## 7<sup>th</sup> Street Bike Lane Traffic Impact Study

Submitted by:

San Francisco Department of Parking and Traffic

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#### **EXECUTIVE SUMMARY**

This report presents the Department of Parking and Traffic's (DPT) proposal for a Class II bikeway (bike lanes) on 7<sup>th</sup> Street between Townsend and 16<sup>th</sup> Streets. As part of the Mission Bay project, the design by Catellus shows four motor vehicle lanes along this stretch of 7<sup>th</sup> Street with no on-street provisions for bicycles (Class III bikeway – shared roadway). DPT proposes three motor vehicle lanes plus bike lanes. The bike lanes would be in both directions between Townsend and 16<sup>th</sup> Streets. North of Townsend Street, the existing northbound bike lane would be retained.

Computer modeling of the two proposals using traffic volumes projected to 2015 shows no degradation in performance with the DPT bike lane proposal. In fact, due to some additional striping changes, performance is improved with the DPT proposal, at no additional cost.

In order for the currently accepted design for 7<sup>th</sup> Street to be amended, the Redevelopment Agency, Catellus, and the Planning Department must approve the changes, prior to approval by the Parking and Traffic Commission and the Board of Supervisors.

## **BACKGROUND**

Seventh Street between Townsend and 16<sup>th</sup> Streets is part of the San Francisco Bicycle Route Network (Route 23). Currently, this section of 7<sup>th</sup> Street is a two-lane street with lanes wide enough to safely and easily accommodate bicyclists and motorists side by side. It connects bike lanes on 16<sup>th</sup> Street to a northbound bike lane on 7<sup>th</sup> Street, starting at Townsend Street.

Seventh Street also borders the Mission Bay Project to the west. In the Final Supplemental Environmental Impact Report (FSEIR) for Mission Bay, the design for 7<sup>th</sup> Street between 16<sup>th</sup> and Townsend Streets does not allow for bicycle lanes. While the San Francisco Bicycle Plan, approved by the Board of Supervisors in March of 1997, does not require bike lanes for this part of 7<sup>th</sup> Street, plans to re-stripe the street with four lanes instead of the current two wide lanes are not consistent with the Bicycle Plan. Therefore, these two documents appear to be in contradiction. Fortunately, this problem is solvable.

This report presents the DPT proposal to amend the currently approved design to allow for the installation of bike lanes on 7<sup>th</sup> Street.

#### **PROPOSAL**

DPT's proposal for 7<sup>th</sup> Street between Townsend and 16<sup>th</sup> Streets calls for three motor vehicle lanes (one southbound and two northbound) and bike lanes in both directions. The design of the intersections at Townsend Street and The Commons also differ from the current Catellus proposal. The lane designations for each intersection can be seen in Figure 1. The respective Level of Service (LOS) results are also shown.

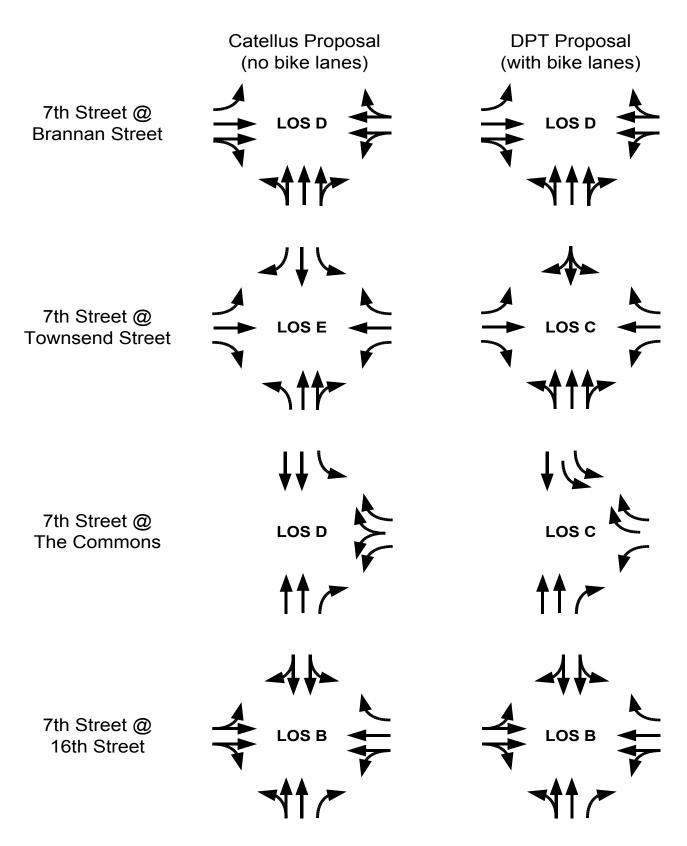


Figure 1. Comparison of Intersection Lane Designations and Resulting Level of Service

The intersections are: 7<sup>th</sup> Street at Brannan Street, at Townsend Street, at The Commons, and at 16<sup>th</sup> Street. The intersection designs at Brannan Street and at 16<sup>th</sup> Street are the same for both proposals. They are shown for information.

A sketch of the DPT proposal for 7<sup>th</sup> Street between Townsend and 16<sup>th</sup> Streets can be seen in Attachment A. The Catellus design can be seen in Attachment B.

## **Possible Bike-Car Conflicts**

With both proposals, there is potential for conflicts between right-turning motorists and through cyclists at intersections. There are some advantages to a Class II bikeway, however. In particular, for northbound 7<sup>th</sup> Street at The Commons, DPT proposes a bike lane between the right turn lane and the through lanes. This design directs cyclists to the left of right-turning vehicles, a maneuver that should be done regardless but may not be performed by less experienced cyclists. A Class III bikeway would be less effective at directing cyclists to the left of the right turn lane.

### **METHODOLOGY**

Both proposals were modeled using Synchro, a computer program based on the Highway Capacity Manual used to model the performance of signalized intersections or corridors.

Traffic volumes used to analyze each proposal were provided by Catellus's transportation consultant, Wilbur Smith Associates. The volumes are projected for the year 2015 and shown in Figure 2 on the next page.

### **RESULTS**

The inputted data and the results of the Synchro analysis are shown in full in Appendix A for the Catellus proposal and Appendix B for the DPT bike lane proposal. The table below summarizes the results:

Table 1. LOS/Delay at 7<sup>th</sup> Street Intersections

	LOS/Intersection	Delay (seconds)*								
	Catellus Proposal	Bike Lane Proposal								
Brannan St/7th St	D/49.1	D/49.1								
Townsend St/7th St	E/80.0	C/32.1								
Commons/7th St	D/42.1	C/26.5								
16th St/7th St	B/13.3	B/13.5								

<sup>\*</sup>LOS and Intersection Delays are based on Webster's Method.

The intersection layouts of 7<sup>th</sup> and Brannan Streets and 7<sup>th</sup> and 16<sup>th</sup> Streets are the same in both proposals and thus generate the same Level of Service results.

