0		50	0		-3	0		-10	0	
Detector 1 Size(ft)	40	40		15	40		60	6		60	0	
Detector 1 Type	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	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	3.0	0.0		0.0	0.0		10.0	0.0		10.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	10.0		7.0	10.0	

## Lanes, Volumes, Timings

3: 3rd St & Market St

9/9/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	24.0	24.0		12.8	21.9		12.5	24.2		12.6	25.8	
Total Split (s)	27.0	27.0		16.0	43.0		15.0	27.0		20.0	32.0	
Total Split (%)	30.0%	30.0%		17.8%	47.8%		16.7%	30.0%		22.2%	35.6%	
Maximum Green (s)	21.0	21.0		10.2	37.1		9.5	20.8		14.4	26.2	
Yellow Time (s)	3.0	3.0		3.0	4.1		3.1	4.2		3.0	3.8	
All-Red Time (s)	3.0	3.0		2.8	1.8		2.4	2.0		2.6	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0			3.9		3.5	4.2		3.6	3.8	
Lead/Lag	Lag	Lag		Lead			Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		1.0	0.2		1.0	0.2	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)	4.0	4.0			4.0			4.0			4.0	
Flash Dont Walk (s)	14.0	14.0			12.0			14.0			16.0	
Pedestrian Calls (#/hr)	0	0			0			0			0	
Act Effct Green (s)	17.5	17.5			17.6		61.2	51.5		62.9	57.2	
Actuated g/C Ratio	0.19	0.19			0.20		0.68	0.57		0.70	0.64	
v/c Ratio	0.29	0.30			0.59		0.08	0.24		0.18	0.31	
Control Delay	33.9	31.2			38.6		4.8	10.6		5.2	9.6	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	33.9	31.2			38.6		4.8	10.6		5.2	9.6	
LOS	C	C			D		A	B		A	A	
Approach Delay		31.8			38.6			10.1			8.9	
Approach LOS		C			D			B			A	

### Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 70 (78%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 16.8

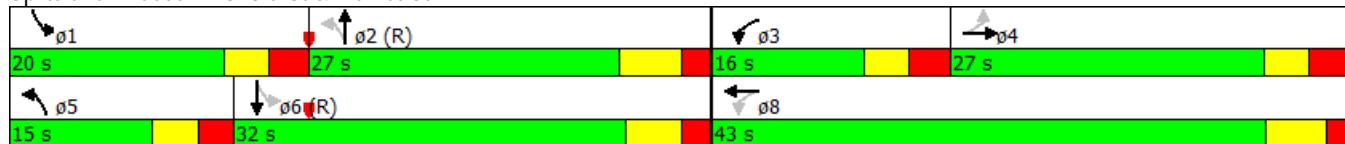
Intersection LOS: B

Intersection Capacity Utilization 50.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: 3rd St & Market St



## Lanes, Volumes, Timings

6: 5th St &amp; Market St

9/9/2015

	↑	→	↓	↗	↖	↙	↖	↑	↗	↖	↓	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑			↑↑			↑↑	
Traffic Volume (vph)	0	353	28	0	346	30	0	145	37	0	86	9
Future Volume (vph)	0	353	28	0	346	30	0	145	37	0	86	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00			1.00			1.00			1.00	
Fr <sub>t</sub>		0.989			0.988			0.970			0.986	
Flt Protected												
Satd. Flow (prot)	0	3497	0	0	3493	0	0	3424	0	0	3485	0
Flt Permitted												
Satd. Flow (perm)	0	3497	0	0	3493	0	0	3424	0	0	3485	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		820			2009			644			690	
Travel Time (s)		16.0			39.1			17.6			18.8	
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	392	31	0	384	33	0	161	41	0	96	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	423	0	0	417	0	0	202	0	0	106	0
Enter Blocked Intersection	No	No	No									
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			0			0	
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			1			1			1	
Detector Template												
Leading Detector (ft)		206			206			40			40	
Trailing Detector (ft)		200			200			0			0	
Detector 1 Position(ft)		200			200			0			0	
Detector 1 Size(ft)		6			6			40			40	
Detector 1 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0			0.0			0.0	
Detector 1 Queue (s)		0.0			0.0			0.0			0.0	
Detector 1 Delay (s)		0.0			0.0			0.0			0.0	
Turn Type		NA			NA			NA			NA	
Protected Phases		2			6			8			4	
Permitted Phases												
Detector Phase		2			6			8			4	
Switch Phase												
Minimum Initial (s)		10.0			10.0			7.0			7.0	
Minimum Split (s)		25.5			26.6			28.7			28.7	
Total Split (s)		59.0			59.0			31.0			31.0	
Total Split (%)		65.6%			65.6%			34.4%			34.4%	

## Lanes, Volumes, Timings

6: 5th St & Market St

9/9/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	53.5				53.4			25.3			25.3	
Yellow Time (s)	3.8				3.9			3.2			3.1	
All-Red Time (s)	1.7				1.7			2.5			2.6	
Lost Time Adjust (s)	-2.0				-2.0			-2.0			-2.0	
Total Lost Time (s)	3.5				3.6			3.7			3.7	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.5				4.5			2.0			2.0	
Minimum Gap (s)	3.0				3.0			3.0			3.0	
Time Before Reduce (s)	10.0				10.0			0.0			0.0	
Time To Reduce (s)	10.0				10.0			0.0			0.0	
Recall Mode	C-Max				C-Max			None			None	
Walk Time (s)	4.0				4.0			4.0			4.0	
Flash Dont Walk (s)	16.0				17.0			19.0			19.0	
Pedestrian Calls (#/hr)	0				0			0			0	
Act Effct Green (s)	71.0				70.9			11.8			11.8	
Actuated g/C Ratio	0.79				0.79			0.13			0.13	
v/c Ratio	0.15				0.15			0.45			0.23	
Control Delay	1.7				2.0			39.0			35.6	
Queue Delay	0.0				0.0			0.0			0.0	
Total Delay	1.7				2.0			39.0			35.6	
LOS	A				A			D			D	
Approach Delay	1.7				2.0			39.0			35.6	
Approach LOS	A				A			D			D	

### Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 32 (36%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 11.5

Intersection LOS: B

Intersection Capacity Utilization 30.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: 5th St & Market St



## Lanes, Volumes, Timings

9: 10th St &amp; Market St

9/9/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	402	7	18	345	22	11	63	30	26	67	7
Future Volume (vph)	13	402	7	18	345	22	11	63	30	26	67	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	100		0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.997			0.992				0.961			0.985
Flt Protected		0.999			0.998			0.995		0.950		
Satd. Flow (prot)	0	3525	0	0	3504	0	0	1781	0	1770	1835	0
Flt Permitted		0.940			0.926			0.960		0.533		
Satd. Flow (perm)	0	3317	0	0	3251	0	0	1718	0	993	1835	0
Right Turn on Red			No			No			No		No	
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		2009			900			828			513	
Travel Time (s)		39.1			17.5			22.6			14.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	14	447	8	20	383	24	12	70	33	29	74	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	469	0	0	427	0	0	115	0	29	82	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			0			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	1		1	1		1	1		1	1	
Detector Template	Left			Left			Left					
Leading Detector (ft)	20	76		20	76		20	33		55	55	
Trailing Detector (ft)	0	70		0	70		0	-2		-5	-5	
Detector 1 Position(ft)	0	70		0	70		0	-2		-5	-5	
Detector 1 Size(ft)	20	6		20	6		20	35		60	60	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
Turn Type	Perm	NA										
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	15.6	15.6		15.4	15.4		12.9	12.9		13.0	13.0	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	

# Lanes, Volumes, Timings

9: 10th St & Market St

9/9/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	54.4	54.4		54.6	54.6		24.1	24.1		24.0	24.0	
Yellow Time (s)	4.1	4.1		3.6	3.6		3.1	3.1		3.2	3.2	
All-Red Time (s)	1.5	1.5		1.8	1.8		2.8	2.8		2.8	2.8	
Lost Time Adjust (s)	-2.0			-2.0			-2.0			-2.0	-2.0	
Total Lost Time (s)		3.6			3.4			3.9		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)		73.2			73.3			12.6		12.6	12.6	
Actuated g/C Ratio		0.81			0.81			0.14		0.14	0.14	
v/c Ratio		0.17			0.16			0.48		0.21	0.32	
Control Delay		3.3			2.9			41.6		36.6	37.3	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		3.3			2.9			41.6		36.6	37.3	
LOS		A			A			D		D	D	
Approach Delay		3.3			2.9			41.6			37.1	
Approach LOS		A			A			D			D	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 78 (87%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.48

Intersection Signal Delay: 10.4

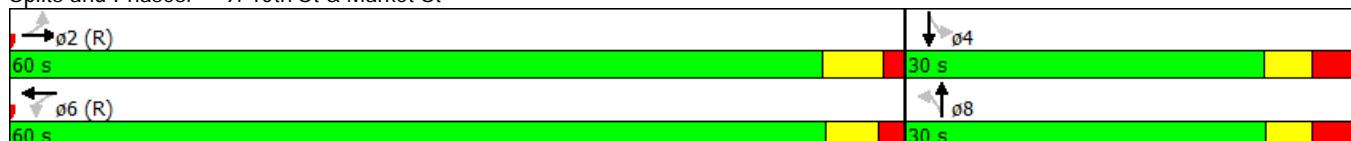
Intersection LOS: B

Intersection Capacity Utilization 42.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 9: 10th St & Market St



## Lanes, Volumes, Timings

14: 16th St &amp; Market St

9/9/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↓		↑	↑↓					↑↓	↑↓	
Traffic Volume (vph)	0	577	189	426	567	0	0	0	0	97	686	18
Future Volume (vph)	0	577	189	426	567	0	0	0	0	97	686	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	150		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor		1.00									1.00	
Frt		0.963									0.997	
Flt Protected				0.950							0.994	
Satd. Flow (prot)	0	3396	0	1770	3539	0	0	0	0	0	3506	0
Flt Permitted				0.155							0.994	
Satd. Flow (perm)	0	3396	0	289	3539	0	0	0	0	0	3506	0
Right Turn on Red			No			No			No		No	
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1473			369			549			1165	
Travel Time (s)		28.7			7.2			10.7			22.7	
Confl. Peds. (#/hr)			1	1						1		1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	641	210	473	630	0	0	0	0	108	762	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	851	0	473	630	0	0	0	0	0	890	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)		12			12			0			0	
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		1	1					1	1	
Detector Template										Left		
Leading Detector (ft)		206			40	206				20	40	
Trailing Detector (ft)		200		0	200					0	0	
Detector 1 Position(ft)		200		0	200					0	0	
Detector 1 Size(ft)		6		40	6					20	40	
Detector 1 Type		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	
Detector 1 Queue (s)		0.0		0.0	0.0					0.0	0.0	
Detector 1 Delay (s)		0.0		15.0	0.0					0.0	5.0	
Turn Type	NA		pm+pt	NA					Perm	NA		
Protected Phases	2		1	6							4	
Permitted Phases			6							4		
Detector Phase	2		1	6						4	4	
Switch Phase												
Minimum Initial (s)		10.0		7.0	8.0					7.0	7.0	

# Lanes, Volumes, Timings

14: 16th St & Market St

9/9/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	17.1			12.1	13.3					23.7	23.7	
Total Split (s)	32.0			28.0	60.0					30.0	30.0	
Total Split (%)	35.6%			31.1%	66.7%					33.3%	33.3%	
Maximum Green (s)	26.9			22.9	54.7					24.3	24.3	
Yellow Time (s)	3.8			3.0	4.0					3.8	3.8	
All-Red Time (s)	1.3			2.1	1.3					1.9	1.9	
Lost Time Adjust (s)	-2.0			-2.0	-2.0					-2.0		
Total Lost Time (s)	3.1			3.1	3.3					3.7		
Lead/Lag	Lead			Lag								
Lead-Lag Optimize?	Yes			Yes								
Vehicle Extension (s)	6.0			2.0	6.0					5.0	5.0	
Minimum Gap (s)	2.5			3.0	2.5					2.5	2.5	
Time Before Reduce (s)	10.0			0.0	10.0					0.0	0.0	
Time To Reduce (s)	15.0			0.0	15.0					10.0	10.0	
Recall Mode	C-Max			None	C-Max					None	None	
Walk Time (s)	4.0				4.0					4.0	4.0	
Flash Dont Walk (s)	8.0				4.0					14.0	14.0	
Pedestrian Calls (#/hr)	0				0					0	0	
Act Effct Green (s)	29.0			57.0	56.8					26.2		
Actuated g/C Ratio	0.32			0.63	0.63					0.29		
v/c Ratio	0.78			0.80	0.28					0.87		
Control Delay	36.9			26.0	1.3					27.7		
Queue Delay	0.0			52.8	0.2					0.0		
Total Delay	36.9			78.8	1.5					27.7		
LOS	D			E	A					C		
Approach Delay	36.9				34.7					27.7		
Approach LOS				D			C			C		

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 58 (64%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 33.2

Intersection LOS: C

Intersection Capacity Utilization 78.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 14: 16th St & Market St



Lanes, Volumes, Timings  
17: 17th St & Market St

9/9/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑		↑	↑↑	↑			
Traffic Volume (vph)	21	667	0	0	880	43	128	917	514	0	0	0
Future Volume (vph)	21	667	0	0	880	43	128	917	514	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor					1.00		1.00		0.99			
Fr <sub>t</sub>					0.993				0.850			
Flt Protected		0.998					0.950					
Satd. Flow (prot)	0	3532	0	0	3512	0	1770	3539	1583	0	0	0
Flt Permitted		0.905					0.950					
Satd. Flow (perm)	0	3203	0	0	3512	0	1767	3539	1562	0	0	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35		35		35			
Link Distance (ft)		369			1854		597		1164			
Travel Time (s)		7.2			36.1		11.6		22.7			
Confl. Peds. (#/hr)	1					1	1		1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	23	741	0	0	978	48	142	1019	571	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	764	0	0	1026	0	142	1019	571	0	0	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)		12			0		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	0			0		1	1	1			
Detector Template	Left											
Leading Detector (ft)	20	0			0		40	40	40			
Trailing Detector (ft)	0	0			0		0	0	0			
Detector 1 Position(ft)	0	0			0		0	0	0			
Detector 1 Size(ft)	20	6			6		40	40	40			
Detector 1 Type	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			
Detector 1 Queue (s)	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	15.0			
Turn Type	Perm	NA			NA		Perm	NA	Perm			
Protected Phases		2			6			8				
Permitted Phases	2						8		8			
Detector Phase	2	2			6		8	8	8			
Switch Phase												
Minimum Initial (s)	10.0	10.0			10.0		7.0	7.0	7.0			
Minimum Split (s)	21.4	21.4			21.2		26.4	26.4	26.4			
Total Split (s)	45.0	45.0			45.0		45.0	45.0	45.0			
Total Split (%)	50.0%	50.0%			50.0%		50.0%	50.0%	50.0%			

# Lanes, Volumes, Timings

17: 17th St & Market St

9/9/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	39.6	39.6			39.8		39.6	39.6	39.6			
Yellow Time (s)	3.8	3.8			3.8		3.9	3.9	3.9			
All-Red Time (s)	1.6	1.6			1.4		1.5	1.5	1.5			
Lost Time Adjust (s)		-2.0			-2.0		-2.0	-2.0	-2.0			
Total Lost Time (s)		3.4			3.2		3.4	3.4	3.4			
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	0.2	0.2			0.2		2.0	2.0	2.0			
Recall Mode	C-Max	C-Max			C-Max		None	None	None			
Walk Time (s)	4.0	4.0			4.0		4.0	4.0	4.0			
Flash Dont Walk (s)	12.0	12.0			12.0		17.0	17.0	17.0			
Pedestrian Calls (#/hr)	0	0			0		0	0	0			
Act Effct Green (s)	44.8				45.0		38.4	38.4	38.4			
Actuated g/C Ratio	0.50				0.50		0.43	0.43	0.43			
v/c Ratio	0.48				0.58		0.19	0.67	0.86			
Control Delay	2.0				22.2		15.8	22.9	36.9			
Queue Delay	0.1				0.0		0.0	0.0	0.0			
Total Delay	2.1				22.2		15.8	22.9	36.9			
LOS	A				C		B	C	D			
Approach Delay	2.1				22.2			27.0				
Approach LOS	A				C			C				

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 55 (61%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 20.2

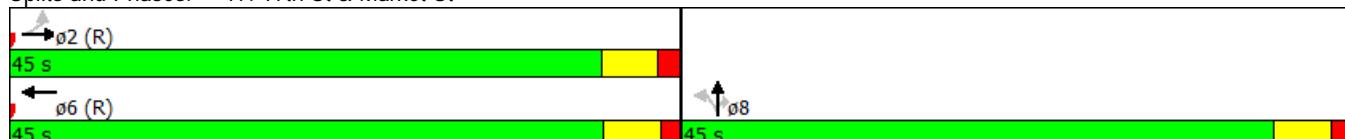
Intersection LOS: C

Intersection Capacity Utilization 65.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 17: 17th St & Market St



## Lanes, Volumes, Timings

23: Market St &amp; 23rd St

9/9/2015



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↖	
Traffic Volume (vph)	45	1061	918	105	231	76
Future Volume (vph)	45	1061	918	105	231	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor					1.00	
Frt			0.985		0.967	
Flt Protected		0.998			0.964	
Satd. Flow (prot)	0	3532	3486	0	1730	0
Flt Permitted		0.852			0.964	
Satd. Flow (perm)	0	3015	3486	0	1730	0
Right Turn on Red				No	No	
Satd. Flow (RTOR)						
Link Speed (mph)		35	35		35	
Link Distance (ft)		993	944		1214	
Travel Time (s)		19.3	18.4		23.6	
Confl. Peds. (#/hr)					1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	50	1179	1020	117	257	84
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1229	1137	0	341	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	1	1		1	
Detector Template	Left					
Leading Detector (ft)	20	76	81		68	
Trailing Detector (ft)	0	70	75		-2	
Detector 1 Position(ft)	0	70	75		-2	
Detector 1 Size(ft)	20	6	6		70	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		10.0	
Turn Type	Perm	NA	NA		Prot	
Protected Phases		2	6		4	
Permitted Phases	2					
Detector Phase	2	2	6		4	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		7.0	
Minimum Split (s)	14.9	14.9	15.1		15.8	
Total Split (s)	60.0	60.0	60.0		30.0	
Total Split (%)	66.7%	66.7%	66.7%		33.3%	