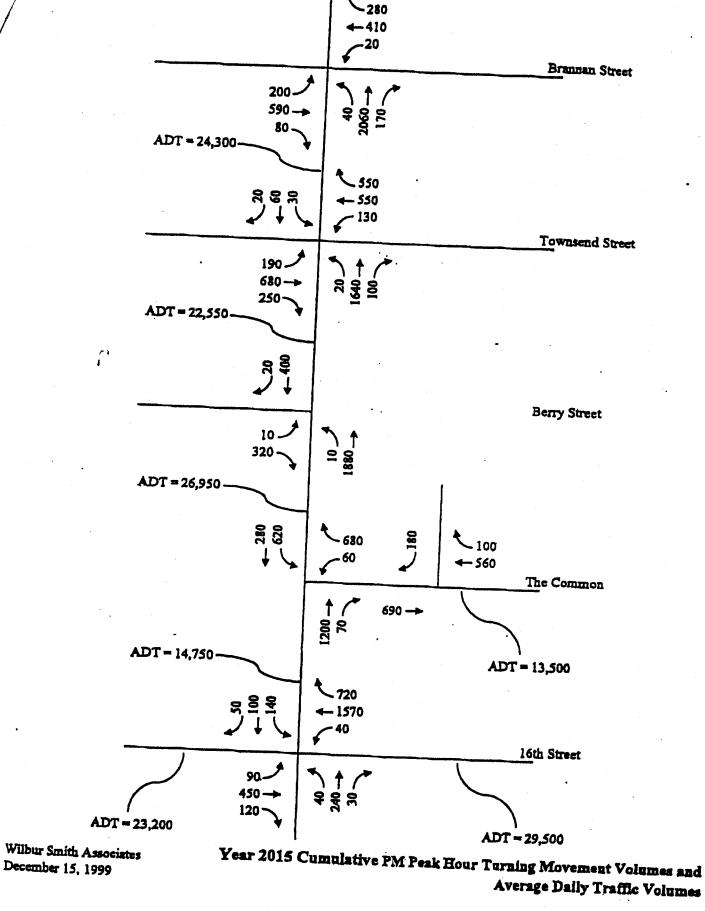


Figure 2. Projected Volumes Used in Synchro Modeling

## Southbound 7<sup>th</sup> Street at Townsend Street

The DPT proposal for southbound 7<sup>th</sup> Street at Townsend Street shows one lane instead of Catellus's three. Given the projected volumes, this design was sufficient, as shown in Table 1. However, if the need for two lanes along the southbound approach to Townsend Street arises, a tow-away restriction can be legislated and parking removed so the two lanes can be striped, a left-turn only lane and a through/right turn lane. Three lanes for this approach are excessive and do not allow for as many receiving lanes for northbound 7<sup>th</sup> Street. DPT does not anticipate that this second southbound lane at Townsend Street will be necessary, however.

The projected PM peak hour volumes for the 7th/Townsend Street intersection show the southbound 7<sup>th</sup> Street approach as the lightest of all approaches. This is expected as 7th Street is one-way northbound starting one block north at Brannan Street. Given this, DPT also expects that this approach will be the lightest during the AM, with most vehicles wishing to access southbound Seventh Street turning from Townsend Street.

The DPT proposal showing one lane for this approach is based on this light demand. Generally, one left turn movement per cycle still allows space for through and right turn movements to pass. Given the circulation patterns in the area and the low demand for southbound 7th Street at this intersection, it is doubtful that there will be enough left-turners to create delays of any significance. This is supported by the 20 left turn movements per PM peak hour projected for 2015.

With this in mind, the one lane southbound design balances the need of this approach with parking needs in the area and the need to accommodate the heavier northbound volume. Catellus's proposal requires parking removal on the west side of the street on that approach while DPT's proposal preserves it. Also, Catellus's proposal does not accommodate the heavier northbound traffic as effectively.

DPT did model a few scenarios for this approach. The first scenario is the same as the PM peak hour and uses those projected volumes. For the second scenario, DPT doubled the right, through, and left turn volumes for southbound 7<sup>th</sup> Street at Townsend Street. That resulted in LOS E for the approach. In the third scenario, DPT added a lane for the southbound approach and modeled a left turn only lane with a through/right turn lane. Keeping all else the same, this design was able to accommodate 110 left turns, 650 through, and 40 right turns at a LOS D. Thus, if the need for a second lane does arise, this design will be able to accommodate 10 times the amount of through traffic projected for the PM peak. The Synchro reports of these three scenarios are in Appendix C.

With 7<sup>th</sup> Street being a one-way street starting at Brannan Street, the northbound approach will always be more critical than the southbound approach. Assuming one-and two-way designations for the streets in the area remain the same as today, traffic wishing to access southbound 7<sup>th</sup> Street will be most likely to turn onto 7<sup>th</sup> Street from Townsend Street. Still, there will be the flexibility of making the southbound approach two lanes if warranted.

## POTENTIAL TRAFFIC GROWTH

There are concerns that unanticipated development not addressed in the Mission Bay FEIR may create more pressure on southbound 7<sup>th</sup> Street than the FEIR anticipated, thus necessitating the second southbound lane.

South of Townsend Street, there are two signals, one at The Commons and one at 16<sup>th</sup> Street. The only significant left turn is at The Commons, which will have two left turn lanes under DPT's proposal. At 16<sup>th</sup> Street, the intersection design is the same for both proposals.

One lane can handle up to 1900 vehicles per hour minus any red time at intersections and any friction from parking maneuvers, heavy vehicles, etc. Signalized intersections prove to be the primary source of bottlenecking, and since the intersection at 7<sup>th</sup>/16<sup>th</sup> Streets is the same configuration for both proposals, The Commons becomes the potential bottleneck in this stretch.

At the intersection of 7<sup>th</sup> Street and The Commons, the southbound through movement degrades to D only after the volume is increased from 280 to 1350 vehicles per hour. This is without any changes in the proposed signal timing. Adjusting the signal timing could accommodate an even greater increase. See the Synchro reports in Appendix D.

As a last resort, the installation of bike lanes can always be revoked if there is compelling need to do so and the Board of Supervisors agree.

While the DPT proposal will accommodate Mission Bay traffic in addition to some traffic from unanticipated developments, DPT will continue to monitor conditions and make adjustments as necessary.

#### **DETOUR ROUTING**

With the current two-lane design of 7<sup>th</sup> Street (one lane northbound and one lane southbound), there have not been any problems with Pacific Bell game day detour traffic along 7<sup>th</sup> Street. DPT does not anticipate any significant increase in detour traffic to 7<sup>th</sup> Street on game/event days and believe that a three-lane design with one lane southbound will suffice.

As noted earlier, the addition of a tow-away for the southbound approach to Townsend Street could be considered on game days if warranted. South of Townsend Street, there are no left turns to impede traffic until The Commons which, as noted, will have two left turn lanes.

#### COST OF DPT PROPOSAL

The difference in cost of DPT's proposal in lieu of the current Catellus proposal is negligible as the two proposals vary insignificantly in amount of paint and signage.

### APPROVAL PROCESS

Since the current proposal for 7<sup>th</sup> Street (without bike lanes) was studied in the Mission Bay Environmental Impact Report, and because DPT's proposal alters the Infrastructure Plans, the City Attorney has advised DPT to take a series of steps to amend the current proposal. A flowchart illustrating these steps is shown in Figure 3 on the next page.

DPT must present its proposal to the Planning Department's Major Environmental Analysis section to determine if further environmental review is warranted by the bike lane proposal. If not, the bike lane proposal will be presented to the developer, Catellus, and the Redevelopment Agency who must agree to the modification in the Infrastructure Plan. Once the agreement is obtained, the City may approve any non-material or material changes to the Interagency Cooperation Agreement. Non-material changes (i.e. changes that do not result in increased costs or liabilities to the City or decreased time for City reviews and approvals) may be approved by the Mayor and the Director of DPW. Material changes in the Infrastructure Plan require Board of Supervisors approval.

### **CONCLUSIONS**

As DPT's proposal actually improves traffic conditions for motor vehicles and for bicyclists, while not increasing costs or delaying project implementation for Catellus, DPT believes that the proposal should be accepted in lieu of the current four lane Catellus proposal without need for further environmental review.