# Lanes, Volumes, Timings

## 23: Market St & 23rd St

9/9/2015



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Maximum Green (s)	55.1	55.1	54.9		25.2	
Yellow Time (s)	3.7	3.7	3.9		3.0	
All-Red Time (s)	1.2	1.2	1.2		1.8	
Lost Time Adjust (s)		-2.0	-2.0		-2.0	
Total Lost Time (s)		2.9	3.1		2.8	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		2.0	
Recall Mode	C-Max	C-Max	C-Max		None	
Walk Time (s)					4.0	
Flash Dont Walk (s)					7.0	
Pedestrian Calls (#/hr)					0	
Act Effct Green (s)	61.2	61.0		23.1		
Actuated g/C Ratio	0.68	0.68		0.26		
v/c Ratio	0.60	0.48		0.77		
Control Delay	8.7	6.1		42.5		
Queue Delay	0.0	0.0		0.0		
Total Delay	8.7	6.1		42.5		
LOS	A	A		D		
Approach Delay	8.7	6.1		42.5		
Approach LOS	A	A		D		

### Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 28 (31%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 45

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 11.9

Intersection LOS: B

Intersection Capacity Utilization 86.5%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 23: Market St & 23rd St



Lanes, Volumes, Timings  
25: Forest Hills Dr & Market St

9/9/2015



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↓		↖↑	↖	↗	
Traffic Volume (vph)	1246	107	79	988	115	55
Future Volume (vph)	1246	107	79	988	115	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor					1.00	
Frt	0.988				0.956	
Flt Protected				0.996	0.967	
Satd. Flow (prot)	3497	0	0	3525	1714	0
Flt Permitted				0.691	0.967	
Satd. Flow (perm)	3497	0	0	2446	1714	0
Right Turn on Red		No			No	
Satd. Flow (RTOR)						
Link Speed (mph)	35			35	25	
Link Distance (ft)	944			866	959	
Travel Time (s)	18.4			16.9	26.2	
Confl. Peds. (#/hr)					1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1384	119	88	1098	128	61
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1503	0	0	1186	189	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	1		1	1	1	
Detector Template			Left			
Leading Detector (ft)	76		20	76	40	
Trailing Detector (ft)	70		0	70	0	
Detector 1 Position(ft)	70		0	70	0	
Detector 1 Size(ft)	6		20	6	40	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	5.0	
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Detector Phase	2		6	6	8	
Switch Phase						
Minimum Initial (s)	9.0		8.0	8.0	7.0	
Minimum Split (s)	14.4		12.8	12.8	20.3	
Total Split (s)	67.0		67.0	67.0	23.0	
Total Split (%)	74.4%		74.4%	74.4%	25.6%	



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Maximum Green (s)	61.6		62.2	62.2	17.7	
Yellow Time (s)	3.8		3.8	3.8	3.0	
All-Red Time (s)	1.6		1.0	1.0	2.3	
Lost Time Adjust (s)	-2.0			-2.0	-2.0	
Total Lost Time (s)	3.4			2.8	3.3	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	2.0	
Recall Mode	C-Max		C-Max	C-Max	None	
Walk Time (s)					4.0	
Flash Dont Walk (s)					11.0	
Pedestrian Calls (#/hr)					0	
Act Effct Green (s)	67.5		68.1	15.8		
Actuated g/C Ratio	0.75		0.76	0.18		
v/c Ratio	0.57		0.64	0.63		
Control Delay	4.1		7.7	43.6		
Queue Delay	0.0		0.0	0.0		
Total Delay	4.1		7.7	43.6		
LOS	A		A	D		
Approach Delay	4.1		7.7	43.6		
Approach LOS	A		A	D		

#### Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 24 (27%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 8.2

Intersection LOS: A

Intersection Capacity Utilization 87.3%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 25: Forest Hills Dr & Market St



Lanes, Volumes, Timings  
28: 23rd St & Princess Pl

9/9/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑		↑	↑	↑	↑	↑		↑	↑	↑
Traffic Volume (vph)	321	368	105	53	374	243	178	252	72	87	654	437
Future Volume (vph)	321	368	105	53	374	243	178	252	72	87	654	437
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	275			0	160		100	50		0	180	160
Storage Lanes	1			0	1		1	1		0	1	1
Taper Length (ft)	100				100			100			100	
Lane Util. 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
Frt		0.967				0.850			0.967			0.850
Flt Protected	0.950				0.950			0.950			0.950	
Satd. Flow (prot)	1770	1801	0	1770	1863	1583	1770	1801	0	1770	1863	1583
Flt Permitted	0.133				0.469			0.237			0.197	
Satd. Flow (perm)	248	1801	0	874	1863	1583	441	1801	0	367	1863	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1312			1183			857			783	
Travel Time (s)		25.6			23.0			16.7			15.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	357	409	117	59	416	270	198	280	80	97	727	486
Shared Lane Traffic (%)												
Lane Group Flow (vph)	357	526	0	59	416	270	198	360	0	97	727	486
Enter Blocked Intersection	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	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	pm+ov
Protected Phases	5	2			6			8		7	4	5
Permitted Phases	2			6		6	8			4		4
Minimum Split (s)	12.4	15.4		15.8	15.8	15.8	12.1	12.1		12.8	12.5	12.4
Total Split (s)	140.0	30.0		30.0	30.0	30.0	20.0	20.0		20.0	20.0	140.0
Total Split (%)	66.7%	14.3%		14.3%	14.3%	14.3%	9.5%	9.5%		9.5%	9.5%	66.7%
Maximum Green (s)	134.6	24.6		24.2	24.2	24.2	14.9	14.9		14.2	14.5	134.6
Yellow Time (s)	3.0	3.8		4.0	4.0	4.0	3.8	3.8		3.0	4.0	3.0
All-Red Time (s)	2.4	1.6		1.8	1.8	1.8	1.3	1.3		2.8	1.5	2.4
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	3.4	3.4		3.8	3.8	3.8	3.1	3.1		3.8	3.5	3.4
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead		Lead
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes		Yes
Act Effct Green (s)	166.6	166.6		26.2	26.2	26.2	16.9	16.9		36.2	36.5	176.6
Actuated g/C Ratio	0.79	0.79		0.12	0.12	0.12	0.08	0.08		0.17	0.17	0.84
v/c Ratio	0.30	0.37		0.54	1.79	1.37	5.66	2.50		0.57	2.25	0.37
Control Delay	9.5	7.2		105.7	417.0	256.0	2168.2	725.1		89.6	604.6	4.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	9.5	7.2		105.7	417.0	256.0	2168.2	725.1		89.6	604.6	4.7

# Lanes, Volumes, Timings

28: 23rd St & Princess Pl

9/9/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	A	A		F	F	F	F	F	F	F	F	A
Approach Delay		8.1			334.0			1237.1			343.9	
Approach LOS		A			F			F			F	

## Intersection Summary

Area Type: Other

Cycle Length: 210

Actuated Cycle Length: 210

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

Natural Cycle: 75

Control Type: Pretimed

Maximum v/c Ratio: 5.66

Intersection Signal Delay: 399.6

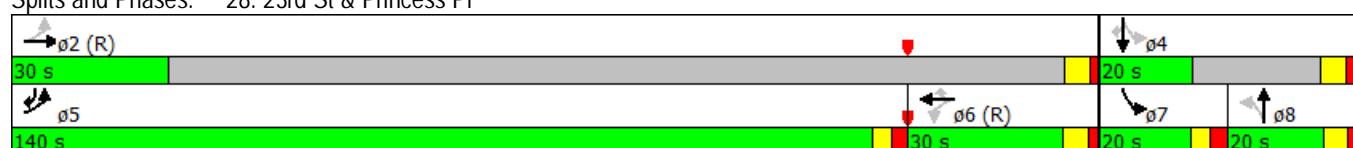
Intersection LOS: F

Intersection Capacity Utilization 95.1%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 28: 23rd St & Princess Pl



## Lanes, Volumes, Timings

33: Covil Ave/Montgomery Ave &amp; Market St

9/9/2015

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↓		↑	↑↓		↑	↑	↑	↑	↑	
Traffic Volume (vph)	115	2044	437	509	2193	80	441	94	686	127	98	98
Future Volume (vph)	115	2044	437	509	2193	80	441	94	686	127	98	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	600		0	0		0	0		0
Storage Lanes	1		0	1		0	0		1	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.974			0.995				0.850		0.925	
Flt Protected	0.950			0.950				0.960		0.950		
Satd. Flow (prot)	1770	3447	0	1770	3522	0	0	1788	1583	1770	1723	0
Flt Permitted	0.069			0.065				0.482		0.087		
Satd. Flow (perm)	129	3447	0	121	3522	0	0	898	1583	162	1723	0
Right Turn on Red			No			No			No		No	
Satd. Flow (RTOR)												
Link Speed (mph)		40			40			35			25	
Link Distance (ft)		2438			3526			759			597	
Travel Time (s)		41.6			60.1			14.8			16.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	128	2271	486	566	2437	89	490	104	762	141	109	109
Shared Lane Traffic (%)												
Lane Group Flow (vph)	128	2757	0	566	2526	0	0	594	762	141	218	0
Enter Blocked Intersection	No											
Lane Alignment	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		Yes			Yes							
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	1	1	1	1	1
Detector Template							Left					
Leading Detector (ft)	60	256		60	256		20	35	60	35	55	
Trailing Detector (ft)	0	80		0	80		0	-5	0	-5	-5	
Detector 1 Position(ft)	0	80		0	80		0	-5	0	-5	-5	
Detector 1 Size(ft)	60	6		60	6		20	40	60	40	60	
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		15.0	0.0		0.0	3.0	15.0	3.0	15.0	
Detector 2 Position(ft)		250			250							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		1.3			1.3							
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases		2		1	6			8	1		4	
Permitted Phases		2		6			8		8	4		

## Lanes, Volumes, Timings

33: Covil Ave/Montgomery Ave & Market St

9/9/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		1	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	16.0	16.0		12.3	15.8		12.8	12.8	12.3	13.1	13.1	
Total Split (s)	62.0	62.0		40.0	102.0		50.0	50.0	40.0	50.0	50.0	
Total Split (%)	40.8%	40.8%		26.3%	67.1%		32.9%	32.9%	26.3%	32.9%	32.9%	
Maximum Green (s)	56.0	56.0		34.7	96.2		44.2	44.2	34.7	43.9	43.9	
Yellow Time (s)	4.2	4.2		3.0	4.2		3.8	3.8	3.0	3.6	3.6	
All-Red Time (s)	1.8	1.8		2.3	1.6		2.0	2.0	2.3	2.5	2.5	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		3.3	3.8		3.8	3.8	3.3	4.1	4.1	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?	Yes	Yes		Yes					Yes			
Vehicle Extension (s)	3.0	3.0		1.0	3.0		1.0	1.0	1.0	1.0	1.0	
Recall Mode	C-Max	C-Max		None	C-Max		None	None	None	None	None	
Act Effct Green (s)	58.0	58.0		98.7	98.2		46.2	86.7	45.9	45.9		
Actuated g/C Ratio	0.38	0.38		0.65	0.65		0.30	0.57	0.30	0.30		
v/c Ratio	2.61	2.10		1.19	1.11		2.18	0.84	2.94	0.42		
Control Delay	801.9	521.7		140.5	82.6		570.6	37.6	945.0	45.4		
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		
Total Delay	801.9	521.7		140.5	82.6		570.6	37.6	945.0	45.4		
LOS	F	F		F	F			F	D	F	D	
Approach Delay		534.1			93.2			271.1			398.8	
Approach LOS		F			F			F			F	

### Intersection Summary

Area Type: Other

Cycle Length: 152

Actuated Cycle Length: 152

Offset: 5 (3%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 2.94

Intersection Signal Delay: 304.2

Intersection LOS: F

Intersection Capacity Utilization 152.6%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 33: Covil Ave/Montgomery Ave & Market St



## Lanes, Volumes, Timings

38: 16th St &amp; Grace St

9/9/2015

	↑	→	↓	↗	↖	↙	↖	↗	↑	↗	↖	↓	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑	↑	↑							↑↑		
Traffic Volume (vph)	0	60	61	476	0	0	0	0	0	100	158	0	
Future Volume (vph)	0	60	61	476	0	0	0	0	0	100	158	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		150	0		0	0		0	0	0	0	
Storage Lanes	0		1	1		0	0		0	0	0	0	
Taper Length (ft)	100			100			100			100			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	
Fr <sub>t</sub>				0.850									
Flt Protected					0.950						0.981		
Satd. Flow (prot)	0	1863	1583	1770	0	0	0	0	0	0	3472	0	
Flt Permitted					0.090						0.981		
Satd. Flow (perm)	0	1863	1583	168	0	0	0	0	0	0	3472	0	
Right Turn on Red				No			No			No		No	
Satd. Flow (RTOR)													
Link Speed (mph)		35			35			35			35		
Link Distance (ft)		511			350			1165			463		
Travel Time (s)		10.0			6.8			22.7			9.0		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	0	67	68	529	0	0	0	0	0	111	176	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	67	68	529	0	0	0	0	0	0	287	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)		12			12			0			0		
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	1	0						1	1		
Detector Template										Left			
Leading Detector (ft)		40	40	0						20	40		
Trailing Detector (ft)		0	0	0						0	0		
Detector 1 Position(ft)		0	0	0						0	0		
Detector 1 Size(ft)		40	40	20						20	40		
Detector 1 Type	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		
Detector 1 Queue (s)	0.0	0.0	0.0							0.0	0.0		
Detector 1 Delay (s)	0.0	15.0	0.0							0.0	0.0		
Turn Type	NA	Perm	Perm							Perm	NA		
Protected Phases		4									6		
Permitted Phases			4	3							6		
Detector Phase		4	4	3							6	6	
Switch Phase													
Minimum Initial (s)		7.0	7.0	7.0						7.0	7.0		
Minimum Split (s)		11.8	11.8	11.8						11.8	11.8		
Total Split (s)		20.0	20.0	47.0						23.0	23.0		

## Lanes, Volumes, Timings

38: 16th St & Grace St

9/9/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	22.2%	22.2%	52.2%							25.6%	25.6%	
Maximum Green (s)	15.2	15.2	42.2							18.2	18.2	
Yellow Time (s)	3.8	3.8	3.0							3.8	3.8	
All-Red Time (s)	1.0	1.0	1.8							1.0	1.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0							-2.0		
Total Lost Time (s)	2.8	2.8	2.8							2.8		
Lead/Lag	Lag	Lag	Lead									
Lead-Lag Optimize?	Yes	Yes	Yes									
Vehicle Extension (s)	3.0	3.0	3.0							3.0	3.0	
Recall Mode	None	None	Max							C-Max	C-Max	
Act Effct Green (s)	11.5	11.5	44.2							28.3		
Actuated g/C Ratio	0.13	0.13	0.49							0.31		
v/c Ratio	0.28	0.34	6.45							0.26		
Control Delay	37.8	39.7	2477.8							25.5		
Queue Delay	0.0	0.0	0.0							0.0		
Total Delay	37.8	39.7	2477.8							25.5		
LOS	D	D	F							C		
Approach Delay	38.7									25.5		
Approach LOS	D									C		

### Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 60 (67%), Referenced to phase 6:SBTL, Start of Green

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 6.45

Intersection Signal Delay: 1391.5

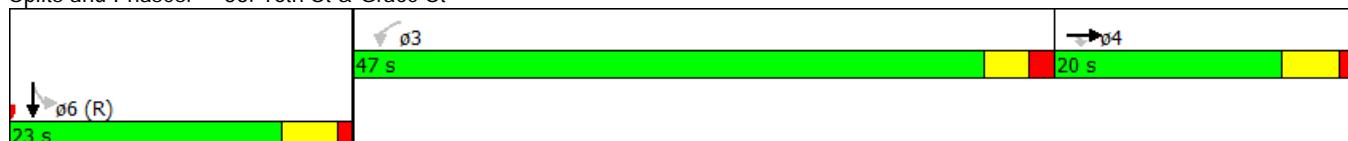
Intersection LOS: F

Intersection Capacity Utilization 66.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 38: 16th St & Grace St



Lanes, Volumes, Timings  
39: 17th St & Grace St/Princess Pl

9/9/2015

	↑	→	↓	↗	↖	↙	↖	↗	↑	↗	↖	↓	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑			↑	↖		↑	↖				
Traffic Volume (vph)	0	174	0	0	552	170	8	204	811	0	0	0	
Future Volume (vph)	0	174	0	0	552	170	8	204	811	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		225	0		0	0	0	0	
Storage Lanes	0		0	0		1	0		1	0		0	
Taper Length (ft)	100			100			100			100			
Lane Util. 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	
Frt						0.850				0.850			
Flt Protected									0.998				
Satd. Flow (prot)	0	1863	0	0	1863	1583	0	1859	1583	0	0	0	
Flt Permitted									0.998				
Satd. Flow (perm)	0	1863	0	0	1863	1583	0	1859	1583	0	0	0	
Right Turn on Red			No			No			No			No	
Satd. Flow (RTOR)													
Link Speed (mph)		35			35			35			35		
Link Distance (ft)		350			720			1164			324		
Travel Time (s)		6.8			14.0			22.7			6.3		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	0	193	0	0	613	189	9	227	901	0	0	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	193	0	0	613	189	0	236	901	0	0	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)		0			0			0			0		
Link Offset(ft)		0			-12			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	1			1	0	1	1	1				
Detector Template	Left						Left						
Leading Detector (ft)	20	40			40	0	20	40	40				
Trailing Detector (ft)	0	0			0	0	0	0	0				
Detector 1 Position(ft)	0	0			0	0	0	0	0				
Detector 1 Size(ft)	20	40			40	20	20	40	40				
Detector 1 Type	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				
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0				
Detector 1 Delay (s)	0.0	3.0			0.0	0.0	0.0	0.0	0.0				
Turn Type		NA			NA	Perm	Perm	NA	Perm				
Protected Phases		4				8			2				
Permitted Phases	4					8	2		2				
Detector Phase	4	4			8	8	2	2	2				
Switch Phase													
Minimum Initial (s)	7.0	7.0			7.0	7.0	7.0	7.0	7.0				
Minimum Split (s)	12.4	12.4			12.0	12.0	12.2	12.2	12.2				
Total Split (s)	42.0	42.0			42.0	42.0	48.0	48.0	48.0				

Lanes, Volumes, Timings  
39: 17th St & Grace St/Princess Pl

9/9/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	46.7%	46.7%			46.7%	46.7%	53.3%	53.3%	53.3%			
Maximum Green (s)	36.6	36.6			37.0	37.0	42.8	42.8	42.8			
Yellow Time (s)	3.8	3.8			3.7	3.7	3.8	3.8	3.8			
All-Red Time (s)	1.6	1.6			1.3	1.3	1.4	1.4	1.4			
Lost Time Adjust (s)	-2.0				-2.0	-2.0		-2.0	-2.0			
Total Lost Time (s)		3.4			3.0	3.0		3.2	3.2			
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0			
Recall Mode	None	None			Max	Max	C-Max	C-Max	C-Max			
Act Effct Green (s)		38.6			39.0	39.0		44.8	44.8			
Actuated g/C Ratio		0.43			0.43	0.43		0.50	0.50			
v/c Ratio		0.24			0.76	0.28		0.26	1.14			
Control Delay		12.3			29.0	17.8		6.0	98.2			
Queue Delay		0.0			0.0	0.0		0.0	0.0			
Total Delay		12.3			29.0	17.8		6.0	98.2			
LOS		B			C	B		A	F			
Approach Delay		12.3			26.4			79.0				
Approach LOS		B			C			E				

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 18 (20%), Referenced to phase 2:NBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.14

Intersection Signal Delay: 53.2

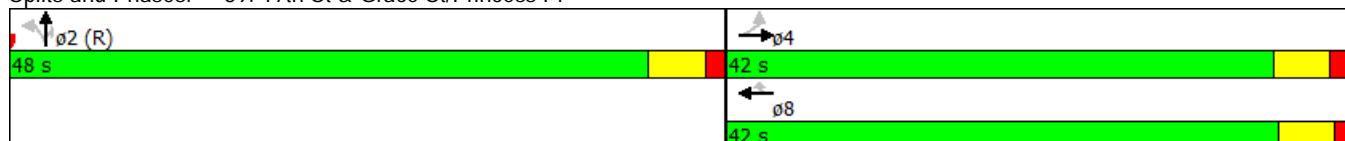
Intersection LOS: D

Intersection Capacity Utilization 66.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 39: 17th St & Grace St/Princess Pl



## Lanes, Volumes, Timings

44: Kerr Ave &amp; MLK Blvd

9/9/2015

	↑	→	↓	↗	↖	↙	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑↑	↑	↑	↑↑↑	↑	↑	↑↑↑	↑	↑	↑↑↑	↑
Traffic Volume (vph)	480	2166	444	234	1281	176	326	633	249	93	580	211
Future Volume (vph)	480	2166	444	234	1281	176	326	633	249	93	580	211
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		360	365		200	270		130	280		125
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Fr <sub>t</sub>			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.950			0.950			0.140			0.204		
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	261	3539	1583	380	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		55			55			45			45	
Link Distance (ft)		1466			1826			427			690	
Travel Time (s)		18.2			22.6			6.5			10.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	533	2407	493	260	1423	196	362	703	277	103	644	234
Shared Lane Traffic (%)												
Lane Group Flow (vph)	533	2407	493	260	1423	196	362	703	277	103	644	234
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		28			28			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
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	1	0	1	1	0	1	1	1	1	1	1
Detector Template												
Leading Detector (ft)	40	426	0	40	426	0	40	40	40	40	40	40
Trailing Detector (ft)	0	420	0	0	420	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	420	0	0	420	0	0	0	0	0	0	0
Detector 1 Size(ft)	40	6	20	40	6	20	40	40	40	40	40	40
Detector 1 Type	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	15.0	0.0	15.0	15.0	0.0	15.0
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8	1	7	4	5
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	3	1	6	7	3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	14.0	7.0	7.0	14.0	7.0	7.0	12.0	7.0	7.0	12.0	7.0
Minimum Split (s)	13.3	20.3	12.9	13.3	20.3	12.9	12.9	18.5	13.3	12.9	18.3	13.3
Total Split (s)	40.0	56.0	22.0	30.0	46.0	16.0	22.0	50.0	30.0	16.0	44.0	40.0

## Lanes, Volumes, Timings

44: Kerr Ave &amp; MLK Blvd

9/9/2015

Lane Group	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	26.3%	36.8%	14.5%	19.7%	30.3%	10.5%	14.5%	32.9%	19.7%	10.5%	28.9%	26.3%
Maximum Green (s)	33.7	49.7	16.1	23.7	39.7	10.1	16.1	43.5	23.7	10.1	37.7	33.7
Yellow Time (s)	3.0	5.2	3.0	3.0	5.2	3.0	3.0	4.6	3.0	3.0	4.3	3.0
All-Red Time (s)	3.3	1.1	2.9	3.3	1.1	2.9	2.9	1.9	3.3	2.9	2.0	3.3
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.3	4.3	3.9	4.3	4.3	3.9	3.9	4.5	4.3	3.9	4.3	4.3
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes											
Vehicle Extension (s)	2.0	6.0	2.0	2.0	6.0	2.0	2.0	6.0	2.0	2.0	6.0	2.0
Minimum Gap (s)	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Time Before Reduce (s)	0.0	15.0	0.0	0.0	15.0	0.0	0.0	15.0	0.0	0.0	15.0	0.0
Time To Reduce (s)	0.0	50.0	0.0	0.0	50.0	0.0	0.0	30.0	0.0	0.0	30.0	0.0
Recall Mode	None	C-Max	None	None	C-Max	None						
Act Effct Green (s)	35.7	55.1	77.5	25.5	44.9	56.8	58.9	42.9	72.9	48.4	36.5	72.2
Actuated g/C Ratio	0.23	0.36	0.51	0.17	0.30	0.37	0.39	0.28	0.48	0.32	0.24	0.48
v/c Ratio	1.28	1.31	0.61	0.88	0.95	0.33	1.29	0.70	0.36	0.46	0.76	0.31
Control Delay	190.7	180.8	31.5	89.8	65.8	19.2	171.5	39.4	26.5	36.7	59.8	14.6
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	190.7	180.8	31.5	89.8	65.8	19.2	171.5	39.4	26.5	36.7	59.8	14.6
LOS	F	F	C	F	E	B	F	D	C	D	E	B
Approach Delay				160.9			64.3			72.4		46.6
Approach LOS				F			E			E		D

## Intersection Summary

Area Type: Other

Cycle Length: 152

Actuated Cycle Length: 152

Offset: 105 (69%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 130

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.31

Intersection Signal Delay: 106.9

Intersection LOS: F

Intersection Capacity Utilization 103.0%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 44: Kerr Ave &amp; MLK Blvd



## Lanes, Volumes, Timings

49: Market St &amp; Kerr Ave

9/9/2015

	↑	→	↓	↗	↖	↙	↖	↗	↑	↗	↖	↓	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑	↑	
Traffic Volume (vph)	363	1585	431	436	1412	225	298	384	176	231	470	260	
Future Volume (vph)	363	1585	431	436	1412	225	298	384	176	231	470	260	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	70		0	225		0	0		0	420		375	
Storage Lanes	1		1	1		1	2		1	1		1	
Taper Length (ft)	70			180			100			100			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00	
Frt			0.850			0.850			0.850			0.850	
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	3433	1863	1583	1770	1863	1583	
Flt Permitted	0.095			0.095			0.950			0.301			
Satd. Flow (perm)	177	3539	1583	177	3539	1583	3433	1863	1583	561	1863	1583	
Right Turn on Red			No			No			No			No	
Satd. Flow (RTOR)													
Link Speed (mph)		40			40			35			45		
Link Distance (ft)		905			1376			407			2922		
Travel Time (s)		15.4			23.5			7.9			44.3		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	403	1761	479	484	1569	250	331	427	196	257	522	289	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	403	1761	479	484	1569	250	331	427	196	257	522	289	
Enter Blocked Intersection	No												
Lane Alignment	Left	Left	Right										
Median Width(ft)		12			12			24			12		
Link Offset(ft)		0			0			0			0		
Crosswalk Width(ft)		16			16			16			16		
Two way Left Turn Lane		Yes			Yes						Yes		
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	1	0	1	1	0	1	1	1	1	1	1	
Detector Template													
Leading Detector (ft)	40	306	0	40	306	0	40	40	40	35	40	40	
Trailing Detector (ft)	0	300	0	0	300	0	0	0	0	-5	0	0	
Detector 1 Position(ft)	0	300	0	0	300	0	0	0	0	-5	0	0	
Detector 1 Size(ft)	40	6	20	40	6	20	40	40	40	40	40	40	
Detector 1 Type	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)	10.0	0.0	0.0	10.0	0.0	0.0	3.0	0.0	15.0	10.0	0.0	15.0	
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	pm+pt	NA	pm+ov	
Protected Phases	5	2	3	1	6	7	3	8	1	7	4	5	
Permitted Phases	2		2	6		6			8	4		4	
Detector Phase	5	2	3	1	6	7	3	8	1	7	4	5	
Switch Phase													
Minimum Initial (s)	7.0	12.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	13.2	18.2	13.1	13.1	18.2	12.8	13.1	13.5	13.1	12.8	13.5	13.2	
Total Split (s)	30.0	72.0	18.0	30.0	72.0	18.0	18.0	32.0	30.0	18.0	32.0	30.0	

## Lanes, Volumes, Timings

49: Market St &amp; Kerr Ave

9/9/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	19.7%	47.4%	11.8%	19.7%	47.4%	11.8%	11.8%	21.1%	19.7%	11.8%	21.1%	19.7%
Maximum Green (s)	23.8	65.8	11.9	23.9	65.8	12.2	11.9	25.5	23.9	12.2	25.5	23.8
Yellow Time (s)	3.0	4.5	3.0	3.0	4.5	3.0	3.0	4.5	3.0	3.0	4.5	3.0
All-Red Time (s)	3.2	1.7	3.1	3.1	1.7	2.8	3.1	2.0	3.1	2.8	2.0	3.2
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.2	4.2	4.1	4.1	4.2	3.8	4.1	4.5	4.1	3.8	4.5	4.2
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes											
Vehicle Extension (s)	2.0	5.0	1.0	2.0	4.5	2.0	1.0	2.0	2.0	2.0	2.0	2.0
Minimum Gap (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
Time Before Reduce (s)	0.0	15.0	0.0	0.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0	0.0	0.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	C-Max	None	None	Max	None						
Act Effct Green (s)	67.8	67.8	85.9	67.9	67.8	86.2	13.9	27.5	53.8	28.2	27.5	53.6
Actuated g/C Ratio	0.45	0.45	0.57	0.45	0.45	0.57	0.09	0.18	0.35	0.19	0.18	0.35
v/c Ratio	1.15	1.12	0.54	1.38	0.99	0.28	1.06	1.27	0.35	1.18	1.55	0.52
Control Delay	132.6	88.4	23.2	231.7	62.9	18.0	130.6	190.2	25.6	157.3	295.1	40.8
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	132.6	88.4	23.2	231.7	62.9	18.0	130.6	190.2	25.6	157.3	295.1	40.8
LOS	F	F	C	F	E	B	F	F	C	F	F	D
Approach Delay						93.5			135.7			193.1
Approach LOS						F			F			F

## Intersection Summary

Area Type: Other

Cycle Length: 152

Actuated Cycle Length: 152

Offset: 70 (46%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.55

Intersection Signal Delay: 110.7

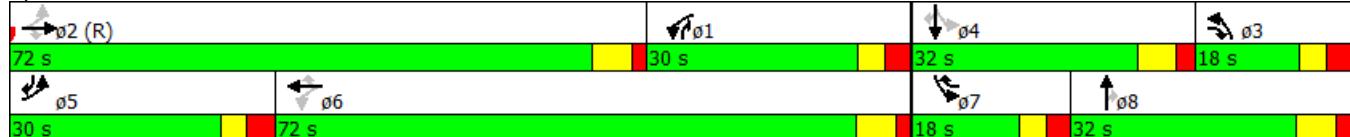
Intersection LOS: F

Intersection Capacity Utilization 115.3%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 49: Market St &amp; Kerr Ave



Lanes, Volumes, Timings  
56: Kerr Ave & Randall Pkwy

9/9/2015

	↑	→	↓	↗	↖	↙	↖	↗	↑	↗	↖	↓	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↑	↑↓		↑	↑↓		↑	↑	↑	↑	↑	↑	
Traffic Volume (vph)	332	757	78	318	806	219	50	646	338	268	763	332	
Future Volume (vph)	332	757	78	318	806	219	50	646	338	268	763	332	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	200		0	90		150	150		160	
Storage Lanes	1		0	1		0	1		1	1		1	
Taper Length (ft)	100			100			100			100			
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Fr <sub>t</sub>		0.986			0.968				0.850			0.850	
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1770	3490	0	1770	3426	0	1770	1863	1583	1770	1863	1583	
Flt Permitted	0.097			0.097			0.162			0.062			
Satd. Flow (perm)	181	3490	0	181	3426	0	302	1863	1583	115	1863	1583	
Right Turn on Red			No			No			No			No	
Satd. Flow (RTOR)													
Link Speed (mph)		35			35			45			45		
Link Distance (ft)		892			741			556			3064		
Travel Time (s)		17.4			14.4			8.4			46.4		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	369	841	87	353	896	243	56	718	376	298	848	369	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	369	928	0	353	1139	0	56	718	376	298	848	369	
Enter Blocked Intersection	No												
Lane Alignment	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								Yes			Yes		
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	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	pm+pt	NA	pm+ov	
Protected Phases	7	4		3	8			2	3	1	6	7	
Permitted Phases	4			8			2		2	6		6	
Minimum Split (s)	12.8	12.8		12.6	12.6		18.1	18.1	12.6	12.9	17.9	12.8	
Total Split (s)	20.0	45.0		20.0	45.0		65.0	65.0	20.0	25.0	65.0	20.0	
Total Split (%)	12.9%	29.0%		12.9%	29.0%		41.9%	41.9%	12.9%	16.1%	41.9%	12.9%	
Maximum Green (s)	14.2	39.2		14.4	39.4		58.9	58.9	14.4	19.1	59.1	14.2	
Yellow Time (s)	3.0	3.8		3.0	3.8		4.5	4.5	3.0	3.0	4.5	3.0	
All-Red Time (s)	2.8	2.0		2.6	1.8		1.6	1.6	2.6	2.9	1.4	2.8	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	3.8	3.8		3.6	3.6		4.1	4.1	3.6	3.9	3.9	3.8	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lead	Lead		Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes		Yes	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		10.0	10.0	0.0	0.0	10.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		25.0	25.0	0.0	0.0	25.0	0.0	
Act Effct Green (s)	57.4	41.2		57.8	41.4		60.9	60.9	81.4	86.1	86.1	106.2	
Actuated g/C Ratio	0.37	0.27		0.37	0.27		0.39	0.39	0.53	0.56	0.56	0.69	
v/c Ratio	1.58	1.00		1.50	1.24		0.47	0.98	0.45	1.03	0.82	0.34	

Lanes, Volumes, Timings  
56: Kerr Ave & Randall Pkwy

9/9/2015

Lane Group	EBL	EBT	EBC	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	313.7	85.9		279.8	165.5		51.3	75.3	25.1	107.2	36.3	11.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	313.7	85.9		279.8	165.5		51.3	75.3	25.1	107.2	36.3	11.1
LOS	F	F		F	F		D	E	C	F	D	B
Approach Delay		150.7			192.5				57.7		44.1	
Approach LOS		F			F			E			D	

Intersection Summary

Area Type: Other

Cycle Length: 155

Actuated Cycle Length: 155

Offset: 25 (16%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 110

Control Type: Pretimed

Maximum v/c Ratio: 1.58

Intersection Signal Delay: 112.9

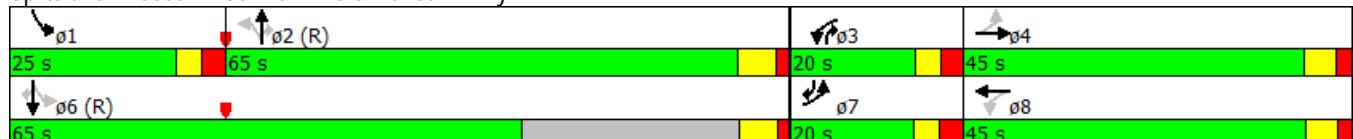
Intersection LOS: F

Intersection Capacity Utilization 111.2%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 56: Kerr Ave & Randall Pkwy



## Lanes, Volumes, Timings

3: 3rd St &amp; Market St

9/10/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑↑		↑	↑↑	
Traffic Volume (vph)	13	30	13	65	74	90	58	516	86	59	251	69
Future Volume (vph)	13	30	13	65	74	90	58	516	86	59	251	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125			0	200		0	150		0	200	0
Storage Lanes	1			1	1		0	1		0	1	0
Taper Length (ft)	100				100			100			100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00			0.99	1.00	0.99		1.00	1.00		1.00	1.00
Frt				0.850		0.918			0.978			0.968
Flt Protected	0.950				0.950			0.950			0.950	
Satd. Flow (prot)	1770	1863	1583	1770	1697	0	1770	3450	0	1770	3410	0
Flt Permitted	0.643				0.503			0.531			0.353	
Satd. Flow (perm)	1196	1863	1562	936	1697	0	988	3450	0	657	3410	0
Right Turn on Red			No			No			No		No	
Satd. Flow (RTOR)												
Link Speed (mph)		25			35			35			35	
Link Distance (ft)		656			820			581			760	
Travel Time (s)		17.9			16.0			11.3			14.8	
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	14	33	14	72	82	100	64	573	96	66	279	77
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	33	14	72	182	0	64	669	0	66	356	0
Enter Blocked Intersection	No											
Lane Alignment	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	1	1	1	1		1	0		1	0	
Detector Template			Right									
Leading Detector (ft)	40	40	20	65	40		57	0		50	0	
Trailing Detector (ft)	0	0	0	50	0		-3	0		-10	0	
Detector 1 Position(ft)	0	0	0	50	0		-3	0		-10	0	
Detector 1 Size(ft)	40	40	20	15	40		60	6		60	0	
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)	3.0	0.0	0.0	0.0	0.0		10.0	0.0		10.0	0.0	
Turn Type	Perm	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	10.0		7.0	10.0	