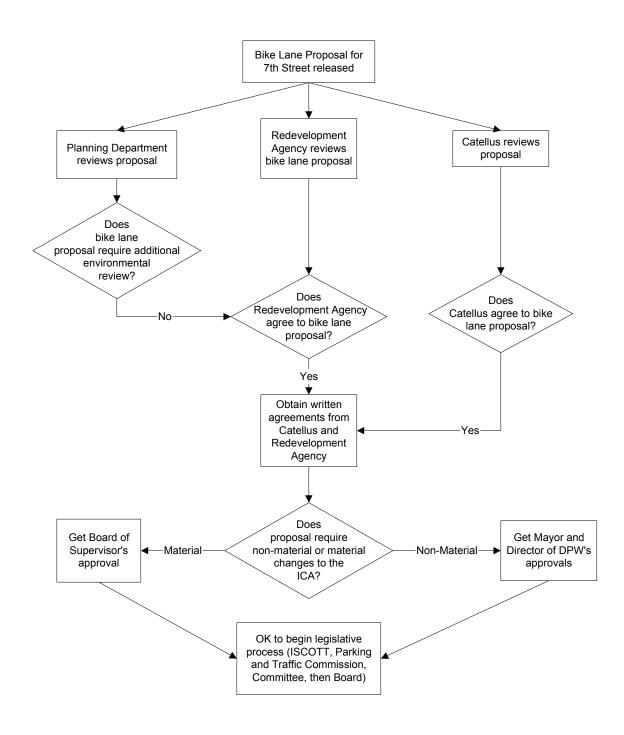
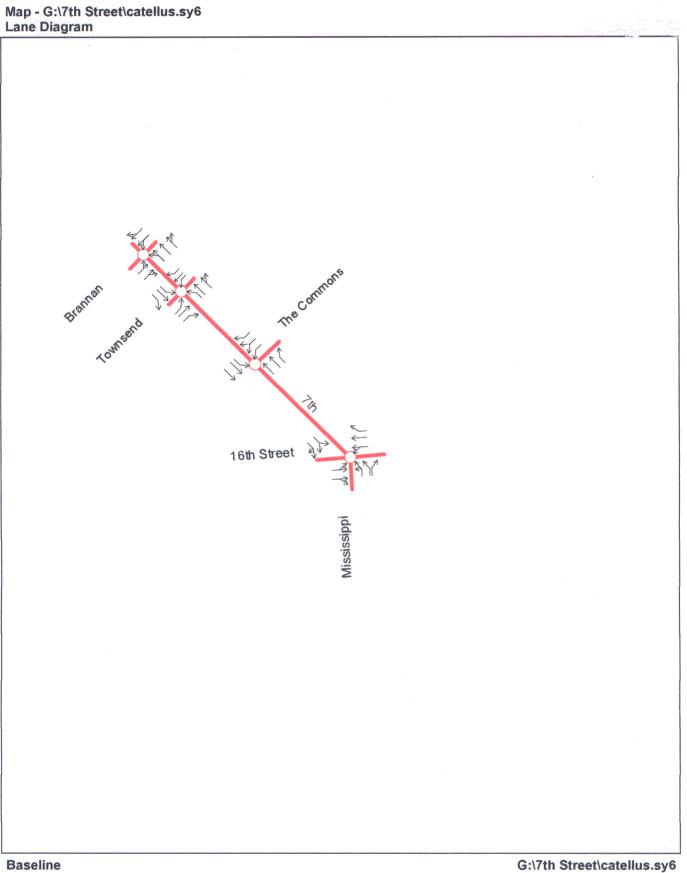


Figure 3. Flowchart Illustrating Steps to be Taken to Modify Mission Bay Infrastructure Plans

## APPENDIX A

# Synchro Analysis of 7<sup>th</sup> Street Intersections for Catellus Proposal



Baseline Timing Plan: Default

Lanes, volumes, rinin	.50		ye, ye, it were a									The section of
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Lane Group	EBL	<b>EBT</b>	EBR	WBL	WBT	WBR	NBL2	NBL	NBR	SEL	SER	SER2
Lane Configurations		47			44	7		ইণ	7"	141	ď.	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	11	12
Grade (%)		0%			0%			0%		0%		
Storage Length (ft)	0		0	0		0		0	0	0	0	
Storage Lanes	0		0	0		1		0	1	1	0	
Total Lost Time (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
Leading Detector (ft)	50	50		50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15	15	9	15	9	9
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.97	1.00	1.00	0.95	1.00
Frt Protected		0.973				0.850			0.850		0.850	
Flt Protected		0.993			0.999			0.950		0.950		
Satd. Flow (prot)	0	3420	0	0	3536	1583	0	3433	1583	1770	1454	0
Frt Perm.		0.973				0.850			0.850		0.850	
Flt Perm.		0.591			0.922			0.899		0.526		
Satd. Flow (perm)	0	2035	0	0	3263	1583	0	3249	1583	980	1454	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		82				319			33		23	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00
Volume (vph)	90	450	120	40	1570	720	40	240	30	140	100	50
Confl. Peds. (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%		0%		
Adj. Flow (vph)	100	500	133	44	1744	800	44	267	33	156	111	56
Lane Group Flow (vph)	0	733	0	0	1788	800	0	311	33	156	167	0
Turn Type	Perm			Perm	2	Perm	Perm		Perm	Perm		
Protected Phases		2			6	-		8			4	
Permitted Phases	2	_		6		6	8		8	4		
Detector Phases	2	2		6	6	6	8	8	8	4	4	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	
Total Split (s)	40.0	40.0	0.0	40.0	40.0	40.0	20.0	20.0	20.0	20.0	20.0	0.0
Total Split (%)	67%	67%	0%	67%	67%	67%	33%	33%	33%	33%	33%	0%
Maximum Green (s)	36.0	36.0	0,0	36.0	36.0	36.0	16.0	16.0	16.0	16.0	16.0	0,0
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Lead/Lag	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
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	0.0	0.0	0.0	0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Recall Mode	Max	Max		Max	Max	Max	Max	Max	Max	Max	Max	
TOOLII WOOD	IVICA	IVION		IVICIA	IVICA	IVION	IVICA	IAIGIX	IVICIA	IVICA	IVION	

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Lane Group	EBL	<b>EBT</b>	EBR	WBL	<b>WBT</b>	<b>WBR</b>	NBL2	<b>NBL</b>	<b>NBR</b>	SEL	SER	SER2
Walk Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	. 0	0		0	0	0	0	0	0	0	0	
Lane Grp Cap (vph)		1286			2012	1098		921	472	278	428	
v/s Ratio Prot											0.11	
v/s Ratio Perm		0.35			0.55	0.45		0.10	0.02	0.16		
Critical LG?					Yes					Yes		
Act Effct Green (s)		37.0			37.0	37.0		17.0	17.0	17.0	17.0	
Actuated g/C Ratio		0.62			0.62	0.62		0.28	0.28	0.28	0.28	
v/c Ratio		0.57			0.89	0.73		0.34	0.07	0.56	0.39	
Uniform Delay, d1		5.9			9.7	4.3		17.0	0.0	18.3	14.8	
Percentile Delay		6.2			13.1	5.0		17.3	6.7	16.3	12.4	
Percentile LOS		Α			В	Α		В	Α	В	В	
Uniform Delay, d1		5.9			9.7	4.3		17.0	0.0	18.3	14.8	
Platoon Factor		1.00			1.00	1.00		1.00	1.00	0.87	0.85	
Incr. Delay, d2		1.8			6.3	4.3		1.0	0.3	7.9	2.6	
Webster Delay		7.7			16.1	8.5		18.0	0.3	23.8	15.2	
Webster LOS		Α			В	Α		В	Α	С	В	

Area Type:

Other

Cycle Length: 60

Actuated Cycle Length: 60

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

Natural Cycle: 60 Control Type: Pretimed Total Lost Time: 6

Sum of Critical v/s Ratios: 0.71 Intersection v/c Ratio: 0.79

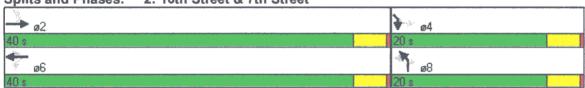
Intersection Percentile Signal Delay: 10.6

Intersection Percentile LOS: B

Intersection Webster Signal Delay: 13.3

Intersection LOS: B

Splits and Phases: 2: 16th Street & 7th Street



Lane Groun	Lanes, volumes, limit	igs											
Lane Cornigurations   SEL   SER		4	<b>X</b>	2	100	K		7	×	04	4	K	*
Ideal Flow (γρhpi)		SEL	SET	SER	NWL		NWR			NER	SWL		<u>SWR</u>
Lane Width (ft)	_	1900	1900	1900	1900		1900	1900		1900	1900		1900
Grade (%)         0%													
Storage Lanes			0%			0%			0%			0%	
Total Lost Time (s)		0								-	_		
Leading Detector (ft)	=									-			
Trailing Detector (ft)		3.0	3.0	3.0			3.0			3.0			3.0
Turning Speed (mph)	. ,												
Lane Util. Factor		15		9		O	9	-	O	9		O	9
Fit Protected   Fit Protected   1.098   1.098   1.098   1.099   1.09			1.00			0.91			0.95	_		0.95	_
Satid. Flow (prot)   0   0   0   0   5024   0   0   3451   0   0   3327   0   0   0   0   0   0   0   0   0													
Fit Perm.						0.999							
Fit Perm.		0	0	0	0		0	0		0	0		0
Static Flow (perm)         0         0         0         5024         0         2027         0         0         3057         708           Right Turn on Red         Yes         27         27         21         0         1         708         709         100													
Right Tum on Red Satd. Flow (RTOR)         Yes         Yes         Yes         27         21         Tes         1         1           Headway Factor         1.00         0.90 <t< td=""><td></td><td>0</td><td>0</td><td>0</td><td>0</td><td></td><td>0</td><td>0</td><td></td><td>0</td><td>0</td><td></td><td>0</td></t<>		0	0	0	0		0	0		0	0		0
Satid. Flow (RTOR)         L         27         21         2         2		U	U		Ü	5024		. 0	2027		U	3057	
Headway Factor   1.00	_			165		27	165		21	165		1	165
Volume (vph) Confl. Peds. (#/hr)         0         0         40         2060         170         200         590         80         20         410         280           Confl. Peds. (#/hr)         0.90         200         200         0.90		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00		1.00
Confl. Peds. (#/hr)         Peak Hour Factor         0.90	-												
Growth Factor         100%         20%         2%	` ' '												
Heavy Vehicles (%)													
Bus Blockages (#/hr) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0													
Parking (#/hr)         Mid-Block Traffic (%)         0%         311         Lane Group Flow (vph)         0         0         0         0         2522         0         0         967         0         0         789         0           Turn Type         Split         Perm         Perm         Perm         Perm         Perm         Perm         Perm         8         8         8         8         8         8         8         8         9         22         22         2         4         4         8         8         8         8         8         8         8         8         8         8         8         8         8         8         8         8         8         8         8         9         22         2         2         4         4         4													
Mid-Block Traffic (%)         0%         311           Lane Group Flow (vph)         0         0         0         0         25222         0         0         967         0         0         789         0           Turn Type         Split         Perm         Perm         Perm         Perm         Perm         Perm         8         1         8         1 <t< td=""><td>- , ,</td><td>0</td><td>Ü</td><td>0</td><td>0</td><td>0</td><td>0</td><td>Ü</td><td>Ü</td><td>Ü</td><td>Ü</td><td>U</td><td>0</td></t<>	- , ,	0	Ü	0	0	0	0	Ü	Ü	Ü	Ü	U	0
Adj. Flow (vph)       0       0       0       44       2289       189       222       656       89       22       456       311         Lane Group Flow (vph)       0       0       0       2522       0       0       967       0       0       789       0         Turn Type       Split       Perm       Perm       Perm       Perm       Perm       Perm       8         Permitted Phases       2       2       2       4       4       8       8         Detector Phases       2       2       2       4       4       8       8         Minimum Initial (s)       4.0 <td></td> <td></td> <td>0%</td> <td></td> <td></td> <td>0%</td> <td></td> <td></td> <td>0%</td> <td></td> <td></td> <td>0%</td> <td></td>			0%			0%			0%			0%	
Lane Group Flow (vph)         0         0         0         25222         0         0         967         0         0         789         0           Turn Type         Split         Perm         Perm         Perm         8           Permitted Phases         2         2         4         8         8           Detector Phases         2         2         4         4         8         8           Minimum Initial (s)         4.0<		0		0	44		189	222		89	22		311
Turn Type         Split         Perm         Perm           Protected Phases         2         2         4         8           Permitted Phases         4         8         8           Detector Phases         2         2         4         4         8         8           Minimum Initial (s)         4.0 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>													
Permitted Phases         4         8         8           Detector Phases         2         2         4         4         8         8           Minimum Initial (s)         4.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0					Split			Perm			Perm		
Detector Phases       2       2       4       4       8       8         Minimum Initial (s)       4.0<					2	2			4			8	
Minimum Initial (s)       4.0       4.0       4.0       4.0       4.0       4.0       4.0       4.0       4.0       4.0       Minimum Split (s)       20.0       <													
Minimum Split (s)       20.0       20								•	•				
Total Split (s)         0.0         0.0         34.0         34.0         0.0         31.0         0.0         31.0         0.0         31.0         0.0         31.0         0.0         31.0         0.0         31.0         0.0         31.0         0.0         31.0         0.0         31.0         0.0         0.0         31.0         0.0         0.0         31.0         0.0         0.0         0.0         31.0         0.0         0.0         48%         48%         0%         48%         48%         0%         48%         48%         0%         48%         48%         0%         48%         48%         0%         48%         48%         0%         48%         48%         0%         48%         48%         0%         48%         48%         0%         48%         48%         0%         48%         48%         0%         48%         48%         0%         48%         48%         0%         48%         48%         0%         48%         48%         0%         48%         50%         50%         50%         50%         50%         50%         50%         50%         50%         50%         50%         50%         50%         50%         50%	, ,												
Total Split (%)         0%         0%         52%         52%         0%         48%         48%         0%         48%         48%         0%           Maximum Green (s)         30.0         30.0         27.0         20.5         10.5         10.5         10.5         10.5         10.5         10.5         10.5         10.5         10.5         10.5         10.5         10.5         10.5         10.5         10.5         10.5	,	0.0	0.0	0.0			0.0			0.0			0.0
Maximum Green (s)       30.0       30.0       27.0       27.0       27.0       27.0         Yellow Time (s)       3.5       3.5       3.5       3.5       3.5       3.5         All-Red Time (s)       0.5       0.5       0.5       0.5       0.5       0.5         Lead/Lag       Lead-Lag Optimize?       Vehicle Extension (s)       3.0       3.0       3.0       3.0       3.0         Minimum Gap (s)       3.0       3.0       3.0       3.0       3.0       3.0         Time Before Reduce (s)       0.0       0.0       0.0       0.0       0.0       0.0													
Yellow Time (s)       3.5       3.5       3.5       3.5       3.5         All-Red Time (s)       0.5       0.5       0.5       0.5       0.5         Lead/Lag       Lead-Lag Optimize?         Vehicle Extension (s)       3.0       3.0       3.0       3.0       3.0         Minimum Gap (s)       3.0       3.0       3.0       3.0       3.0         Time Before Reduce (s)       0.0       0.0       0.0       0.0       0.0       0.0	,	0,0		- 70						0,0			0,0
Lead/Lag         Lead-Lag Optimize?         Vehicle Extension (s)       3.0       3.0       3.0       3.0       3.0       3.0         Minimum Gap (s)       3.0       3.0       3.0       3.0       3.0       3.0         Time Before Reduce (s)       0.0       0.0       0.0       0.0       0.0       0.0	Yellow Time (s)				3.5	3.5		3.5	3.5		3.5	3.5	
Lead-Lag Optimize?         Vehicle Extension (s)       3.0 <td></td> <td></td> <td></td> <td></td> <td>0.5</td> <td>0.5</td> <td></td> <td>0.5</td> <td>0.5</td> <td></td> <td>0.5</td> <td>0.5</td> <td></td>					0.5	0.5		0.5	0.5		0.5	0.5	
Vehicle Extension (s)       3.0       3.	-												
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       3.0       3.0       3.0       3.0       3.0       0.0	<u> </u>				0.0	0.0		0.0	0.0			0.0	
Time Before Reduce (s) 0.0 0.0 0.0 0.0 0.0	1, 1												
Time to Reduce (s) 0.0 0.0 0.0 0.0 0.0 0.0	Time To Reduce (s)				0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode Max Max Max Max Max Max	. ,												

Lanes, Vo	lumes, T	imings
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	4	×	1	100	K	7	7	A	4	4	K	1
Lane Group	SEL	SET	SER	<b>NWL</b>	<b>NWT</b>	<b>NWR</b>	NEL	NET	<b>NER</b>	<b>SWL</b>	SWT	<b>SWR</b>
Walk Time (s)				5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)				11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)				0	0		0	0		0	0	
Lane Grp Cap (vph)					2410			885			1317	
v/s Ratio Prot												
v/s Ratio Perm					0.50			0.47			0.26	
Critical LG?					Yes			Yes				
Act Effct Green (s)					31.0			28.0			28.0	
Actuated g/C Ratio					0.48			0.43			0.43	
v/c Ratio					1.05			1.09			0.60	
Uniform Delay, d1					16.8			18.0			14.2	
Percentile Delay					44.1			66.3			14.5	
Percentile LOS					D			E			В	
Uniform Delay, d1					16.8			18.0			14.2	
Platoon Factor					1.00			1.00			1.00	
Incr. Delay, d2					31.9			58.7			2.0	
Webster Delay					48.7			76.8			16.2	
Webster LOS					D			E			В	

Area Type:

Other

Cycle Length: 65

Actuated Cycle Length: 65

Offset: 0 (0%), Referenced to phase 6:, Start of Green

Natural Cycle: 65 Control Type: Pretimed Total Lost Time: 6

Sum of Critical v/s Ratios: 0.97 Intersection v/c Ratio: 1.07

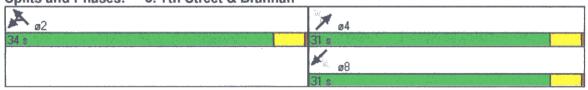
Intersection Percentile Signal Delay: 43.7