# Lanes, Volumes, Timings

3: 3rd St & Market St

9/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	24.0	24.0	24.0	12.8	21.9		12.5	24.2		12.6	25.8	
Total Split (s)	24.0	24.0	24.0	14.0	38.0		13.0	38.0		14.0	39.0	
Total Split (%)	26.7%	26.7%	26.7%	15.6%	42.2%		14.4%	42.2%		15.6%	43.3%	
Maximum Green (s)	18.0	18.0	18.0	8.2	32.1		7.5	31.8		8.4	33.2	
Yellow Time (s)	3.0	3.0	3.0	3.0	4.1		3.1	4.2		3.0	3.8	
All-Red Time (s)	3.0	3.0	3.0	2.8	1.8		2.4	2.0		2.6	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0	4.0	3.8	3.9		3.5	4.2		3.6	3.8	
Lead/Lag	Lag	Lag	Lag	Lead			Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		1.0	0.2		1.0	0.2	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	4.0	4.0	4.0		4.0			4.0			4.0	
Flash Dont Walk (s)	14.0	14.0	14.0		12.0			14.0			16.0	
Pedestrian Calls (#/hr)	0	0	0		0			0			0	
Act Effct Green (s)	9.5	9.5	9.5	18.6	18.5		61.2	53.3		61.2	53.8	
Actuated g/C Ratio	0.11	0.11	0.11	0.21	0.21		0.68	0.59		0.68	0.60	
v/c Ratio	0.11	0.17	0.08	0.25	0.52		0.09	0.33		0.12	0.17	
Control Delay	38.6	38.9	37.6	17.1	23.9		5.5	11.6		5.7	10.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	38.6	38.9	37.6	17.1	23.9		5.5	11.6		5.7	10.2	
LOS	D	D	D	B	C		A	B		A	B	
Approach Delay		38.5			22.0			11.0			9.5	
Approach LOS		D			C			B			A	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 18 (20%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.52

Intersection Signal Delay: 13.6

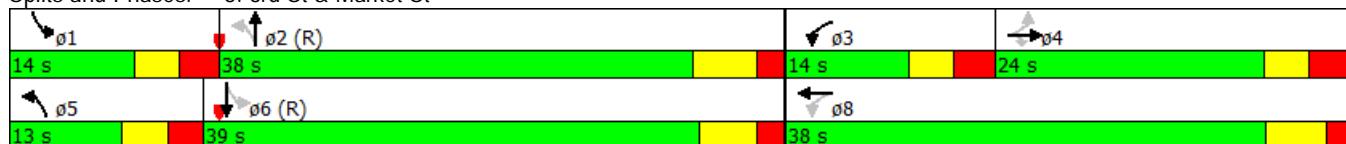
Intersection LOS: B

Intersection Capacity Utilization 44.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: 3rd St & Market St



## Lanes, Volumes, Timings

6: 5th St &amp; Market St

9/10/2015

	↑	→	↓	↗	↖	↙	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑↑			↑↑	
Traffic Volume (vph)	0	192	10	0	290	36	0	73	38	0	36	7
Future Volume (vph)	0	192	10	0	290	36	0	73	38	0	36	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00			1.00			0.99			1.00	
Fr <sub>t</sub>		0.993			0.985			0.949			0.975	
Flt Protected												
Satd. Flow (prot)	0	1848	0	0	1832	0	0	3334	0	0	3438	0
Flt Permitted												
Satd. Flow (perm)	0	1848	0	0	1832	0	0	3334	0	0	3438	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		820			2009			644			690	
Travel Time (s)		16.0			39.1			17.6			18.8	
Confl. Peds. (#/hr)			1			1			1			1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	213	11	0	322	40	0	81	42	0	40	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	224	0	0	362	0	0	123	0	0	48	0
Enter Blocked Intersection	No	No	No									
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			0			0	
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			1			1			1	
Detector Template												
Leading Detector (ft)		206			206			40			40	
Trailing Detector (ft)		200			200			0			0	
Detector 1 Position(ft)		200			200			0			0	
Detector 1 Size(ft)		6			6			40			40	
Detector 1 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0			0.0			0.0	
Detector 1 Queue (s)		0.0			0.0			0.0			0.0	
Detector 1 Delay (s)		0.0			0.0			0.0			0.0	
Turn Type		NA			NA			NA			NA	
Protected Phases		2			6			8			4	
Permitted Phases												
Detector Phase		2			6			8			4	
Switch Phase												
Minimum Initial (s)		10.0			10.0			7.0			7.0	
Minimum Split (s)		25.5			26.6			28.7			28.7	
Total Split (s)		58.0			58.0			32.0			32.0	
Total Split (%)		64.4%			64.4%			35.6%			35.6%	

# Lanes, Volumes, Timings

6: 5th St & Market St

9/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	52.5				52.4			26.3			26.3	
Yellow Time (s)	3.8				3.9			3.2			3.1	
All-Red Time (s)	1.7				1.7			2.5			2.6	
Lost Time Adjust (s)	-2.0				-2.0			-2.0			-2.0	
Total Lost Time (s)	3.5				3.6			3.7			3.7	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.5				4.5			2.0			2.0	
Minimum Gap (s)	3.0				3.0			3.0			3.0	
Time Before Reduce (s)	10.0				10.0			0.0			0.0	
Time To Reduce (s)	10.0				10.0			0.0			0.0	
Recall Mode	C-Max				C-Max			None			None	
Walk Time (s)	4.0				4.0			4.0			4.0	
Flash Dont Walk (s)	16.0				17.0			19.0			19.0	
Pedestrian Calls (#/hr)	0				0			0			0	
Act Effct Green (s)	72.7				72.6			10.1			10.1	
Actuated g/C Ratio	0.81				0.81			0.11			0.11	
v/c Ratio	0.15				0.25			0.33			0.12	
Control Delay	1.9				2.0			39.0			36.2	
Queue Delay	0.0				0.0			0.0			0.0	
Total Delay	1.9				2.0			39.0			36.2	
LOS	A				A			D			D	
Approach Delay	1.9				2.0			39.0			36.2	
Approach LOS	A				A			D			D	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 37 (41%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.33

Intersection Signal Delay: 10.1

Intersection LOS: B

Intersection Capacity Utilization 30.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: 5th St & Market St



## Lanes, Volumes, Timings

9: 10th St &amp; Market St

9/10/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑		↑	↑		↔	↔		↑	↑	↔
Traffic Volume (vph)	7	182	9	38	326	15	12	67	26	18	51	4
Future Volume (vph)	7	182	9	38	326	15	12	67	26	18	51	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	200		0	0		0	100		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. 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
Fr <sub>t</sub>		0.993			0.993				0.966		0.990	
Flt Protected	0.950			0.950				0.994		0.950		
Satd. Flow (prot)	1770	1850	0	1770	1850	0	0	1789	0	1770	1844	0
Flt Permitted	0.525			0.625				0.960		0.531		
Satd. Flow (perm)	978	1850	0	1164	1850	0	0	1727	0	989	1844	0
Right Turn on Red			No			No			No		No	
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		2009			900			828			513	
Travel Time (s)		39.1			17.5			22.6			14.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	8	202	10	42	362	17	13	74	29	20	57	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	8	212	0	42	379	0	0	116	0	20	61	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			0			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	1		1	1		1	1		1	1	
Detector Template	Left			Left			Left					
Leading Detector (ft)	20	76		20	76		20	33		55	55	
Trailing Detector (ft)	0	70		0	70		0	-2		-5	-5	
Detector 1 Position(ft)	0	70		0	70		0	-2		-5	-5	
Detector 1 Size(ft)	20	6		20	6		20	35		60	60	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
Turn Type	Perm	NA										
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	15.6	15.6		15.4	15.4		12.9	12.9		13.0	13.0	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	

# Lanes, Volumes, Timings

## 9: 10th St & Market St

9/10/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	54.4	54.4		54.6	54.6		24.1	24.1		24.0	24.0	
Yellow Time (s)	4.1	4.1		3.6	3.6		3.1	3.1		3.2	3.2	
All-Red Time (s)	1.5	1.5		1.8	1.8		2.8	2.8		2.8	2.8	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	3.6	3.6		3.4	3.4		3.9			4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	73.2	73.2		73.3	73.3					12.6	12.6	12.6
Actuated g/C Ratio	0.81	0.81		0.81	0.81					0.14	0.14	0.14
v/c Ratio	0.01	0.14		0.04	0.25					0.48	0.14	0.24
Control Delay	3.1	3.6		0.5	0.6					41.7	34.8	35.5
Queue Delay	0.0	0.0		0.0	0.0					0.0	0.0	0.0
Total Delay	3.1	3.6		0.5	0.6					41.7	34.8	35.5
LOS	A	A		A	A					D	C	D
Approach Delay		3.6			0.6					41.7		35.3
Approach LOS		A			A					D		D

### Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 73 (81%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.48

Intersection Signal Delay: 10.4

Intersection LOS: B

Intersection Capacity Utilization 48.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 9: 10th St & Market St



## Lanes, Volumes, Timings

14: 16th St &amp; Market St

9/10/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↑	↑	↑					↑↑	↑↑	
Traffic Volume (vph)	0	347	78	649	872	0	0	0	0	87	779	41
Future Volume (vph)	0	347	78	649	872	0	0	0	0	87	779	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	25			100		0	0		0	0		0
Storage Lanes	1		1	1		0	0		0	0		0
Taper Length (ft)	200			25			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor				0.99							1.00	
Frt				0.850							0.993	
Flt Protected					0.950							0.995
Satd. Flow (prot)	0	1863	1583	1770	1863	0	0	0	0	0	3493	0
Flt Permitted					0.216							0.995
Satd. Flow (perm)	0	1863	1561	402	1863	0	0	0	0	0	3492	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1473			369			549			1165	
Travel Time (s)		28.7			7.2			10.7			22.7	
Confl. Peds. (#/hr)			1	1						1		1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	386	87	721	969	0	0	0	0	97	866	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	386	87	721	969	0	0	0	0	0	1009	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)		12			12			0				0
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane				Yes								
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	1	1	1					1	1	
Detector Template			Right							Left		
Leading Detector (ft)		206	20	40	206					20	40	
Trailing Detector (ft)		200	0	0	200					0	0	
Detector 1 Position(ft)		200	0	0	200					0	0	
Detector 1 Size(ft)		6	20	40	6					20	40	
Detector 1 Type		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	
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0	0.0	
Detector 1 Delay (s)		0.0	0.0	15.0	0.0					0.0	5.0	
Turn Type		NA	Perm	pm+pt	NA					Perm	NA	
Protected Phases		2		1	6						4	
Permitted Phases			2	6						4		
Detector Phase		2	2	1	6					4	4	
Switch Phase												
Minimum Initial (s)		10.0	10.0	7.0	8.0					7.0	7.0	

# Lanes, Volumes, Timings

14: 16th St & Market St

9/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	17.1	17.1	12.1	13.3						23.7	23.7	
Total Split (s)	25.7	25.7	33.3	59.0						31.0	31.0	
Total Split (%)	28.6%	28.6%	37.0%	65.6%						34.4%	34.4%	
Maximum Green (s)	20.6	20.6	28.2	53.7						25.3	25.3	
Yellow Time (s)	3.8	3.8	3.0	4.0						3.8	3.8	
All-Red Time (s)	1.3	1.3	2.1	1.3						1.9	1.9	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0						-2.0		
Total Lost Time (s)	3.1	3.1	3.1	3.3						3.7		
Lead/Lag	Lead	Lead	Lag									
Lead-Lag Optimize?	Yes	Yes	Yes									
Vehicle Extension (s)	6.0	6.0	2.0	6.0						5.0	5.0	
Minimum Gap (s)	2.5	2.5	3.0	2.5						2.5	2.5	
Time Before Reduce (s)	10.0	10.0	0.0	10.0						0.0	0.0	
Time To Reduce (s)	15.0	15.0	0.0	15.0						10.0	10.0	
Recall Mode	C-Max	C-Max	None	C-Max						None	None	
Walk Time (s)	4.0	4.0		4.0						4.0	4.0	
Flash Dont Walk (s)	8.0	8.0		4.0						14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0						0	0	
Act Effct Green (s)	22.6	22.6	55.9	55.7						27.3		
Actuated g/C Ratio	0.25	0.25	0.62	0.62						0.30		
v/c Ratio	0.83	0.22	1.02	0.84						0.95		
Control Delay	41.9	22.5	38.6	12.2						34.3		
Queue Delay	0.0	0.0	33.8	48.7						0.0		
Total Delay	41.9	22.5	72.4	60.9						34.3		
LOS	D	C	E	E						C		
Approach Delay	38.3			65.8						34.3		
Approach LOS		D		E						C		

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 10 (11%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.02

Intersection Signal Delay: 51.7

Intersection LOS: D

Intersection Capacity Utilization 133.9%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 14: 16th St & Market St



## Lanes, Volumes, Timings

17: 17th St &amp; Market St

9/10/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑			↑	↑	↑	↑↑	↑			
Traffic Volume (vph)	14	397	0	0	1267	43	252	690	357	0	0	0
Future Volume (vph)	14	397	0	0	1267	43	252	690	357	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		200	0		0	0		0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (ft)	25			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor						0.99	1.00		0.98			
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1770	1863	0	0	1863	1583	1770	3539	1583	0	0	0
Flt Permitted	0.066						0.950					
Satd. Flow (perm)	123	1863	0	0	1863	1562	1766	3539	1548	0	0	0
Right Turn on Red			No			No			No		No	
Satd. Flow (RTOR)												
Link Speed (mph)	35			35			35			35		
Link Distance (ft)	369			1854			597			1164		
Travel Time (s)	7.2			36.1			11.6			22.7		
Confl. Peds. (#/hr)	1					1	1		1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	16	441	0	0	1408	48	280	767	397	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	441	0	0	1408	48	280	767	397	0	0	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)	12			12			12			12		
Link Offset(ft)	0			0			0			0		
Crosswalk Width(ft)	16			16			16			16		
Two way Left Turn Lane	Yes											
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	0			0	1	1	1	1			
Detector Template	Left					Right						
Leading Detector (ft)	20	0			0	20	40	40	40			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Detector 1 Position(ft)	0	0			0	0	0	0	0			
Detector 1 Size(ft)	20	6			6	20	40	40	40			
Detector 1 Type	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			
Detector 1 Queue (s)	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	15.0		
Turn Type	Perm	NA			NA	Perm	Perm	NA	Perm			
Protected Phases		2			6			8				
Permitted Phases	2					6	8		8			
Detector Phase	2	2			6	6	8	8	8			
Switch Phase												
Minimum Initial (s)	10.0	10.0			10.0	10.0	7.0	7.0	7.0			

# Lanes, Volumes, Timings

17: 17th St & Market St

9/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	21.4	21.4			21.2	21.2	26.4	26.4	26.4			
Total Split (s)	63.6	63.6			63.6	63.6	26.4	26.4	26.4			
Total Split (%)	70.7%	70.7%			70.7%	70.7%	29.3%	29.3%	29.3%			
Maximum Green (s)	58.2	58.2			58.4	58.4	21.0	21.0	21.0			
Yellow Time (s)	3.8	3.8			3.8	3.8	3.9	3.9	3.9			
All-Red Time (s)	1.6	1.6			1.4	1.4	1.5	1.5	1.5			
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0	-2.0	-2.0	-2.0			
Total Lost Time (s)	3.4	3.4			3.2	3.2	3.4	3.4	3.4			
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	0.2	0.2			0.2	0.2	2.0	2.0	2.0			
Recall Mode	C-Max	C-Max			C-Max	C-Max	None	None	None			
Walk Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Flash Dont Walk (s)	12.0	12.0			12.0	12.0	17.0	17.0	17.0			
Pedestrian Calls (#/hr)	0	0			0	0	0	0	0			
Act Effct Green (s)	60.2	60.2			60.4	60.4	23.0	23.0	23.0			
Actuated g/C Ratio	0.67	0.67			0.67	0.67	0.26	0.26	0.26			
v/c Ratio	0.20	0.35			1.13	0.05	0.62	0.85	1.01			
Control Delay	6.9	3.4			71.9	4.4	36.7	42.3	82.2			
Queue Delay	0.0	2.6			0.6	0.0	0.0	0.0	0.0			
Total Delay	6.9	6.0			72.5	4.4	36.7	42.3	82.2			
LOS	A	A			E	A	D	D	F			
Approach Delay		6.0			70.3			52.2				
Approach LOS		A			E			D				

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 11 (12%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.13

Intersection Signal Delay: 53.8

Intersection LOS: D

Intersection Capacity Utilization 133.9%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 17: 17th St & Market St



## Lanes, Volumes, Timings

23: Market St &amp; 23rd St

9/10/2015



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑	↓		↑	
Traffic Volume (vph)	66	724	1218	141	194	87
Future Volume (vph)	66	724	1218	141	194	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	100				100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor					0.99	
Frt			0.986		0.958	
Flt Protected	0.950				0.967	
Satd. Flow (prot)	1770	1863	1837	0	1713	0
Flt Permitted	0.058				0.967	
Satd. Flow (perm)	108	1863	1837	0	1713	0
Right Turn on Red				No		No
Satd. Flow (RTOR)						
Link Speed (mph)		35	35		35	
Link Distance (ft)		993	944		1214	
Travel Time (s)		19.3	18.4		23.6	
Confl. Peds. (#/hr)					1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	73	804	1353	157	216	97
Shared Lane Traffic (%)						
Lane Group Flow (vph)	73	804	1510	0	313	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	1	1		1	
Detector Template	Left					
Leading Detector (ft)	20	76	81		68	
Trailing Detector (ft)	0	70	75		-2	
Detector 1 Position(ft)	0	70	75		-2	
Detector 1 Size(ft)	20	6	6		70	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		10.0	
Turn Type	Perm	NA	NA		Prot	
Protected Phases		2	6		4	
Permitted Phases	2					
Detector Phase	2	2	6		4	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		7.0	



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Minimum Split (s)	14.9	14.9	15.1		15.8	
Total Split (s)	71.4	71.4	71.4		18.6	
Total Split (%)	79.3%	79.3%	79.3%		20.7%	
Maximum Green (s)	66.5	66.5	66.3		13.8	
Yellow Time (s)	3.7	3.7	3.9		3.0	
All-Red Time (s)	1.2	1.2	1.2		1.8	
Lost Time Adjust (s)	-2.0	-2.0	-2.0		-2.0	
Total Lost Time (s)	2.9	2.9	3.1		2.8	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		2.0	
Recall Mode	C-Max	C-Max	C-Max		None	
Walk Time (s)					4.0	
Flash Dont Walk (s)					7.0	
Pedestrian Calls (#/hr)					0	
Act Effct Green (s)	68.5	68.5	68.3		15.8	
Actuated g/C Ratio	0.76	0.76	0.76		0.18	
v/c Ratio	0.89	0.57	1.08		1.04	
Control Delay	78.4	1.5	56.9		102.1	
Queue Delay	0.0	0.0	0.0		0.0	
Total Delay	78.4	1.5	56.9		102.1	
LOS	E	A	E		F	
Approach Delay		7.9	56.9		102.1	
Approach LOS		A	E		F	

### Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 46 (51%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 120

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.08

Intersection Signal Delay: 46.2

Intersection LOS: D

Intersection Capacity Utilization 95.4%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 23: Market St & 23rd St



Lanes, Volumes, Timings  
25: Forest Hills Dr & Market St

9/10/2015

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→	↓	↖	←	↑	↗
Traffic Volume (vph)	806	72	48	1140	146	38
Future Volume (vph)	806	72	48	1140	146	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			100		100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor					1.00	
Frt	0.989				0.972	
Flt Protected				0.950	0.962	
Satd. Flow (prot)	1842	0	1770	1863	1734	0
Flt Permitted				0.207	0.962	
Satd. Flow (perm)	1842	0	386	1863	1734	0
Right Turn on Red		No			No	
Satd. Flow (RTOR)						
Link Speed (mph)	35			35	25	
Link Distance (ft)	944			866	959	
Travel Time (s)	18.4			16.9	26.2	
Confl. Peds. (#/hr)					1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	896	80	53	1267	162	42
Shared Lane Traffic (%)						
Lane Group Flow (vph)	976	0	53	1267	204	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	1		1	1	1	
Detector Template			Left			
Leading Detector (ft)	76		20	76	40	
Trailing Detector (ft)	70		0	70	0	
Detector 1 Position(ft)	70		0	70	0	
Detector 1 Size(ft)	6		20	6	40	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	5.0	
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Detector Phase	2		6	6	8	
Switch Phase						
Minimum Initial (s)	9.0		8.0	8.0	7.0	



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Minimum Split (s)	14.4		12.8	12.8	20.3	
Total Split (s)	69.7		69.7	69.7	20.3	
Total Split (%)	77.4%		77.4%	77.4%	22.6%	
Maximum Green (s)	64.3		64.9	64.9	15.0	
Yellow Time (s)	3.8		3.8	3.8	3.0	
All-Red Time (s)	1.6		1.0	1.0	2.3	
Lost Time Adjust (s)	-2.0		-2.0	-2.0	-2.0	
Total Lost Time (s)	3.4		2.8	2.8	3.3	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	2.0	
Recall Mode	C-Max		C-Max	C-Max	None	
Walk Time (s)					4.0	
Flash Dont Walk (s)					11.0	
Pedestrian Calls (#/hr)					0	
Act Effct Green (s)	68.1		68.7	68.7	15.2	
Actuated g/C Ratio	0.76		0.76	0.76	0.17	
v/c Ratio	0.70		0.18	0.89	0.70	
Control Delay	4.0		5.0	18.9	48.1	
Queue Delay	0.0		0.0	20.5	0.0	
Total Delay	4.0		5.0	39.4	48.1	
LOS	A		A	D	D	
Approach Delay	4.0			38.0	48.1	
Approach LOS	A			D	D	

#### Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 48 (53%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 25.6

Intersection LOS: C

Intersection Capacity Utilization 77.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 25: Forest Hills Dr & Market St



## Lanes, Volumes, Timings

33: Covil Ave/Montgomery Ave &amp; Market St

9/10/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑		↑	↑	↑	↑	↑	↑	↑	↑	
Traffic Volume (vph)	77	1042	266	362	1591	49	252	207	337	54	86	20
Future Volume (vph)	77	1042	266	362	1591	49	252	207	337	54	86	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	600		0	0		0	0		0
Storage Lanes	1		0	1		1	0		1	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. 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
Fr <sub>t</sub>		0.969				0.850			0.850		0.972	
Flt Protected		0.950			0.950			0.973		0.950		
Satd. Flow (prot)	1770	1805	0	1770	1863	1583	0	1812	1583	1770	1811	0
Flt Permitted		0.045			0.044			0.676		0.115		
Satd. Flow (perm)	84	1805	0	82	1863	1583	0	1259	1583	214	1811	0
Right Turn on Red			No			No			No		No	
Satd. Flow (RTOR)												
Link Speed (mph)		40			40			35			25	
Link Distance (ft)		2438			3526			759			597	
Travel Time (s)		41.6			60.1			14.8			16.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	86	1158	296	402	1768	54	280	230	374	60	96	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	1454	0	402	1768	54	0	510	374	60	118	0
Enter Blocked Intersection	No											
Lane Alignment	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					Yes							
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	1	1	1	1	1	1
Detector Template					Right		Left					
Leading Detector (ft)	60	256		60	256	20	20	35	60	35	55	
Trailing Detector (ft)	0	80		0	80	0	0	-5	0	-5	-5	
Detector 1 Position(ft)	0	80		0	80	0	0	-5	0	-5	-5	
Detector 1 Size(ft)	60	6		60	6	20	20	40	60	40	60	
Detector 1 Type	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
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
Detector 1 Delay (s)	0.0	0.0		15.0	0.0	0.0	0.0	3.0	15.0	3.0	15.0	
Detector 2 Position(ft)		250			250							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		1.3			1.3							
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	pm+ov	Perm	NA	
Protected Phases		2		1	6			8	1		4	
Permitted Phases		2		6		6	8		8	4		

## Lanes, Volumes, Timings

33: Covil Ave/Montgomery Ave & Market St

9/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		1	6	6	8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	16.0	16.0		12.3	15.8	15.8	12.8	12.8	12.3	13.1	13.1	
Total Split (s)	92.0	92.0		21.0	113.0	113.0	39.0	39.0	21.0	39.0	39.0	
Total Split (%)	60.5%	60.5%		13.8%	74.3%	74.3%	25.7%	25.7%	13.8%	25.7%	25.7%	
Maximum Green (s)	86.0	86.0		15.7	107.2	107.2	33.2	33.2	15.7	32.9	32.9	
Yellow Time (s)	4.2	4.2		3.0	4.2	4.2	3.8	3.8	3.0	3.6	3.6	
All-Red Time (s)	1.8	1.8		2.3	1.6	1.6	2.0	2.0	2.3	2.5	2.5	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		3.3	3.8	3.8	3.8	3.8	3.3	4.1	4.1	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?	Yes	Yes		Yes					Yes			
Vehicle Extension (s)	3.0	3.0		1.0	3.0	3.0	1.0	1.0	1.0	1.0	1.0	
Recall Mode	C-Max	C-Max		None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	88.0	88.0		109.7	109.2	109.2		35.2	56.7	34.9	34.9	
Actuated g/C Ratio	0.58	0.58		0.72	0.72	0.72		0.23	0.37	0.23	0.23	
v/c Ratio	1.79	1.39		1.58	1.32	0.05		1.75	0.63	1.22	0.28	
Control Delay	452.0	210.7		296.1	172.9	4.3		386.2	45.0	249.0	50.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	452.0	210.7		296.1	172.9	4.3		386.2	45.0	249.0	50.5	
LOS	F	F		F	F	A		F	D	F	D	
Approach Delay		224.2			191.1			241.8			117.4	
Approach LOS		F			F			F			F	

### Intersection Summary

Area Type: Other

Cycle Length: 152

Actuated Cycle Length: 152

Offset: 18 (12%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.79

Intersection Signal Delay: 208.2

Intersection LOS: F

Intersection Capacity Utilization 136.2%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 33: Covil Ave/Montgomery Ave & Market St



## Lanes, Volumes, Timings

3: 3rd St &amp; Market St

9/10/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑	↑	↑	↑	↑	↑	↑↑		↑	↑↑	
Traffic Volume (vph)	46	131	47	123	77	59	40	380	48	108	600	29
Future Volume (vph)	46	131	47	123	77	59	40	380	48	108	600	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125			0	200		0	150		0	200	0
Storage Lanes	1			1	1		0	1		0	1	0
Taper Length (ft)	100				100			100			100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	1.00			0.99	1.00	0.99		1.00	1.00		1.00	1.00
Frt				0.850		0.935			0.983			0.993
Flt Protected	0.950				0.950			0.950			0.950	
Satd. Flow (prot)	1770	1863	1583	1770	1731	0	1770	3470	0	1770	3511	0
Flt Permitted	0.660				0.414			0.346			0.407	
Satd. Flow (perm)	1228	1863	1562	770	1731	0	644	3470	0	757	3511	0
Right Turn on Red			No			No			No		No	
Satd. Flow (RTOR)												
Link Speed (mph)		25			35			35			35	
Link Distance (ft)		656			820			581			760	
Travel Time (s)		17.9			16.0			11.3			14.8	
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	51	146	52	137	86	66	44	422	53	120	667	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	146	52	137	152	0	44	475	0	120	699	0
Enter Blocked Intersection	No											
Lane Alignment	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	1	1	1	1		1	0		1	0	
Detector Template			Right									
Leading Detector (ft)	40	40	20	65	40		57	0		50	0	
Trailing Detector (ft)	0	0	0	50	0		-3	0		-10	0	
Detector 1 Position(ft)	0	0	0	50	0		-3	0		-10	0	
Detector 1 Size(ft)	40	40	20	15	40		60	6		60	0	
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)	3.0	0.0	0.0	0.0	0.0		10.0	0.0		10.0	0.0	
Turn Type	Perm	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	10.0		7.0	10.0	

# Lanes, Volumes, Timings

3: 3rd St & Market St

9/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	24.0	24.0	24.0	12.8	21.9		12.5	24.2		12.6	25.8	
Total Split (s)	26.0	26.0	26.0	14.0	40.0		13.0	36.0		14.0	37.0	
Total Split (%)	28.9%	28.9%	28.9%	15.6%	44.4%		14.4%	40.0%		15.6%	41.1%	
Maximum Green (s)	20.0	20.0	20.0	8.2	34.1		7.5	29.8		8.4	31.2	
Yellow Time (s)	3.0	3.0	3.0	3.0	4.1		3.1	4.2		3.0	3.8	
All-Red Time (s)	3.0	3.0	3.0	2.8	1.8		2.4	2.0		2.6	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0	4.0	3.8	3.9		3.5	4.2		3.6	3.8	
Lead/Lag	Lag	Lag	Lag	Lead			Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		1.0	0.2		1.0	0.2	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)	4.0	4.0	4.0		4.0			4.0			4.0	
Flash Dont Walk (s)	14.0	14.0	14.0		12.0			14.0			16.0	
Pedestrian Calls (#/hr)	0	0	0		0			0			0	
Act Effct Green (s)	13.5	13.5	13.5	27.2	27.1		51.4	41.7		53.7	47.7	
Actuated g/C Ratio	0.15	0.15	0.15	0.30	0.30		0.57	0.46		0.60	0.53	
v/c Ratio	0.28	0.53	0.22	0.40	0.29		0.09	0.30		0.22	0.38	
Control Delay	36.5	41.5	34.5	13.7	12.0		8.6	16.5		9.1	15.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	36.5	41.5	34.5	13.7	12.0		8.6	16.5		9.1	15.1	
LOS	D	D	C	B	B		A	B		A	B	
Approach Delay		39.0			12.8			15.9			14.2	
Approach LOS		D			B			B			B	

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 74 (82%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 17.8

Intersection LOS: B

Intersection Capacity Utilization 50.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: 3rd St & Market St



## Lanes, Volumes, Timings

6: 5th St &amp; Market St

9/10/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑↑			↑↑	
Traffic Volume (vph)	0	353	28	0	346	30	0	145	37	0	86	9
Future Volume (vph)	0	353	28	0	346	30	0	145	37	0	86	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00			1.00			1.00			1.00	
Fr <sub>t</sub>		0.990			0.989			0.970			0.986	
Flt Protected												
Satd. Flow (prot)	0	1842	0	0	1840	0	0	3418	0	0	3482	0
Flt Permitted												
Satd. Flow (perm)	0	1842	0	0	1840	0	0	3418	0	0	3482	0
Right Turn on Red				No		No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		820			2009			644			690	
Travel Time (s)		16.0			39.1			17.6			18.8	
Confl. Peds. (#/hr)			1			1			1			1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	392	31	0	384	33	0	161	41	0	96	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	423	0	0	417	0	0	202	0	0	106	0
Enter Blocked Intersection	No	No	No									
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			0			0	
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			1			1			1	
Detector Template												
Leading Detector (ft)		206			206			40			40	
Trailing Detector (ft)		200			200			0			0	
Detector 1 Position(ft)		200			200			0			0	
Detector 1 Size(ft)		6			6			40			40	
Detector 1 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0			0.0			0.0	
Detector 1 Queue (s)		0.0			0.0			0.0			0.0	
Detector 1 Delay (s)		0.0			0.0			0.0			0.0	
Turn Type		NA			NA			NA			NA	
Protected Phases		2			6			8			4	
Permitted Phases												
Detector Phase		2			6			8			4	
Switch Phase												
Minimum Initial (s)		10.0			10.0			7.0			7.0	
Minimum Split (s)		25.5			26.6			28.7			28.7	
Total Split (s)		57.0			57.0			33.0			33.0	
Total Split (%)		63.3%			63.3%			36.7%			36.7%	

# Lanes, Volumes, Timings

6: 5th St & Market St

9/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Maximum Green (s)	51.5			51.4			27.3			27.3		
Yellow Time (s)	3.8			3.9			3.2			3.1		
All-Red Time (s)	1.7			1.7			2.5			2.6		
Lost Time Adjust (s)	-2.0			-2.0			-2.0			-2.0		
Total Lost Time (s)	3.5			3.6			3.7			3.7		
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.5			4.5			2.0			2.0		
Minimum Gap (s)	3.0			3.0			3.0			3.0		
Time Before Reduce (s)	10.0			10.0			0.0			0.0		
Time To Reduce (s)	10.0			10.0			0.0			0.0		
Recall Mode	C-Max			C-Max			None			None		
Walk Time (s)	4.0			4.0			4.0			4.0		
Flash Dont Walk (s)	16.0			17.0			19.0			19.0		
Pedestrian Calls (#/hr)	0			0			0			0		
Act Effct Green (s)	71.0			70.9			11.8			11.8		
Actuated g/C Ratio	0.79			0.79			0.13			0.13		
v/c Ratio	0.29			0.29			0.45			0.23		
Control Delay	3.7			4.8			39.0			35.6		
Queue Delay	0.0			0.0			0.0			0.0		
Total Delay	3.7			4.8			39.0			35.6		
LOS	A			A			D			D		
Approach Delay	3.7			4.8			39.0			35.6		
Approach LOS	A			A			D			D		

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 6 (7%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 13.2

Intersection LOS: B

Intersection Capacity Utilization 33.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: 5th St & Market St



## Lanes, Volumes, Timings

9: 10th St &amp; Market St

9/10/2015

	↑	→	↓	↗	↖	↙	↖	↑	↗	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑		↑	↑			↔		↑	↑	
Traffic Volume (vph)	13	402	7	18	345	22	11	63	30	26	67	7
Future Volume (vph)	13	402	7	18	345	22	11	63	30	26	67	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			200		0	0		0	100		0
Storage Lanes	1			1			0	0		0	1	
Taper Length (ft)	100			100			100			100		
Lane Util. 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
Fr <sub>t</sub>		0.997			0.991			0.961			0.985	
Flt Protected	0.950			0.950				0.995		0.950		
Satd. Flow (prot)	1770	1857	0	1770	1846	0	0	1781	0	1770	1835	0
Flt Permitted	0.508			0.481				0.960		0.533		
Satd. Flow (perm)	946	1857	0	896	1846	0	0	1718	0	993	1835	0
Right Turn on Red			No			No			No		No	
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		2009			900			828			513	
Travel Time (s)		39.1			17.5			22.6			14.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	14	447	8	20	383	24	12	70	33	29	74	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	455	0	20	407	0	0	115	0	29	82	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			0			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	1		1	1		1	1		1	1	
Detector Template	Left			Left			Left					
Leading Detector (ft)	20	76		20	76		20	33		55	55	
Trailing Detector (ft)	0	70		0	70		0	-2		-5	-5	
Detector 1 Position(ft)	0	70		0	70		0	-2		-5	-5	
Detector 1 Size(ft)	20	6		20	6		20	35		60	60	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
Turn Type	Perm	NA										
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	15.6	15.6		15.4	15.4		12.9	12.9		13.0	13.0	
Total Split (s)	63.0	63.0		63.0	63.0		27.0	27.0		27.0	27.0	

# Lanes, Volumes, Timings

9: 10th St & Market St

9/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	57.4	57.4		57.6	57.6		21.1	21.1		21.0	21.0	
Yellow Time (s)	4.1	4.1		3.6	3.6		3.1	3.1		3.2	3.2	
All-Red Time (s)	1.5	1.5		1.8	1.8		2.8	2.8		2.8	2.8	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	3.6	3.6		3.4	3.4		3.9			4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	2.0		2.0	2.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	73.2	73.2		73.3	73.3					12.6	12.6	12.6
Actuated g/C Ratio	0.81	0.81		0.81	0.81					0.14	0.14	0.14
v/c Ratio	0.02	0.30		0.03	0.27					0.48	0.21	0.32
Control Delay	1.8	3.0		0.9	1.5					41.6	36.6	37.3
Queue Delay	0.0	0.0		0.0	0.0					0.0	0.0	0.0
Total Delay	1.8	3.0		0.9	1.5					41.6	36.6	37.3
LOS	A	A		A	A					D	D	D
Approach Delay		2.9			1.5					41.6		37.1
Approach LOS		A			A					D		D

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 39 (43%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.48

Intersection Signal Delay: 9.7

Intersection LOS: A

Intersection Capacity Utilization 40.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 9: 10th St & Market St



## Lanes, Volumes, Timings

14: 16th St &amp; Market St

9/10/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑	↑	↑	↑					↑↑	↑↑	
Traffic Volume (vph)	0	577	189	426	567	0	0	0	0	97	686	18
Future Volume (vph)	0	577	189	426	567	0	0	0	0	97	686	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	25			100		0	0		0	0		0
Storage Lanes	1		1	1		0	0		0	0		0
Taper Length (ft)	200			25			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor				0.99							1.00	
Frt				0.850							0.997	
Flt Protected					0.950							0.994
Satd. Flow (prot)	0	1863	1583	1770	1863	0	0	0	0	0	3506	0
Flt Permitted					0.132							0.994
Satd. Flow (perm)	0	1863	1561	246	1863	0	0	0	0	0	3505	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1473			369			549			1165	
Travel Time (s)		28.7			7.2			10.7			22.7	
Confl. Peds. (#/hr)			1	1						1		1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	641	210	473	630	0	0	0	0	108	762	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	641	210	473	630	0	0	0	0	0	890	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)		12			12			0				0
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane				Yes								
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	1	1	1					1	1	
Detector Template			Right							Left		
Leading Detector (ft)		206	20	40	206					20	40	
Trailing Detector (ft)		200	0	0	200					0	0	
Detector 1 Position(ft)		200	0	0	200					0	0	
Detector 1 Size(ft)		6	20	40	6					20	40	
Detector 1 Type		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	
Detector 1 Queue (s)		0.0	0.0	0.0	0.0					0.0	0.0	
Detector 1 Delay (s)		0.0	0.0	15.0	0.0					0.0	5.0	
Turn Type		NA	Perm	pm+pt	NA					Perm	NA	
Protected Phases		2		1	6						4	
Permitted Phases			2	6						4		
Detector Phase		2	2	1	6					4	4	
Switch Phase												
Minimum Initial (s)		10.0	10.0	7.0	8.0					7.0	7.0	

# Lanes, Volumes, Timings

14: 16th St & Market St

9/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	17.1	17.1	12.1	13.3						23.7	23.7	
Total Split (s)	39.0	39.0	23.0	62.0						28.0	28.0	
Total Split (%)	43.3%	43.3%	25.6%	68.9%						31.1%	31.1%	
Maximum Green (s)	33.9	33.9	17.9	56.7						22.3	22.3	
Yellow Time (s)	3.8	3.8	3.0	4.0						3.8	3.8	
All-Red Time (s)	1.3	1.3	2.1	1.3						1.9	1.9	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0						-2.0		
Total Lost Time (s)	3.1	3.1	3.1	3.3						3.7		
Lead/Lag	Lead	Lead	Lag									
Lead-Lag Optimize?	Yes	Yes	Yes									
Vehicle Extension (s)	6.0	6.0	2.0	6.0						5.0	5.0	
Minimum Gap (s)	2.5	2.5	3.0	2.5						2.5	2.5	
Time Before Reduce (s)	10.0	10.0	0.0	10.0						0.0	0.0	
Time To Reduce (s)	15.0	15.0	0.0	15.0						10.0	10.0	
Recall Mode	C-Max	C-Max	None	C-Max						None	None	
Walk Time (s)	4.0	4.0		4.0						4.0	4.0	
Flash Dont Walk (s)	8.0	8.0		4.0						14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0						0	0	
Act Effct Green (s)	35.9	35.9	58.9	58.7						24.3		
Actuated g/C Ratio	0.40	0.40	0.65	0.65						0.27		
v/c Ratio	0.86	0.34	0.95	0.52						0.94		
Control Delay	33.7	16.3	39.9	1.7						30.0		
Queue Delay	0.0	0.0	0.0	2.3						0.0		
Total Delay	33.7	16.3	39.9	4.0						30.0		
LOS	C	B	D	A						C		
Approach Delay	29.4			19.4						30.0		
Approach LOS	C			B						C		

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 64 (71%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 25.7

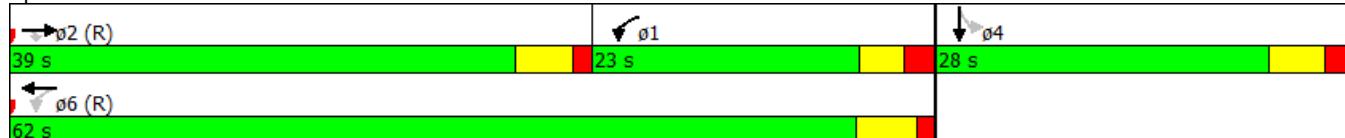
Intersection LOS: C

Intersection Capacity Utilization 90.0%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 14: 16th St & Market St



Lanes, Volumes, Timings  
17: 17th St & Market St

9/10/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑			↑	↑	↑	↑↑	↑			
Traffic Volume (vph)	21	667	0	0	880	43	128	917	514	0	0	0
Future Volume (vph)	21	667	0	0	880	43	128	917	514	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		200	0		0	0		0
Storage Lanes	1		0	0		1	1		1	0		0
Taper Length (ft)	25			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor						0.99	1.00		0.98			
Frt						0.850			0.850			
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1770	1863	0	0	1863	1583	1770	3539	1583	0	0	0
Flt Permitted	0.082						0.950					
Satd. Flow (perm)	153	1863	0	0	1863	1562	1766	3539	1548	0	0	0
Right Turn on Red			No			No			No		No	
Satd. Flow (RTOR)												
Link Speed (mph)	35				35			35			35	
Link Distance (ft)	369				1854			597			1164	
Travel Time (s)	7.2				36.1			11.6			22.7	
Confl. Peds. (#/hr)	1					1	1		1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	23	741	0	0	978	48	142	1019	571	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	741	0	0	978	48	142	1019	571	0	0	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)	12				12			12			12	
Link Offset(ft)	0				0			0			0	
Crosswalk Width(ft)	16				16			16			16	
Two way Left Turn Lane	Yes											
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	0			0	1	1	1	1			
Detector Template	Left				Right							
Leading Detector (ft)	20	0			0	20	40	40	40			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Detector 1 Position(ft)	0	0			0	0	0	0	0			
Detector 1 Size(ft)	20	6			6	20	40	40	40			
Detector 1 Type	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			
Detector 1 Queue (s)	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	15.0		
Turn Type	Perm	NA			NA	Perm	Perm	NA	Perm			
Protected Phases		2			6			8				
Permitted Phases	2				6	8		8				
Detector Phase	2	2			6	6	8	8	8			
Switch Phase												
Minimum Initial (s)	10.0	10.0			10.0	10.0	7.0	7.0	7.0			

# Lanes, Volumes, Timings

17: 17th St & Market St

9/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Split (s)	21.4	21.4			21.2	21.2	26.4	26.4	26.4			
Total Split (s)	52.0	52.0			52.0	52.0	38.0	38.0	38.0			
Total Split (%)	57.8%	57.8%			57.8%	57.8%	42.2%	42.2%	42.2%			
Maximum Green (s)	46.6	46.6			46.8	46.8	32.6	32.6	32.6			
Yellow Time (s)	3.8	3.8			3.8	3.8	3.9	3.9	3.9			
All-Red Time (s)	1.6	1.6			1.4	1.4	1.5	1.5	1.5			
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0	-2.0	-2.0	-2.0			
Total Lost Time (s)	3.4	3.4			3.2	3.2	3.4	3.4	3.4			
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	0.2	0.2			0.2	0.2	2.0	2.0	2.0			
Recall Mode	C-Max	C-Max			C-Max	C-Max	None	None	None			
Walk Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Flash Dont Walk (s)	12.0	12.0			12.0	12.0	17.0	17.0	17.0			
Pedestrian Calls (#/hr)	0	0			0	0	0	0	0			
Act Effct Green (s)	48.6	48.6			48.8	48.8	34.6	34.6	34.6			
Actuated g/C Ratio	0.54	0.54			0.54	0.54	0.38	0.38	0.38			
v/c Ratio	0.28	0.74			0.97	0.06	0.21	0.75	0.96			
Control Delay	7.6	6.6			28.0	7.7	19.6	28.2	57.3			
Queue Delay	0.0	0.1			4.6	0.0	0.1	0.0	0.0			
Total Delay	7.6	6.7			32.7	7.7	19.7	28.2	57.3			
LOS	A	A			C	A	B	C	E			
Approach Delay		6.7			31.5			37.1				
Approach LOS		A			C			D				

## Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 55 (61%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 28.9

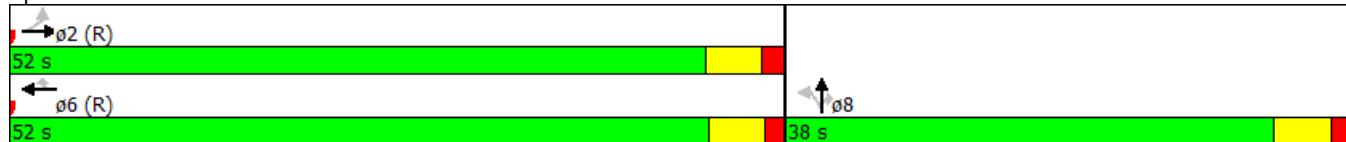
Intersection LOS: C

Intersection Capacity Utilization 90.0%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 17: 17th St & Market St



## Lanes, Volumes, Timings

23: Market St &amp; 23rd St

9/10/2015



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑	↓		↑	
Traffic Volume (vph)	45	1061	918	105	231	76
Future Volume (vph)	45	1061	918	105	231	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	100				100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor					0.99	
Frt			0.986		0.967	
Flt Protected	0.950				0.964	
Satd. Flow (prot)	1770	1863	1837	0	1726	0
Flt Permitted	0.090				0.964	
Satd. Flow (perm)	168	1863	1837	0	1726	0
Right Turn on Red				No		No
Satd. Flow (RTOR)						
Link Speed (mph)		35	35		35	
Link Distance (ft)		993	944		1214	
Travel Time (s)		19.3	18.4		23.6	
Confl. Peds. (#/hr)					1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	50	1179	1020	117	257	84
Shared Lane Traffic (%)						
Lane Group Flow (vph)	50	1179	1137	0	341	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Number of Detectors	1	1	1		1	
Detector Template	Left					
Leading Detector (ft)	20	76	81		68	
Trailing Detector (ft)	0	70	75		-2	
Detector 1 Position(ft)	0	70	75		-2	
Detector 1 Size(ft)	20	6	6		70	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	
Detector 1 Delay (s)	0.0	0.0	0.0		10.0	
Turn Type	Perm	NA	NA		Prot	
Protected Phases		2	6		4	
Permitted Phases	2					
Detector Phase	2	2	6		4	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		7.0	



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Minimum Split (s)	14.9	14.9	15.1		15.8	
Total Split (s)	66.0	66.0	66.0		24.0	
Total Split (%)	73.3%	73.3%	73.3%		26.7%	
Maximum Green (s)	61.1	61.1	60.9		19.2	
Yellow Time (s)	3.7	3.7	3.9		3.0	
All-Red Time (s)	1.2	1.2	1.2		1.8	
Lost Time Adjust (s)	-2.0	-2.0	-2.0		-2.0	
Total Lost Time (s)	2.9	2.9	3.1		2.8	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		2.0	
Recall Mode	C-Max	C-Max	C-Max		None	
Walk Time (s)					4.0	
Flash Dont Walk (s)					7.0	
Pedestrian Calls (#/hr)					0	
Act Effct Green (s)	63.8	63.8	63.6		20.5	
Actuated g/C Ratio	0.71	0.71	0.71		0.23	
v/c Ratio	0.42	0.89	0.88		0.87	
Control Delay	14.5	17.8	14.2		56.7	
Queue Delay	0.0	40.0	0.0		0.0	
Total Delay	14.5	57.8	14.2		56.7	
LOS	B	E	B		E	
Approach Delay		56.1	14.2		56.7	
Approach LOS		E	B		E	

### Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 87 (97%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 38.6

Intersection LOS: D

Intersection Capacity Utilization 80.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 23: Market St & 23rd St



Lanes, Volumes, Timings  
25: Forest Hills Dr & Market St

9/10/2015

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→	↓	↖	←	↑	↗
Traffic Volume (vph)	1246	107	79	988	115	55
Future Volume (vph)	1246	107	79	988	115	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	200		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			100		100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor					0.99	
Frt	0.989				0.956	
Flt Protected			0.950		0.967	
Satd. Flow (prot)	1842	0	1770	1863	1709	0
Flt Permitted			0.058		0.967	
Satd. Flow (perm)	1842	0	108	1863	1709	0
Right Turn on Red		No			No	
Satd. Flow (RTOR)						
Link Speed (mph)	35			35	25	
Link Distance (ft)	944			866	959	
Travel Time (s)	18.4			16.9	26.2	
Confl. Peds. (#/hr)					1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1384	119	88	1098	128	61
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1503	0	88	1098	189	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		15	9
Number of Detectors	1		1	1	1	
Detector Template			Left			
Leading Detector (ft)	76		20	76	40	
Trailing Detector (ft)	70		0	70	0	
Detector 1 Position(ft)	70		0	70	0	
Detector 1 Size(ft)	6		20	6	40	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	5.0	
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Detector Phase	2		6	6	8	
Switch Phase						
Minimum Initial (s)	9.0		8.0	8.0	7.0	



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Minimum Split (s)	14.4		12.8	12.8	20.3	
Total Split (s)	69.7		69.7	69.7	20.3	
Total Split (%)	77.4%		77.4%	77.4%	22.6%	
Maximum Green (s)	64.3		64.9	64.9	15.0	
Yellow Time (s)	3.8		3.8	3.8	3.0	
All-Red Time (s)	1.6		1.0	1.0	2.3	
Lost Time Adjust (s)	-2.0		-2.0	-2.0	-2.0	
Total Lost Time (s)	3.4		2.8	2.8	3.3	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	2.0	
Recall Mode	C-Max		C-Max	C-Max	None	
Walk Time (s)					4.0	
Flash Dont Walk (s)					11.0	
Pedestrian Calls (#/hr)					0	
Act Effct Green (s)	68.4		69.0	69.0	14.9	
Actuated g/C Ratio	0.76		0.77	0.77	0.17	
v/c Ratio	1.07		1.06	0.77	0.67	
Control Delay	54.2		141.0	11.3	47.0	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	54.2		141.0	11.3	47.0	
LOS	D		F	B	D	
Approach Delay	54.2			20.9	47.0	
Approach LOS	D			C	D	

#### Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 80 (89%), Referenced to phase 2:EBT and 6:WBTL, Start of Green

Natural Cycle: 130

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.07

Intersection Signal Delay: 40.0

Intersection LOS: D

Intersection Capacity Utilization 88.6%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 25: Forest Hills Dr & Market St



## Lanes, Volumes, Timings

33: Covil Ave/Montgomery Ave &amp; Market St

9/10/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑		↑	↑	↑	↑	↑	↑	↑	↑	
Traffic Volume (vph)	115	2044	437	509	2193	80	441	94	686	127	98	98
Future Volume (vph)	115	2044	437	509	2193	80	441	94	686	127	98	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	600		0	0		0	0		0
Storage Lanes	1		0	1		1	0		1	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. 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
Fr <sub>t</sub>		0.974				0.850			0.850		0.925	
Flt Protected	0.950			0.950				0.960		0.950		
Satd. Flow (prot)	1770	1814	0	1770	1863	1583	0	1788	1583	1770	1723	0
Flt Permitted	0.062			0.058				0.523		0.099		
Satd. Flow (perm)	115	1814	0	108	1863	1583	0	974	1583	184	1723	0
Right Turn on Red			No			No			No		No	
Satd. Flow (RTOR)												
Link Speed (mph)		40			40			35			25	
Link Distance (ft)		2438			3526			759			597	
Travel Time (s)		41.6			60.1			14.8			16.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	128	2271	486	566	2437	89	490	104	762	141	109	109
Shared Lane Traffic (%)												
Lane Group Flow (vph)	128	2757	0	566	2437	89	0	594	762	141	218	0
Enter Blocked Intersection	No											
Lane Alignment	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					Yes							
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	1	1	1	1	1	1
Detector Template					Right		Left					
Leading Detector (ft)	60	256		60	256	20	20	35	60	35	55	
Trailing Detector (ft)	0	80		0	80	0	0	-5	0	-5	-5	
Detector 1 Position(ft)	0	80		0	80	0	0	-5	0	-5	-5	
Detector 1 Size(ft)	60	6		60	6	20	20	40	60	40	60	
Detector 1 Type	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		15.0	0.0	0.0	0.0	3.0	15.0	3.0	15.0	
Detector 2 Position(ft)		250			250							
Detector 2 Size(ft)		6			6							
Detector 2 Type		Cl+Ex			Cl+Ex							
Detector 2 Channel												
Detector 2 Extend (s)		1.3			1.3							
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	pm+ov	Perm	NA	
Protected Phases		2		1	6			8	1		4	
Permitted Phases		2		6		6	8		8	4		

## Lanes, Volumes, Timings

33: Covil Ave/Montgomery Ave & Market St

9/10/2015

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		1	6	6	8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	16.0	16.0		12.3	15.8	15.8	12.8	12.8	12.3	13.1	13.1	
Total Split (s)	69.0	69.0		23.0	92.0	92.0	60.0	60.0	23.0	60.0	60.0	
Total Split (%)	45.4%	45.4%		15.1%	60.5%	60.5%	39.5%	39.5%	15.1%	39.5%	39.5%	
Maximum Green (s)	63.0	63.0		17.7	86.2	86.2	54.2	54.2	17.7	53.9	53.9	
Yellow Time (s)	4.2	4.2		3.0	4.2	4.2	3.8	3.8	3.0	3.6	3.6	
All-Red Time (s)	1.8	1.8		2.3	1.6	1.6	2.0	2.0	2.3	2.5	2.5	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		3.3	3.8	3.8	3.8	3.8	3.3	4.1	4.1	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?	Yes	Yes		Yes					Yes			
Vehicle Extension (s)	3.0	3.0		1.0	3.0	3.0	1.0	1.0	1.0	1.0	1.0	
Recall Mode	C-Max	C-Max		None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	65.0	65.0		88.7	88.2	88.2	56.2	79.7	55.9	55.9	55.9	
Actuated g/C Ratio	0.43	0.43		0.58	0.58	0.58	0.37	0.52	0.37	0.37	0.37	
v/c Ratio	2.61	3.56		2.04	2.25	0.10	1.65	0.92	2.10	0.34		
Control Delay	801.3	1169.6		500.4	590.1	21.5	336.6	50.6	569.6	36.7		
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	801.3	1169.6		500.4	590.1	21.5	336.6	50.6	569.6	36.7		
LOS	F	F		F	F	C		F	D	F	D	
Approach Delay		1153.3			557.3			175.9			246.0	
Approach LOS		F			F			F			F	

### Intersection Summary

Area Type: Other

Cycle Length: 152

Actuated Cycle Length: 152

Offset: 124 (82%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 3.56

Intersection Signal Delay: 699.1

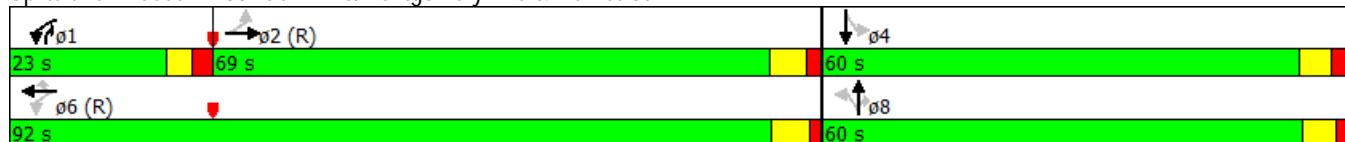
Intersection LOS: F

Intersection Capacity Utilization 216.3%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 33: Covil Ave/Montgomery Ave & Market St



## APPENDIX B: SIMTRAFFIC REPORTS

### Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	6:57	6:57	6:57	6:57
End Time	8:07	8:07	8:07	8:07
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	14444	14769	14402	14535
Vehs Exited	13967	14248	13854	14024
Starting Vehs	976	979	895	949
Ending Vehs	1453	1500	1443	1457
Travel Distance (mi)	15210	15360	14850	15140
Travel Time (hr)	1773.0	1731.1	1657.6	1720.6
Total Delay (hr)	1303.1	1257.6	1200.3	1253.7
Total Stops	28170	29534	28098	28601
Fuel Used (gal)	782.4	774.3	749.3	768.7

### Interval #0 Information Seeding

Start Time	6:57
End Time	7:07
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

### Interval #1 Information Recording

Start Time	7:07
End Time	8:07
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	Avg
Vehs Entered	14444	14769	14402	14535
Vehs Exited	13967	14248	13854	14024
Starting Vehs	976	979	895	949
Ending Vehs	1453	1500	1443	1457
Travel Distance (mi)	15210	15360	14850	15140
Travel Time (hr)	1773.0	1731.1	1657.6	1720.6
Total Delay (hr)	1303.1	1257.6	1200.3	1253.7
Total Stops	28170	29534	28098	28601
Fuel Used (gal)	782.4	774.3	749.3	768.7

# Queuing and Blocking Report

2020 No-Build AM

9/9/2015

## Intersection: 3: 3rd St & Market St

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	LT	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	59	70	53	110	149	59	138	124	66	88	83
Average Queue (ft)	13	24	16	58	76	22	66	46	26	37	26
95th Queue (ft)	43	59	44	103	125	54	125	104	55	77	66
Link Distance (ft)		610	610	734	734		535	535		714	714
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)		125				150			200		
Storage Blk Time (%)							0				
Queuing Penalty (veh)							0				

## Intersection: 6: 5th St & Market St

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	T	TR	T	TR	T	TR	T	TR
Maximum Queue (ft)	67	46	46	54	99	75	75	31
Average Queue (ft)	10	8	6	9	45	29	25	8
95th Queue (ft)	40	31	28	39	86	66	62	30
Link Distance (ft)	734	734	1935	1935	598	598	644	644
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

## Intersection: 9: 10th St & Market St

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	LT	TR	LT	TR	LTR	L	TR
Maximum Queue (ft)	52	74	58	36	140	56	87
Average Queue (ft)	13	22	9	4	70	19	35
95th Queue (ft)	41	55	34	22	123	50	73
Link Distance (ft)	1935	1935	838	838	782		467
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)					100		
Storage Blk Time (%)						0	
Queuing Penalty (veh)						0	

# Queuing and Blocking Report

2020 No-Build AM

9/9/2015

## Intersection: 14: 16th St & Market St

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	TR	L	T	T	LT	TR
Maximum Queue (ft)	193	194	250	351	319	252	257
Average Queue (ft)	96	101	193	153	109	146	161
95th Queue (ft)	160	162	277	335	211	222	233
Link Distance (ft)	1394	1394		330	330	1072	1072
Upstream Blk Time (%)				2	0		
Queuing Penalty (veh)				17	0		
Storage Bay Dist (ft)			150				
Storage Blk Time (%)			27	0			
Queuing Penalty (veh)			119	2			

## Intersection: 17: 17th St & Market St

Movement	EB	EB	WB	WB	NB	NB	NB	NB
Directions Served	LT	T	T	TR	L	T	T	R
Maximum Queue (ft)	120	96	313	278	214	211	264	345
Average Queue (ft)	51	37	145	114	117	116	167	177
95th Queue (ft)	97	86	270	212	188	194	245	296
Link Distance (ft)	330	330	1768	1768	551	551	551	551
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

## Intersection: 23: Market St & 23rd St

Movement	EB	EB	WB	WB	SB
Directions Served	LT	T	T	TR	LR
Maximum Queue (ft)	167	148	181	221	410
Average Queue (ft)	66	36	95	98	235
95th Queue (ft)	127	93	164	169	412
Link Distance (ft)	940	940	877	877	1144
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

# Queuing and Blocking Report

2020 No-Build AM

9/9/2015

## Intersection: 25: Forest Hills Dr & Market St

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (ft)	148	174	174	181	216
Average Queue (ft)	68	86	80	81	116
95th Queue (ft)	134	148	150	162	193
Link Distance (ft)	877	877	816	816	919
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

## Intersection: 28: 23rd St & Princess Pl

Movement	EB	EB	WB	WB	WB	NB	NB	B30	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	T	L	T	R
Maximum Queue (ft)	324	143	193	1100	200	108	875	614	233	724	260
Average Queue (ft)	125	29	31	792	110	7	725	211	70	314	135
95th Queue (ft)	264	96	119	1310	272	45	1001	682	169	653	311
Link Distance (ft)		1239		1144			790	1144		749	
Upstream Blk Time (%)				12			46			1	
Queuing Penalty (veh)				0			95			0	
Storage Bay Dist (ft)	275		160		100	50			180		160
Storage Blk Time (%)	1			85	0	2	93			35	0
Queuing Penalty (veh)	1			99	0	4	3			164	1

## Intersection: 33: Covil Ave/Montgomery Ave & Market St

Movement	EB	EB	EB	WB	WB	WB	B51	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	T	LT	R	L	TR
Maximum Queue (ft)	225	893	936	388	332	319	10	743	736	110	188
Average Queue (ft)	147	516	539	246	169	179	0	723	689	34	76
95th Queue (ft)	263	859	874	363	298	305	6	733	907	87	148
Link Distance (ft)		2362	2362		3457	3457	837	706	706	539	539
Upstream Blk Time (%)								84	43		
Queuing Penalty (veh)								0	0		
Storage Bay Dist (ft)	125			600							
Storage Blk Time (%)	42	43									
Queuing Penalty (veh)	216	33									

# Queuing and Blocking Report

2020 No-Build AM

9/9/2015

## Intersection: 38: 16th St & Grace St

Movement	EB	EB	WB	SB	SB
Directions Served	T	R	L	LT	T
Maximum Queue (ft)	100	124	119	175	136
Average Queue (ft)	34	49	45	87	19
95th Queue (ft)	72	98	95	145	75
Link Distance (ft)	471		314	440	440
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		150			
Storage Blk Time (%)	0	0			
Queuing Penalty (veh)	0	0			

## Intersection: 39: 17th St & Grace St/Princess Pl

Movement	EB	WB	WB	NB	NB
Directions Served	LT	T	R	LT	R
Maximum Queue (ft)	90	523	325	257	494
Average Queue (ft)	43	297	73	84	345
95th Queue (ft)	84	464	294	166	474
Link Distance (ft)	314	646		1086	1086
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		225			
Storage Blk Time (%)	17				
Queuing Penalty (veh)	23				

# Queuing and Blocking Report

2020 No-Build AM

9/9/2015

## Intersection: 44: Kerr Ave & MLK Blvd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	R	L	T	T	T	R	L	T
Maximum Queue (ft)	350	563	585	637	453	465	1815	1802	1806	300	325	392
Average Queue (ft)	209	332	313	284	245	435	1407	1375	1318	206	292	277
95th Queue (ft)	361	478	476	511	417	554	2123	2104	2056	428	344	460
Link Distance (ft)		1414	1414	1414			1772	1772	1772			325
Upstream Blk Time (%)							28	19	21		15	16
Queuing Penalty (veh)							0	0	0		0	57
Storage Bay Dist (ft)	250				360	365				200	270	
Storage Blk Time (%)	4	27		3	10	32	74		76	1	42	3
Queuing Penalty (veh)	15	56		10	39	153	141		105	4	103	13

## Intersection: 44: Kerr Ave & MLK Blvd

Movement	NB	NB	B48	B46	SB	SB	SB	SB	B47
Directions Served	T	R	T	T	L	T	T	R	T
Maximum Queue (ft)	340	190	460	26	380	662	668	225	337
Average Queue (ft)	149	38	109	1	230	622	633	211	298
95th Queue (ft)	359	106	435	14	508	726	705	284	390
Link Distance (ft)	325		724	2825		590	590		294
Upstream Blk Time (%)	1		0			38	43		55
Queuing Penalty (veh)	3		2			0	0		0
Storage Bay Dist (ft)		130			280			125	
Storage Blk Time (%)	2	0				87	19	29	
Queuing Penalty (veh)	4	0				104	113	96	

## Intersection: 47: Bend

Movement	NB
Directions Served	T
Maximum Queue (ft)	201
Average Queue (ft)	7
95th Queue (ft)	111
Link Distance (ft)	590
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

# Queuing and Blocking Report

2020 No-Build AM

9/9/2015

## Intersection: 49: Market St & Kerr Ave

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	L	T	R
Maximum Queue (ft)	140	632	624	317	405	1059	1030	513	203	213	397	252
Average Queue (ft)	129	456	454	168	363	790	765	296	112	115	370	83
95th Queue (ft)	163	625	620	270	502	1361	1347	1143	197	202	432	177
Link Distance (ft)		837	837	837		1324	1324	1324	320	320	320	320
Upstream Blk Time (%)						15	14	8			55	
Queuing Penalty (veh)						0	0	0			111	
Storage Bay Dist (ft)	70					225						
Storage Blk Time (%)	79	41				45	38					
Queuing Penalty (veh)	385	72				338	123					

## Intersection: 49: Market St & Kerr Ave

Movement	B12	B53	SB	SB	SB	B46	B48	B48
Directions Served	T	T	L	T	R	T	T	
Maximum Queue (ft)	532	1698	520	2937	475	836	370	397
Average Queue (ft)	392	916	350	2676	444	600	205	207
95th Queue (ft)	691	2591	694	3541	608	1149	456	512
Link Distance (ft)	430	2989		2825		724	325	325
Upstream Blk Time (%)	39	0		63		58	4	12
Queuing Penalty (veh)	310	1		755		700	23	74
Storage Bay Dist (ft)			420			375		
Storage Blk Time (%)				79				
Queuing Penalty (veh)				375				

## Intersection: 56: Kerr Ave & Randall Pkwy

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	T	R
Maximum Queue (ft)	262	321	324	183	305	303	190	484	250	250	503	260
Average Queue (ft)	140	229	193	58	197	179	57	271	101	110	197	103
95th Queue (ft)	242	318	294	141	287	275	158	450	250	208	390	232
Link Distance (ft)	844	844	844		696	696		510			2989	
Upstream Blk Time (%)								1				
Queuing Penalty (veh)								0				
Storage Bay Dist (ft)				200			90		150	150		160
Storage Blk Time (%)					9		2	38	0	2	12	1
Queuing Penalty (veh)					8		10	80	2	13	59	7

## Network Summary

Network wide Queuing Penalty: 5238

## Summary of All Intervals

Run Number	1	2	3	Avg
Start Time	6:57	6:57	6:57	6:57
End Time	8:07	8:07	8:07	8:07
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	16649	16915	17153	16908
Vehs Exited	16116	16222	16508	16283
Starting Vehs	1334	1405	1312	1350
Ending Vehs	1867	2098	1957	1964
Travel Distance (mi)	16246	16245	16567	16353
Travel Time (hr)	4547.3	4542.5	4349.0	4479.6
Total Delay (hr)	4047.0	4042.1	3838.9	3976.0
Total Stops	32589	35449	36436	34822
Fuel Used (gal)	1450.9	1444.9	1410.1	1435.3

## Interval #0 Information Seeding

Start Time	6:57
End Time	7:07
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

## Interval #1 Information Recording

Start Time	7:07
End Time	8:07
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	Avg
Vehs Entered	16649	16915	17153	16908
Vehs Exited	16116	16222	16508	16283
Starting Vehs	1334	1405	1312	1350
Ending Vehs	1867	2098	1957	1964
Travel Distance (mi)	16246	16245	16567	16353
Travel Time (hr)	4547.3	4542.5	4349.0	4479.6
Total Delay (hr)	4047.0	4042.1	3838.9	3976.0
Total Stops	32589	35449	36436	34822
Fuel Used (gal)	1450.9	1444.9	1410.1	1435.3

# Queuing and Blocking Report

2020 No-Build PM

9/9/2015

## Intersection: 3: 3rd St & Market St

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	LT	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	87	148	147	172	103	53	144	124	80	162	152
Average Queue (ft)	31	67	52	84	59	23	68	40	38	82	58
95th Queue (ft)	71	112	106	141	100	51	123	95	69	148	123
Link Distance (ft)		610	610	734	734		535	535		714	714
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	125					150			200		
Storage Blk Time (%)		0						0			
Queuing Penalty (veh)		0						0			

## Intersection: 6: 5th St & Market St

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	T	TR	T	TR	T	TR	T	TR
Maximum Queue (ft)	60	72	57	66	134	101	114	52
Average Queue (ft)	23	18	14	13	75	44	52	16
95th Queue (ft)	55	51	44	43	118	83	92	44
Link Distance (ft)	734	734	1935	1935	598	598	644	644
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

## Intersection: 9: 10th St & Market St

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	LT	TR	LT	TR	LTR	L	TR
Maximum Queue (ft)	85	94	93	102	154	83	123
Average Queue (ft)	29	33	33	42	68	27	49
95th Queue (ft)	70	81	76	86	122	64	94
Link Distance (ft)	1935	1935	838	838	782		467
Upstream Blk Time (%)					100		
Queuing Penalty (veh)						0	0
Storage Bay Dist (ft)						0	0
Storage Blk Time (%)						0	0
Queuing Penalty (veh)						0	0

# Queuing and Blocking Report

2020 No-Build PM

9/9/2015

## Intersection: 14: 16th St & Market St

Movement	EB	EB	WB	WB	WB	SB	SB
Directions Served	T	TR	L	T	T	LT	TR
Maximum Queue (ft)	242	268	248	294	51	228	232
Average Queue (ft)	142	163	134	25	14	141	143
95th Queue (ft)	233	253	230	126	40	204	216
Link Distance (ft)	1394	1394		330	330	1072	1072
Upstream Blk Time (%)				0			
Queuing Penalty (veh)				0			
Storage Bay Dist (ft)			150				
Storage Blk Time (%)			4	0			
Queuing Penalty (veh)			13	0			

## Intersection: 17: 17th St & Market St

Movement	EB	EB	WB	WB	NB	NB	NB	NB
Directions Served	LT	T	T	TR	L	T	T	R
Maximum Queue (ft)	157	151	341	258	415	566	574	578
Average Queue (ft)	61	44	173	155	157	307	356	284
95th Queue (ft)	121	109	273	232	487	583	605	542
Link Distance (ft)	330	330	1768	1768	551	551	551	551
Upstream Blk Time (%)					8	13	17	12
Queuing Penalty (veh)					0	0	0	0
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

## Intersection: 23: Market St & 23rd St

Movement	EB	EB	WB	WB	SB
Directions Served	LT	T	T	TR	LR
Maximum Queue (ft)	253	257	301	315	289
Average Queue (ft)	93	92	76	87	124
95th Queue (ft)	214	210	277	297	236
Link Distance (ft)	940	940	877	877	1144
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

# Queuing and Blocking Report

2020 No-Build PM

9/9/2015

## Intersection: 25: Forest Hills Dr & Market St

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (ft)	502	491	189	194	226
Average Queue (ft)	116	119	84	83	112
95th Queue (ft)	412	417	153	157	184
Link Distance (ft)	877	877	816	816	919
Upstream Blk Time (%)	0	0			
Queuing Penalty (veh)	0	3			
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

## Intersection: 28: 23rd St & Princess Pl

Movement	EB	EB	WB	WB	WB	NB	NB	B30	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	T	L	T	R
Maximum Queue (ft)	208	224	259	1190	200	150	880	797	279	801	260
Average Queue (ft)	81	70	68	1161	119	144	813	361	83	767	156
95th Queue (ft)	172	183	198	1177	276	155	965	952	221	782	357
Link Distance (ft)		1239		1144			790	1144		749	
Upstream Blk Time (%)				91			76	6		77	
Queuing Penalty (veh)				0			114	10		0	
Storage Bay Dist (ft)	275		160		100	50			180		160
Storage Blk Time (%)				85	1	100	54			78	
Queuing Penalty (veh)				251	3	323	96			410	

## Intersection: 33: Covil Ave/Montgomery Ave & Market St

Movement	EB	EB	EB	B21	B21	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	T	T	L	T	TR	LT	R	L	TR
Maximum Queue (ft)	225	2444	2453	554	560	700	1382	1391	740	749	220	284
Average Queue (ft)	183	1960	1971	153	156	599	896	881	722	722	98	146
95th Queue (ft)	285	2581	2584	630	635	844	1582	1595	733	735	178	261
Link Distance (ft)		2362	2362	816	816		3457	3457	706	706	539	539
Upstream Blk Time (%)		27	28	4	5				78	53		
Queuing Penalty (veh)		177	185	26	31				0	0		
Storage Bay Dist (ft)	125					600						
Storage Blk Time (%)	75	56					18	13				
Queuing Penalty (veh)	765	64				195	65					

# Queuing and Blocking Report

2020 No-Build PM

9/9/2015

## Intersection: 38: 16th St & Grace St

Movement	EB	EB	WB	SB	SB
Directions Served	T	R	L	LT	T
Maximum Queue (ft)	104	111	75	200	147
Average Queue (ft)	46	43	35	110	27
95th Queue (ft)	84	85	72	181	95
Link Distance (ft)	471		314	440	440
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		150			
Storage Blk Time (%)		0			
Queuing Penalty (veh)		0			

## Intersection: 39: 17th St & Grace St/Princess Pl

Movement	EB	WB	NB	NB
Directions Served	LT	T	LT	R
Maximum Queue (ft)	123	236	1131	1113
Average Queue (ft)	56	105	816	1000
95th Queue (ft)	104	199	1432	1340
Link Distance (ft)	314	646	1086	1086
Upstream Blk Time (%)			6	20
Queuing Penalty (veh)			30	96
Storage Bay Dist (ft)				
Storage Blk Time (%)		0		
Queuing Penalty (veh)		1		

# Queuing and Blocking Report

2020 No-Build PM

9/9/2015

## Intersection: 44: Kerr Ave & MLK Blvd

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	R	L	T	T	T	R	L	T
Maximum Queue (ft)	350	1469	1454	1461	460	465	1351	1300	1050	300	295	346
Average Queue (ft)	345	1434	1425	1263	380	437	760	717	549	190	178	186
95th Queue (ft)	386	1452	1450	1826	610	521	1282	1222	1001	413	285	284
Link Distance (ft)		1414	1414	1414			1772	1772	1772			325
Upstream Blk Time (%)		78	25	30						0	0	
Queuing Penalty (veh)		0	0	0						0	1	
Storage Bay Dist (ft)	250				360	365				200	270	
Storage Blk Time (%)	71	46		49	1	66	26		52	0	1	1
Queuing Penalty (veh)	513	220		217	5	280	62		91	1	3	2

## Intersection: 44: Kerr Ave & MLK Blvd

Movement	NB	NB	SB	SB	SB	SB	B47
Directions Served	T	R	L	T	T	R	T
Maximum Queue (ft)	284	210	380	692	662	225	334
Average Queue (ft)	120	81	304	659	612	166	309
95th Queue (ft)	238	169	538	686	657	295	343
Link Distance (ft)	325			590	590		294
Upstream Blk Time (%)	0			67	26		71
Queuing Penalty (veh)	0			0	0		0
Storage Bay Dist (ft)	130	280			125		
Storage Blk Time (%)	4	1		93	24	10	
Queuing Penalty (veh)	10	4		86	51	30	

# Queuing and Blocking Report

2020 No-Build PM

9/9/2015

## Intersection: 49: Market St & Kerr Ave

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	L	T	R
Maximum Queue (ft)	140	550	551	298	405	1372	1364	1370	322	200	396	225
Average Queue (ft)	121	273	265	130	398	1273	1249	977	112	108	350	94
95th Queue (ft)	165	460	453	234	458	1554	1570	1885	220	172	444	191
Link Distance (ft)		837	837	837		1324	1324	1324	320	320	320	320
Upstream Blk Time (%)						55	34	16			47	
Queuing Penalty (veh)						0	0	0			141	
Storage Bay Dist (ft)	70					225						
Storage Blk Time (%)	54	44				78	37					
Queuing Penalty (veh)	425	159				554	162					

## Intersection: 49: Market St & Kerr Ave

Movement	B12	B53	SB	SB	SB	B46	B48	B48
Directions Served	T	T	L	T	R	T	T	
Maximum Queue (ft)	526	969	520	2933	475	830	346	373
Average Queue (ft)	325	223	390	2040	365	333	81	45
95th Queue (ft)	675	717	668	3631	675	960	289	247
Link Distance (ft)	430	2989		2825		724	325	325
Upstream Blk Time (%)	23			36		24	1	3
Queuing Penalty (veh)	280			455		308	4	21
Storage Bay Dist (ft)			420			375		
Storage Blk Time (%)				74				
Queuing Penalty (veh)				365				

## Intersection: 56: Kerr Ave & Randall Pkwy

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	T	R
Maximum Queue (ft)	896	888	860	300	749	735	190	548	250	250	680	260
Average Queue (ft)	854	802	515	292	714	705	55	528	192	128	231	77
95th Queue (ft)	905	1039	1041	344	730	737	157	539	349	233	506	200
Link Distance (ft)	844	844	844		696	696		510			2989	
Upstream Blk Time (%)	86	54	5		83	39		52				
Queuing Penalty (veh)	0	0	0		0	0		0				
Storage Bay Dist (ft)				200			90		150	150		160
Storage Blk Time (%)				78	55		2	57	4	5	11	0
Queuing Penalty (veh)				316	176		21	221	25	54	67	4

## Network Summary

Network wide Queuing Penalty: 8193

**Summary of All Intervals**

Run Number	1	2	3	Avg
Start Time	6:57	6:57	6:57	6:57
End Time	8:07	8:07	8:07	8:07
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	13841	13859	13904	13864
Vehs Exited	13315	13198	13212	13241
Starting Vehs	948	930	915	929
Ending Vehs	1474	1591	1607	1554
Travel Distance (mi)	13760	13728	13585	13691
Travel Time (hr)	2026.1	2164.9	2190.9	2127.3
Total Delay (hr)	1601.6	1742.2	1773.1	1705.6
Total Stops	28654	28780	30534	29319
Fuel Used (gal)	801.5	829.5	827.5	819.5

**Interval #0 Information Seeding**

Start Time	6:57
End Time	7:07
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

**Interval #1 Information Recording**

Start Time	7:07
End Time	8:07
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	Avg
Vehs Entered	13841	13859	13904	13864
Vehs Exited	13315	13198	13212	13241
Starting Vehs	948	930	915	929
Ending Vehs	1474	1591	1607	1554
Travel Distance (mi)	13760	13728	13585	13691
Travel Time (hr)	2026.1	2164.9	2190.9	2127.3
Total Delay (hr)	1601.6	1742.2	1773.1	1705.6
Total Stops	28654	28780	30534	29319
Fuel Used (gal)	801.5	829.5	827.5	819.5

# Queuing and Blocking Report

2020 Build AM

9/10/2015

## Intersection: 6: 5th St & Market St

Movement	EB	WB	NB	NB	SB	SB
Directions Served	TR	TR	T	TR	T	TR
Maximum Queue (ft)	96	83	118	81	82	54
Average Queue (ft)	32	24	52	36	27	10
95th Queue (ft)	78	66	92	74	64	37
Link Distance (ft)	734	1935	610	610	656	656
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

## Intersection: 9: 10th St & Market St

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	TR	LTR	L	TR
Maximum Queue (ft)	28	70	43	64	129	53	100
Average Queue (ft)	2	23	4	9	64	16	38
95th Queue (ft)	14	56	23	38	112	44	82
Link Distance (ft)		1935		838	794		479
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	200		200		100		
Storage Blk Time (%)						1	
Queuing Penalty (veh)						0	

## Intersection: 14: 16th St & Market St

Movement	EB	EB	WB	WB	SB	SB
Directions Served	T	R	L	T	LT	TR
Maximum Queue (ft)	224	509	125	352	370	381
Average Queue (ft)	160	99	124	330	242	262
95th Queue (ft)	241	312	126	363	339	356
Link Distance (ft)		1394		330	1084	1084
Upstream Blk Time (%)				13		
Queuing Penalty (veh)				200		
Storage Bay Dist (ft)	25		100			
Storage Blk Time (%)	65	31	35	26		
Queuing Penalty (veh)	51	107	301	169		

# Queuing and Blocking Report

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## Intersection: 17: 17th St & Market St

Movement	EB	EB	WB	WB	B20	NB	NB	NB	NB
Directions Served	L	T	T	R	T	L	T	T	R
Maximum Queue (ft)	42	108	1876	300	948	366	507	572	557
Average Queue (ft)	8	45	1661	88	583	171	262	405	410
95th Queue (ft)	31	93	2242	304	1289	327	481	661	684
Link Distance (ft)		330	1768		941	563	563	563	563
Upstream Blk Time (%)				65	3	0	0	25	35
Queuing Penalty (veh)			844		41	0	0	0	0
Storage Bay Dist (ft)	100			200					
Storage Blk Time (%)	0	63							
Queuing Penalty (veh)	0	27							

## Intersection: 23: Market St & 23rd St

Movement	EB	EB	B20	WB	SB
Directions Served	L	T	T	TR	LR
Maximum Queue (ft)	168	379	106	893	783
Average Queue (ft)	79	194	8	525	485
95th Queue (ft)	234	763	83	1064	873
Link Distance (ft)		941	1768	877	1150
Upstream Blk Time (%)		3		6	
Queuing Penalty (veh)		23		81	
Storage Bay Dist (ft)	200				
Storage Blk Time (%)		17			
Queuing Penalty (veh)		11			

## Intersection: 25: Forest Hills Dr & Market St

Movement	EB	WB	WB	B21	NB
Directions Served	TR	L	T	T	LR
Maximum Queue (ft)	443	300	932	2352	296
Average Queue (ft)	318	74	390	459	133
95th Queue (ft)	863	262	966	1811	264
Link Distance (ft)	877		816	2366	925
Upstream Blk Time (%)	4		17	0	
Queuing Penalty (veh)	33		312	1	
Storage Bay Dist (ft)		200			
Storage Blk Time (%)			33		
Queuing Penalty (veh)			16		

Intersection: 33: Covil Ave/Montgomery Ave & Market St

Movement	EB	EB	B21	WB	WB	WB	B51	B51	NB	NB	SB	SB
Directions Served	L	TR	T	L	T	R	T	T	LT	R	L	TR
Maximum Queue (ft)	225	2224	276	700	3568	3572	852	855	740	767	109	198
Average Queue (ft)	180	1849	240	547	3118	2901	473	472	733	731	47	88
95th Queue (ft)	279	2565	848	936	4391	4443	1088	1091	739	751	95	162
Link Distance (ft)		2366	816		3457	3457	837	837	718	718	552	552
Upstream Blk Time (%)		25	3		65	46	1	2	89	60		
Queuing Penalty (veh)		210	29		682	481	14	22	0	0		
Storage Bay Dist (ft)	125			600								
Storage Blk Time (%)	73	42			31							
Queuing Penalty (veh)	951	32			112							

Intersection: 3: 3rd St & Market St

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	45	80	52	103	166	54	155	143	73	88	74
Average Queue (ft)	10	23	12	37	81	19	55	35	28	30	22
95th Queue (ft)	36	58	42	78	139	44	124	92	59	72	58
Link Distance (ft)		610	610		734		535	535		726	726
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	125			200		150			200		
Storage Blk Time (%)		0			0		0				
Queuing Penalty (veh)		0			0		0				

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Summary of All Intervals

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Run Number	1	2	3	Avg
Start Time	6:57	6:57	6:57	6:57
End Time	8:07	8:07	8:07	8:07
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	15212	15435	15224	15286
Vehs Exited	14584	14865	14762	14735
Starting Vehs	1220	1272	1322	1264
Ending Vehs	1848	1842	1784	1822
Travel Distance (mi)	13471	13729	13603	13601
Travel Time (hr)	5240.9	5090.0	5066.7	5132.5
Total Delay (hr)	4827.4	4669.1	4648.9	4715.1
Total Stops	30256	29595	30757	30206
Fuel Used (gal)	1528.0	1494.5	1491.3	1504.6

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Interval #0 Information Seeding

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Start Time	6:57
End Time	7:07
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

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Interval #1 Information Recording

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Start Time	7:07
End Time	8:07
Total Time (min)	60
Volumes adjusted by Growth Factors.	

Run Number	1	2	3	Avg
Vehs Entered	15212	15435	15224	15286
Vehs Exited	14584	14865	14762	14735
Starting Vehs	1220	1272	1322	1264
Ending Vehs	1848	1842	1784	1822
Travel Distance (mi)	13471	13729	13603	13601
Travel Time (hr)	5240.9	5090.0	5066.7	5132.5
Total Delay (hr)	4827.4	4669.1	4648.9	4715.1
Total Stops	30256	29595	30757	30206
Fuel Used (gal)	1528.0	1494.5	1491.3	1504.6

# Queuing and Blocking Report

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## Intersection: 6: 5th St & Market St

Movement	EB	WB	NB	NB	SB	SB
Directions Served	TR	TR	T	TR	T	TR
Maximum Queue (ft)	139	130	146	120	102	65
Average Queue (ft)	58	38	79	47	51	11
95th Queue (ft)	120	93	129	95	94	40
Link Distance (ft)	734	1935	610	610	656	656
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

## Intersection: 9: 10th St & Market St

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	TR	LTR	L	TR
Maximum Queue (ft)	29	129	35	59	130	59	123
Average Queue (ft)	4	49	3	11	66	17	48
95th Queue (ft)	21	111	17	39	117	46	95
Link Distance (ft)		1935		838	794		479
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	200		200		100		
Storage Blk Time (%)						2	
Queuing Penalty (veh)						1	

## Intersection: 14: 16th St & Market St

Movement	EB	EB	B2	WB	WB	SB	SB
Directions Served	T	R	T	L	T	LT	TR
Maximum Queue (ft)	225	1371	127	125	237	528	516
Average Queue (ft)	201	783	34	76	45	290	289
95th Queue (ft)	283	1633	185	131	159	544	542
Link Distance (ft)		1394	838		330	1084	1084
Upstream Blk Time (%)		14					
Queuing Penalty (veh)		65					
Storage Bay Dist (ft)	25			100			
Storage Blk Time (%)	75	21		6	0		
Queuing Penalty (veh)	141	123		36	0		

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## Intersection: 17: 17th St & Market St

Movement	EB	EB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R
Maximum Queue (ft)	125	341	213	43	433	568	597	611
Average Queue (ft)	34	270	99	7	65	226	535	554
95th Queue (ft)	118	443	183	25	208	511	713	694
Link Distance (ft)		330	1768		563	563	563	563
Upstream Blk Time (%)		27			0	0	62	78
Queuing Penalty (veh)		183			0	0	0	0
Storage Bay Dist (ft)	100			200				
Storage Blk Time (%)		72	0					
Queuing Penalty (veh)		15	0					

## Intersection: 23: Market St & 23rd St

Movement	EB	EB	B20	WB	SB
Directions Served	L	T	T	TR	LR
Maximum Queue (ft)	300	1044	1783	138	245
Average Queue (ft)	125	921	1404	58	142
95th Queue (ft)	365	1353	2514	126	236
Link Distance (ft)		941	1768	877	1150
Upstream Blk Time (%)		82	16		
Queuing Penalty (veh)		971	187		
Storage Bay Dist (ft)	200				
Storage Blk Time (%)		83			
Queuing Penalty (veh)		37			

## Intersection: 25: Forest Hills Dr & Market St

Movement	EB	WB	WB	NB
Directions Served	TR	L	T	LR
Maximum Queue (ft)	894	59	140	212
Average Queue (ft)	845	22	67	119
95th Queue (ft)	1075	51	129	192
Link Distance (ft)	877		816	925
Upstream Blk Time (%)	19			
Queuing Penalty (veh)	250			
Storage Bay Dist (ft)		200		
Storage Blk Time (%)				
Queuing Penalty (veh)				

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## Intersection: 33: Covil Ave/Montgomery Ave & Market St

Movement	EB	EB	B21	WB	WB	WB	B51	B51	NB	NB	SB	SB
Directions Served	L	TR	T	L	T	R	T	T	LT	R	L	TR
Maximum Queue (ft)	225	2477	832	700	3569	3569	853	866	754	762	240	250
Average Queue (ft)	155	2445	804	586	3522	3447	728	730	735	731	99	129
95th Queue (ft)	258	2466	951	952	3623	4012	1131	1145	745	776	194	220
Link Distance (ft)		2366	816		3457	3457	837	837	718	718	552	552
Upstream Blk Time (%)		92	14		94	78	4	6	78	59		
Queuing Penalty (veh)		1195	178		925	765	43	63	0	0		
Storage Bay Dist (ft)	125			600								
Storage Blk Time (%)	51	58			43							
Queuing Penalty (veh)	1265	67			221							

## Intersection: 3: 3rd St & Market St

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	73	179	88	129	118	47	138	124	82	163	138
Average Queue (ft)	27	83	34	54	48	16	57	28	39	70	42
95th Queue (ft)	61	146	72	106	93	40	109	77	72	139	105
Link Distance (ft)	610	610			734		535	535		726	726
Upstream Blk Time (%)									200		
Queuing Penalty (veh)									0		
Storage Bay Dist (ft)	125			200		150			200		
Storage Blk Time (%)		3							0		
Queuing Penalty (veh)		1							0		