Intersection Percentile LOS: D

Intersection Webster Signal Delay: 49.1

Intersection LOS: D

Splits and Phases: 3: 7th Street & Brannan



Editos, Voldinos, Tillin				<del></del>					······································			
	4	×	À	~	K	ે 🐧	7	1	7	Ĺ		*
Lane Group	SEL	SET	SER	<b>NWL</b>	<u>NWT</u>	<b>NWR</b>	NEL	NET	<b>NER</b>	SWL	<u>SWT</u>	<u>SWR</u>
Lane Configurations	٦	<b>↑</b>	7	ሻ	<b>†</b> }		Ŋ	<b>↑</b>	7	ሻ	<b>↑</b>	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	1		1	1		0	1		1	1		1
Total Lost Time (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
Leading Detector (ft)	50	50	50	50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt Protected			0.850		0.991				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	3507	0	1770	1863	1583	1770	1863	1583
Frt Perm.			0.850		0.991				0.850			0.850
Flt Perm.	0.148			0.713			0.209			0.148		
Satd. Flow (perm)	276	1863	1583	1328	3507	0	389	1863	1583	276	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			22		13				278			4
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
Volume (vph)	30	60	20	20	1640	100	190	680	250	130	550	550
Confl. Peds. (#/hr)						,						
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)	•	•		_	_	_	_	_			-	-
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	33	67	22	22	1822	111	211	756	278	144	611	611
Lane Group Flow (vph)	33	67	22	22	1933	0	211	756	278	144	611	611
Turn Type	Perm	٠.	Perm	Perm		_	Perm		Perm	Perm		Perm
Protected Phases	. •	2			. 6			4	. •		8	. •
Permitted Phases	2		2	6	•		4	•	4	8	•	8
Detector Phases	2	2	2	6	6		4	4	4	8	. 8	8
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0		20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	30.0	30.0	30.0	30.0	30.0	0.0	30.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	50%	50%	50%	50%	50%	0%	50%	50%	50%	50%	50%	50%
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0	0,0	26.0	26.0	26.0	26.0	26.0	26.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5		0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
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
Time Before Reduce (s)		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max	Max	Max	Max		Max	Max	Max	Max	Max	Max
TOOM NOOF	ivias	IVICA	IVIAA	IVIAA	ivias		IVIAA	IVIAX	IVIOA	IVIAA	IVIAA	IVIAN

Lanes,	Vo	lumes,	T	im	ings
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	4	×	1	1	×	₹.	7	×	734	4	K	*
Lane Group	SEL	SET	SER	<b>NWL</b>	<b>NWT</b>	<b>NWR</b>	NEL	<b>NET</b>	<b>NER</b>	SWL	<b>SWT</b>	<b>SWR</b>
Walk Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0	0	0	0	0
Lane Grp Cap (vph)	124	838	724	598	1585		175	838	865	124	838	715
v/s Ratio Prot		0.04			0.55			0.41			0.33	
v/s Ratio Perm	0.12		0.01	0.02			0.54		0.14	0.52		0.38
Critical LG?					Yes		Yes					
Act Effct Green (s)	27.0	27.0	27.0	27.0	27.0		27.0	27.0	27.0	27.0	27.0	27.0
Actuated g/C Ratio	0.45	0.45	0.45	0.45	0.45		0.45	0.45	0.45	0.45	0.45	0.45
v/c Ratio	0.27	0.08	0.03	0.04	1.22		1.21	0.90	0.32	1.16	0.73	0.85
Uniform Delay, d1	10.3	9.4	0.0	9.2	16.3		16.5	15.3	0.0	16.5	13.5	14.6
Percentile Delay	12.1	9.6	4.5	11.2	119.1		118.2	25.4	1.7	118.1	14.8	22.3
Percentile LOS	В	Α	Α	В	F		F	С	Α	F	В	С
Uniform Delay, d1	10.3	9.4	0.0	9.2	16.3		16.5	15.3	0.0	16.5	13.5	14.6
Platoon Factor	1.00	1.00	1.00	1.22	2.28		1.00	1.00	1.00	1.00	1.00	1.00
Incr. Delay, d2	5.2	0.2	0.1	0.1	102.1		134.2	14.8	1.0	130.6	5.5	12.4
Webster Delay	15.5	9.6	0.1	11.3	139.4		150.6	30.1	1.0	147.1	19.0	27.1
Webster LOS	В	Α	Α	В	F		F	С	Α	F	В	C

Area Type:

Other

Cycle Length: 60

Actuated Cycle Length: 60

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

Natural Cycle: 50 Control Type: Pretimed Total Lost Time: 6

Sum of Critical v/s Ratios: 1.09 Intersection v/c Ratio: 1.21

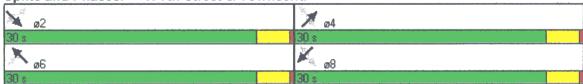
Intersection Percentile Signal Delay: 67.4

Intersection Percentile LOS: E

Intersection Webster Signal Delay: 80.0

Intersection LOS: E

Splits and Phases: 6: 7th Street & Townsend



	4	×	K	₹	4	×
Lane Group	SEL	SET	ТWИ	NWR	SWL	<u>SWR</u>
Lane Configurations	7	什	11	7	AAA	7
ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	11	11	11
Grade (%)		0%	0%	_	0%	_
Storage Length (ft)	180			0	0	0
Storage Lanes	1			1	2	1
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	0.05	0.05	9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	0.91
Frt Protected	0.050			0.850	0.876	0.850
Fit Protected	0.950	0404	2520	4504	0.991	4000
Satd. Flow (prot)	1711	3421	3539	1531	3033	1393
Frt Perm.	0.050			0.850	0.876	0.850
Fit Perm.	0.950	2424	2520	4594	0.991	4202
Satd. Flow (perm)	1711	3421	3539	1531	3033	1393
Right Turn on Red				Yes 78	318	Yes 9
Satd. Flow (RTOR)	4 04	1.04	4.00	1.04	1.04	1.04
Headway Factor Volume (vph)	1.04 620	280	1.00 1200	70	60	680
Confl. Peds. (#/hr)	020	200	1200	70	00	000
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	2/0	0	2.70	0
Parking (#/hr)	Ÿ	Ū	J	Ū	Ū	
Mid-Block Traffic (%)		0%	0%		0%	
Adj. Flow (vph)	689	311	1333	78	67	756
Lane Group Flow (vph)	689	311	1333	78	385	438
Turn Type	Prot	• • • • • • • • • • • • • • • • • • • •		m+Ov		Pt+Ov
Protected Phases	5	2	6	4	4	4.5
Permitted Phases	_	_	_	6	_	
Detector Phases	5	2	6	4	4	45
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	
Total Split (s)	51.0	100.0	49.0	20.0	20.0	71.0
Total Split (%)	43%	83%	41%	<b>17</b> %	17%	59%
Maximum Green (s)	47.0	96.0	45.0	16.0	16.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	
Recall Mode	Max	Max	Max	Max	Max	

	4	×	K	7	- (	*
Lane Group	SEL	SET	<b>NWT</b>	<b>NWR</b>	<b>SWL</b>	<b>SWR</b>
Walk Time (s)		5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0	0	0	0	
Lane Grp Cap (vph)	684	2765	1357	877	703	793
v/s Ratio Prot	0.40	0.09	0.38	0.01	0.08	0.31
v/s Ratio Perm				0.04		
Critical LG?	Yes		Yes			Yes
Act Effct Green (s)	48.0	97.0	46.0	66.0	17.0	68.0
Actuated g/C Ratio	0.40	0.81	0.38	0.55	0.14	0.57
v/c Ratio	1.01	0.11	0.98	0.09	0.55	0.55
Uniform Delay, d1	36.0	2.4	36.6	0.0	7.9	16.0
Percentile Delay	61.5	2.4	50.3	3.0	9.9	16.6
Percentile LOS	Ε	Α	D	Α	Α	В
Uniform Delay, d1	36.0	2.4	36.6	0.0	7.9	16.0
Platoon Factor	1.06	0.90	0.96	99.00	1.00	1.00
Incr. Delay, d2	35.9	0.1	18.9	0.2	3.1	2.8
Webster Delay	74.1	2.3	54.1	0.2	10.9	18.7
Webster LOS	E	Α	D	Α	В	В

Area Type:

Other

Cycle Length: 120

Actuated Cycle Length: 120

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

Natural Cycle: 120 Control Type: Pretimed Total Lost Time: 9

Sum of Critical v/s Ratios: 0.86 Intersection v/c Ratio: 0.93

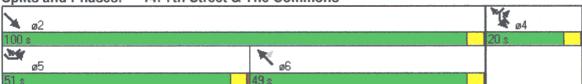
Intersection Percentile Signal Delay: 37.5

Intersection Percentile LOS: D

Intersection Webster Signal Delay: 42.1

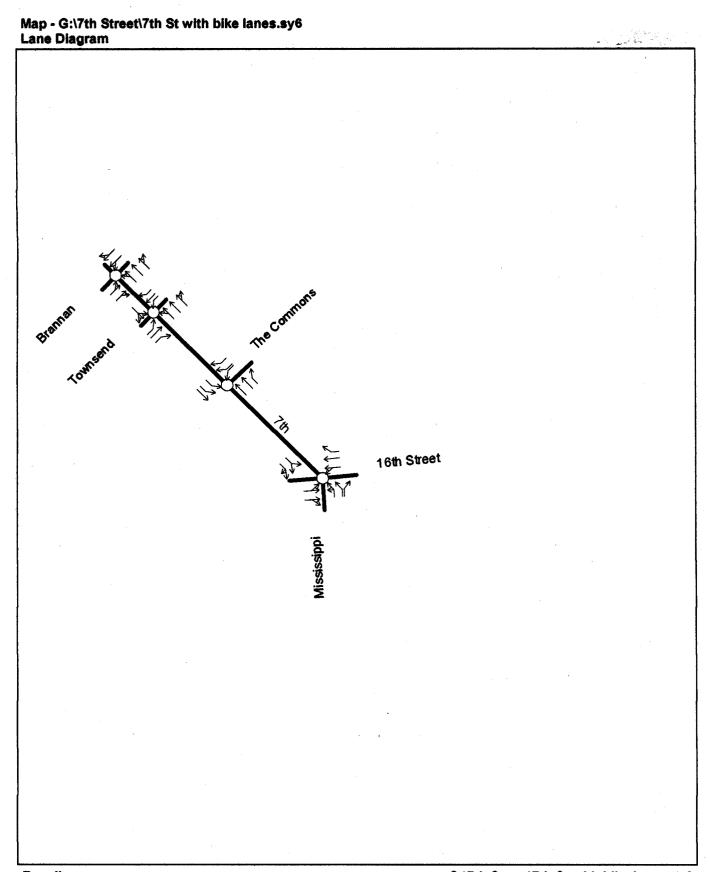
Intersection LOS: D

Splits and Phases: 14: 7th Street & The Commons



## APPENDIX B

# Synchro Analysis of 7<sup>th</sup> Street Intersections for DPT (Bike Lane) Proposal



Baseline Timing Plan: Default

	3	-	~	•	4	*_	4	ħ	1	*	7	4
Lane Group Lane Configurations	EBL	EBI	EBR	WBL	WBT 4↑	WBR	NBL2	NBL	NBR	SEL	SER	SER2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	11	12
Grade (%)	1.000	0%		-	0%			0%		0%		
Storage Length (ft)	0	0 /0	0	0	0,0	0		0,0	0	0,0	. 0	
Storage Lanes	Ö		ő	Ö		1		ŏ	1	1	ő	,
Total Lost Time (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
Leading Detector (ft)	50	50	0.0	50	50	50	50	50	50	50	50	0.0
Trailing Detector (ft)	. 0	0		0	0	0	70	0	0	0	0	
Turning Speed (mph)	15	•	9	15	J	9	15	15	9	15	9	9
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.97	1.00	1.00	0.95	1.00
Frt Protected	0.83	0.93	0.93	0.55	0.85	0.850	0.83	0.81	0.850	1.00	0.850	1.00
Fit Protected		0.993			0.999	0.030		0.950	0.000	0.950	0.030	
Satd. Flow (prot)	0	3420	0	0	3536	1583	. 0	3433	1583	1770	1454	0
Frt Perm.	U	0.973	U	U	3330	0.850		3433	0.850	1770	0.850	U
Fit Perm.		0.591			0.922	0.030		0.899	0.030	0.526	0.050	
Satd. Flow (perm)	0	2035	0	0	3263	1583	0	3249	1583	980	1454	0
	U	2035	Yes	U	3203		U	3248		900	1454	Yes
Right Turn on Red			res			Yes			Yes		000	res
Satd. Flow (RTOR)	4 00	82	4.00	4.00	4.00	319	4 00	4.00	33	4.00	23	4.00
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00
Volume (vph)	90	450	120	40	1570	720	40	240	30	140	100	50
Confl. Peds. (#/hr)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)		001			001			201		001		
Mid-Block Traffic (%)	400	0%	400		0%	200		0%	-	0%		
Adj. Flow (vph)	100	500	133	44	1744	800	44	267	33	156	111	56
Lane Group Flow (vph)	_ 0	733	. 0	_ 0	1788	800	_ 0	311	_ 33	156	167	0
Turn Type	Perm	_		Perm		Perm	Perm	_	Perm	Perm		
Protected Phases	_	2		_	6	_	_	8	_		4	
Permitted Phases	2	_		6	_	6	8	_	8	4		•
Detector Phases	2	2		6	6	6	8	8	8	4	4	
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	
Total Split (s)	40.0	40.0	0.0	40.0	40.0	40.0	20.0	20.0	20.0	20.0	20.0	0.0
Total Split (%)	67%	67%	0%	67%	67%	67%	33%	33%	33%	33%	33%	0%
Maximum Green (s)	36.0	36.0		36.0	36.0	36.0	16.0	16.0	16.0	16.0	16.0	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Lead/Lag											,	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
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	0.0	0.0	0.0	0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Recall Mode	Max	Max		Max	Max	Max	Max	Max	Max	Max	Max	

	3	-	*	1	-	*_	4	ሻ	1	1	7	4
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL2	NBL	NBR	SEL	SER	SER2
Walk Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0	0	0	
Lane Grp Cap (vph)		1286		•	2012	1098		921	472	278	428	
v/s Ratio Prot											0.11	
v/s Ratio Perm		0.35			0.55	0.45		0.10	0.02	0.16		
Critical LG?					Yes					Yes		
Act Effct Green (s)		37.0			37.0	37.0		17.0	17.0	17.0	17.0	
Actuated g/C Ratio		0.62			0.62	0.62		0.28	0.28	0.28	0.28	
v/c Ratio		0.57			0.89	0.73		0.34	0.07	0.56	0.39	
Uniform Delay, d1		5.9			9.7	4.3		17.0	0.0	18.3	14.8	
Percentile Delay		6.2			13.1	5.0		17.3	6.7	19.8	15.4	
Percentile LOS		Α			В	Α		В	Α	В	В	
Uniform Delay, d1		5.9			9.7	4.3		17.0	0.0	18.3	14.8	
Platoon Factor		1.00			1.00	1.00		1.00	1.00	1.00	1.00	
Incr. Delay, d2		1.8			6.3	4.3		1.0	0.3	8.0	2.7	
Webster Delay		7.7			16.1	8.5		18.0	0.3	26.3	17.4	
Webster LOS		Α			В	Α		В	Α	С	В	

Area Type:

Other

Cycle Length: 60

Actuated Cycle Length: 60

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

Natural Cycle: 60 Control Type: Pretimed Total Lost Time: 6

Sum of Critical v/s Ratios: 0.71 Intersection v/c Ratio: 0.79

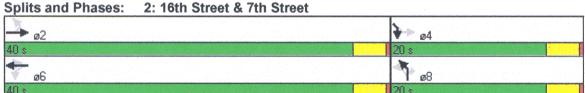
Intersection Percentile Signal Delay: 10.9

Intersection Percentile LOS: B

Intersection Webster Signal Delay: 13.5

Intersection LOS: B

Splits and Phases:



Lanes, volumes, immi	ıyə		,		<del> </del>					······		
	4	×	À	~	X	*	7	Ħ	4	<b>(</b>	K	*
Lane Group	SEL	SET	SER	<u>NWL</u>	ТЖЙ	NWR	NEL	NEI	NER	SWL	SWT	<u>SWR</u>
Lane Configurations		1000		1000	444		4000	43	4000	1000	44	4000
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%	_	•	0%	•	•	0%	^
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0	0.0	0
Total Lost Time (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
Leading Detector (ft)				50	50		50	50		50	50	
Trailing Detector (ft)	45		^	0	0	_	0	0	•	0	0	•
Turning Speed (mph)	15	4.00	9	15	0.04	9	15	0.05	. 9	15	0.05	9
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95
Frt Protected					0.989			0.986			0.941	
Fit Protected	•	•	^	^	0.999	^		0.989	^	^	0.999	^
Satd. Flow (prot)	0	0	0	0	5024	0	0	3451	0	0	3327	0
Frt Perm.					0.989			0.986			0.941	
Fit Perm.	_		_	•	0.999	•	•	0.581	•	•	0.918	•
Satd. Flow (perm)	0	0	. 0	0	5024	0	0	2027	0	0	3057	0
Right Turn on Red			Yes		^=	Yes		•	Yes			Yes
Satd. Flow (RTOR)					27	4.00		21	4 00	4.00	1	4.00
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
Volume (vph)	0	0	0	40	2060	170	200	590	80	20	410	280
Confl. Peds. (#/hr)		0.00	0.00	,	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)		00/			00/			00/			00/	
Mid-Block Traffic (%)	^	0%	^	4.4	0%	400	200	0%	90	00	0%	044
Adj. Flow (vph)	0	0	0	44	2289	189	222	656	89	22 0	456	311
Lane Group Flow (vph)	0	0	U	0	2522	0	0	967	0		789	0
Turn Type				Split	_		Perm			Perm	٥	
Protected Phases				2	2			4			. 8	
Permitted Phases				^	2		4	4	•	8 8	8	
Detector Phases				2			•	4				
Minimum Initial (s)				4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	0.0	0.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
Total Split (s)	0.0	0.0	0.0	34.0	34.0	0.0	31.0	31.0	0.0	31.0	31.0	0.0
Total Split (%)	0%	0%	0%	52%	52%	. 0%	48%	48%	0%	48%	48%	0%
Maximum Green (s)				30.0	30.0		27.0	27.0		27.0	27.0	
Yellow Time (s)				3.5 0.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)				0.5	0.5		0.5	0.5		0.5	0.5	
Lead/Lag											*	
Lead-Lag Optimize?				3.0	3.0		2 0	3.0		3.0	3.0	
Vehicle Extension (s)				3.0	3.0		3.0 3.0	3.0		3.0	3.0	
Minimum Gap (s) Time Before Reduce (s)				0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)				0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode				Max	Max		Max	Max		Max	Max	

	4	×	1	1	K		7	×	a	6	K	*
Lane Group	SEL	SET	SER	NWL	<b>NWT</b>	NWR	NEL	NET	<b>NER</b>	SWL	SWT	<b>SWR</b>
Walk Time (s)				5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)				11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)				0	0		0	0		0	0	
Lane Grp Cap (vph)					2410			885			1317	
v/s Ratio Prot												
v/s Ratio Perm					0.50			0.47			0.26	
Critical LG?					Yes			Yes				
Act Effct Green (s)					31.0			28.0			28.0	
Actuated g/C Ratio					0.48			0.43			0.43	
v/c Ratio					1.05			1.09			0.60	
Uniform Delay, d1					16.8			18.0			14.2	
Percentile Delay					44.1			66.3			14.5	
Percentile LOS					D			E			В	
Uniform Delay, d1					16.8			18.0			14.2	
Platoon Factor					1.00			1.00			1.00	
Incr. Delay, d2					31.9			58.7			2.0	
Webster Delay					48.7			76.8			16.2	
Webster LOS					D			E			В	

Area Type:

Other

Cycle Length: 65

Actuated Cycle Length: 65

Offset: 0 (0%), Referenced to phase 6:, Start of Green

Natural Cycle: 65 Control Type: Pretimed Total Lost Time: 6

Sum of Critical v/s Ratios: 0.97 Intersection v/c Ratio: 1.07

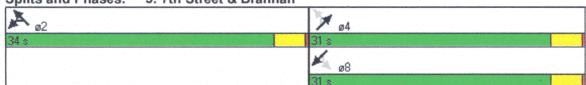
Intersection Percentile Signal Delay: 43.7

Intersection Percentile LOS: D

Intersection Webster Signal Delay: 49.1

Intersection LOS: D

Splits and Phases: 3: 7th Street & Brannan



	4	×	K	₹.	4	*
Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Walk Time (s)		5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0	0	0	0	
Lane Grp Cap (vph)	761	1416	1497	1023	364	1329
v/s Ratio Prot	0.22	0.16	0.39	0.02	0.04	0.14
v/s Ratio Perm				0.04		0.14
Critical LG?	Yes		Yes			Yes
Act Effct Green (s)	19.0	57.0	35.0	55.0	17.0	39.0
Actuated g/C Ratio	0.24	0.71	0.44	0.69	0.21	0.49
v/c Ratio	0.91	0.22	0.89	0.08	0.18	0.57
Uniform Delay, d1	29.6	3.9	20.7	3.0	25.8	13.9
Percentile Delay	39.6	4.0	24.6	3.3	26.3	14.2
Percentile LOS	D	Α	С	Α	C	В
Uniform Delay, d1	29.6	3.9	20.7	3.0	25.8	13.9
Platoon Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incr. Delay, d2	16.4	0.4	8.4	0.1	1.1	1.8
Webster Delay	46.0	4.3	29.1	3.1	26.9	15.6
Webster LOS	D	Α	C	Α	С	В

Area Type:

Other

Cycle Length: 80

Actuated Cycle Length: 80

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

Natural Cycle: 80 Control Type: Pretimed Total Lost Time: 9

Sum of Critical v/s Ratios: 0.73 Intersection v/c Ratio: 0.82

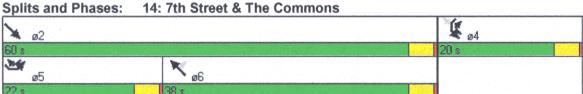
Intersection Percentile Signal Delay: 22.9

Intersection Percentile LOS: C

Intersection Webster Signal Delay: 26.5

Intersection LOS: C

Splits and Phases:



Lane Group         SEI         SET         WWT         WWR         SWI         WWR           Lane Configurations Ideal Flow (vphpl)         1900         100         00         0	Euros, Volumos, Timi	<b>A</b>	_	K	*	(	×
Lane Configurations   Ideal Flow (vphpl)   1900   10000   10	Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Ideal Flow (vphpl)			4	Name and Address of the Owner, where the Owner, which is the Owner, where the Owner, which is the Owner, where the Owner, which is the Owne	7	7	THE REAL PROPERTY AND ADDRESS OF THE PERSONS ASSESSED.
Storage Length (ft)   180   0%   0%   0%   0%   0%   0%   0%			1900		1900	1900	
Storage Length (ft)	Lane Width (ft)	10	14	11	10	11	11
Storage Lanes	Grade (%)		0%	0%		0%	
Total Lost Time (s)         3.0         3.0         3.0         3.0         3.0         3.0         3.0         50 <t< td=""><td>Storage Length (ft)</td><td></td><td></td><td></td><td>0</td><td>0</td><td>_</td></t<>	Storage Length (ft)				0	0	_
Leading Detector (ft)		2					
Trailing Detector (ft)         0							
Turning Speed (mph) Lane Util. Factor Frt Protected Flt Protected Satd. Flow (prot) Satd. Flow (prot) Satd. Flow (prom) Satd. Flow (perm) Satd. Flow (RTOR) Headway Factor Volume (vph) Satd. Flow (RTOR) Headway Factor Volume (vph) Satd. Flow (RTOR) Headway Factor Volume (vph) Satd. Flow (RTOR) Headway Factor Satd. Flow (RTOR) Headway Factor Satd. Flow (RTOR) Headway Factor Satd. Flow (perm) Satd. Flow (RTOR) Satd. Flow (RTOR) Headway Factor Satd. Flow (Prot) Satd. Flow (prom) Satd. 1478 Satd. F	the contract of the contract o						
Lane Util. Factor			0	0			-
Frt Protected			4.00	0.05			
Fit Protected		0.97	1.00	0.95		1.00	
Satd. Flow (prot)         3204         1987         3421         1478         1711         2694           Frt Perm.         0.950         0.850         0.850         0.850           Flt Perm.         0.950         1987         3421         1478         1711         2694           Right Turn on Red Satd. Flow (RTOR)         Yes         Yes         Yes         Yes         Yes           Satd. Flow (RTOR)         1.09         0.92         1.04         1.09         1.04         1.04           Volume (vph)         620         280         1200         70         60         680           Confl. Peds. (#/hr)         620         280         1200         70         60         680           Confl. Peds. (#/hr)         620         280         1200         70         60         680           Confl. Peds. (#/hr)         620         280         1200         70         0.90		0.050			0.850	0.050	0.850
Frt Perm.   0.950   0.850   0.850   Colored			1007	2424	1170		2604
Fit Perm.   0.950   3204   1987   3421   1478   1711   2694   2694   2695   2605   2765   2		3204	1907	3421		1711	
Satd. Flow (perm)         3204         1987         3421         1478         1711         2694           Right Turn on Red Satd. Flow (RTOR)         Yes         Yes         Yes         Yes           Satd. Flow (RTOR)         1.09         0.92         1.04         1.09         1.04         1.04           Volume (vph)         620         280         1200         70         60         680           Confl. Peds. (#/hr)         0.90 <td></td> <td>0.050</td> <td></td> <td></td> <td>0.650</td> <td>0.050</td> <td>0.650</td>		0.050			0.650	0.050	0.650
Right Turn on Red Satd. Flow (RTOR)         Yes         Yes           Satd. Flow (RTOR)         1.09         0.92         1.04         1.09         1.04         1.04           Volume (vph)         620         280         1200         70         60         680           Confl. Peds. (#/hr)         Peak Hour Factor         0.90			1087	3421	1478		2604
Satd. Flow (RTOR)         1.09         0.92         1.04         1.09         1.04         1.04         1.04           Volume (vph)         620         280         1200         70         60         680           Confl. Peds. (#/hr)         8         1200         70         60         680           Confl. Peds. (#/hr)         0.90         0.90         0.90         0.90         0.90         0.90           Growth Factor         100%         100%         100%         100%         100%         100%         100%           Heavy Vehicles (%)         2%		0204	1301	0721		17 11	
Headway Factor							
Volume (vph)         620         280         1200         70         60         680           Confl. Peds. (#/hr)         Peak Hour Factor         0.90		1.09	0.92	1.04		1.04	
Confl. Peds. (#/hr)         Peak Hour Factor         0.90         100%							
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         0.90         0.90         0.90         0.90         0.90         0.90         0.90         100%		· ·					
Heavy Vehicles (%)         2%         0         <		0.90	0.90	0.90	0.90	0.90	0.90
Bus Blockages (#/hr)         0         0         0         0         0         0           Parking (#/hr)         Mid-Block Traffic (%)         0%         0%         0%         0%           Adj. Flow (vph)         689         311         1333         78         67         756           Lane Group Flow (vph)         689         311         1333         78         67         756           Turn Type         Prot         Pm+Ov         Pm+Ov         Pm+Ov           Protected Phases         5         2         6         4         4         5           Permitted Phases         5         2         6         4         4         5           Permitted Phases         5         2         6         4         4         5           Permitted Phases         5         2         6         4         4         5           Minimum Initial (s)         4.0         4.0         4.0         4.0         4.0         4.0           Minimum Split (s)         8.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0	Growth Factor	100%	100%	100%	100%	100%	100%
Parking (#/hr)         Mid-Block Traffic (%)         0%         0%         0%           Adj. Flow (vph)         689         311         1333         78         67         756           Lane Group Flow (vph)         689         311         1333         78         67         756           Turn Type         Prot         Pm+Ov         Pm+Ov         Pm+Ov           Protected Phases         5         2         6         4         4         5           Permitted Phases         5         2         6         4         4         5           Metector Phases         5         2         6         4         4         5           Minimum Initial (s)         4.0         4.0         4.0         4.0         4.0         4.0           Minimum Split (s)         8.0         20.0         20.0         20.0         20.0         22.0           Total Sp	Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Mid-Block Traffic (%)         0%         0%         0%           Adj. Flow (vph)         689         311         1333         78         67         756           Lane Group Flow (vph)         689         311         1333         78         67         756           Turn Type         Prot         Pm+Ov         Pm+Ov         Pm+Ov           Permitted Phases         5         2         6         4         4         5           Metector Phases         5         2         6         4         4         5           Minimum Initial (s)         4.0         4.0         4.0         4.0         4.0         4.0         4.0           Minimum Split (s)         3.0         20.0         20.0         20.0         20.0         20.0         20.0         22.0 </td <td>Bus Blockages (#/hr)</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td>	Bus Blockages (#/hr)	0	0	0	0	0	0
Adj. Flow (vph)       689       311       1333       78       67       756         Lane Group Flow (vph)       689       311       1333       78       67       756         Turn Type       Prot       Pm+Ov       Pm+Ov       Pm+Ov         Protected Phases       5       2       6       4       4       5         Permitted Phases       5       2       6       4       4       5         Minimum Initial (s)       4.0       4.0       4.0       4.0       4.0       4.0       4.0       4.0         Minimum Split (s)       8.0       20.0       20.0       20.0       20.0       20.0       8.0         Total Split (%)       28%       75%       48%       25%       25%       28%         Maximum Green (s)       18.0       56.0       34.0       16.0       16.0       18.0         Yellow Time (s)       3.5       3.5       3.5       3.5       3.5       3.5       3.5         All-Red Time (s)       0.5       0.5       0.5       0.5       0.5       0.5       0.5         Lead/Lag       Lead       Lag       Lead         Lead-Lag Optimize?       2 <t< td=""><td><u> </u></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	<u> </u>						
Lane Group Flow (vph)         689 Prot Turn Type         311 Prot Pm+Ov         Pm+Ov Pm+Ov         Pm+Ov Pm+Ov           Protected Phases         5         2         6         4         4         5           Permitted Phases         5         2         6         4         4         5           Metector Phases         5         2         6         4         4         5           Minimum Initial (s)         4.0							
Turn Type         Prot         Pm+Ov         Pm+Ov           Protected Phases         5         2         6         4         4         5           Permitted Phases         5         2         6         4         4         5           Metector Phases         5         2         6         4         4         5           Minimum Initial (s)         4.0         4.0         4.0         4.0         4.0         4.0         4.0           Minimum Split (s)         8.0         20.0         20.0         20.0         20.0         20.0         8.0           Total Split (s)         22.0         60.0         38.0         20.0         20.0         22.0         20.0         22.0           Total Split (%)         28%         75%         48%         25%         25%         28%           Maximum Green (s)         18.0         56.0         34.0         16.0         16.0         18.0           Yellow Time (s)         3.5         3.5         3.5         3.5         3.5         3.5         3.5           All-Red Time (s)         0.5         0.5         0.5         0.5         0.5         0.5           Lead/Lag         Lead	T						
Protected Phases         5         2         6         4         4         5           Permitted Phases         5         2         6         4         4         5           Detector Phases         5         2         6         4         4         5           Minimum Initial (s)         4.0         4.0         4.0         4.0         4.0         4.0         4.0           Minimum Split (s)         8.0         20.0         20.0         20.0         20.0         20.0         8.0           Total Split (s)         22.0         60.0         38.0         20.0         20.0         20.0         22.0         8.0           Total Split (%)         28%         75%         48%         25%         25%         28%           Maximum Green (s)         18.0         56.0         34.0         16.0         18.0         18.0         Yellow Time (s)         3.5         3.5         3.5         3.5         3.5         3.5         3.5         3.5         3.5         3.5         3.5         3.5         3.5         3.5         3.5         3.5         4.0         Lead         Lead         Lead         Lead         Lead         Lead         Lead <t< td=""><td></td><td></td><td>311</td><td></td><td></td><td></td><td></td></t<>			311				
Permitted Phases         5         2         6         4         4         5           Minimum Initial (s)         4.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         22.0         20.0         20.0         20.0         20.0							
Detector Phases         5         2         6         4         4         5           Minimum Initial (s)         4.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         20.0         3.0		5	2	6		4	
Minimum Initial (s)       4.0       20.0       20.0       20.0       20.0       20.0       20.0       20.0       20.0       20.0       20.0       20.0       20.0       20.0       20.0       20.0       20.0       20.0       20.0       22.0       20.0       20.0       20.0       20.0       20.0       20.0       20.0       20.0       20.0       18.0       25%       25%		-	0	0			
Minimum Split (s)         8.0         20.0         30.0         30.5         3.5 <th< td=""><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td></th<>						-	
Total Split (s)         22.0         60.0         38.0         20.0         20.0         22.0           Total Split (%)         28%         75%         48%         25%         25%         28%           Maximum Green (s)         18.0         56.0         34.0         16.0         16.0         18.0           Yellow Time (s)         3.5         3.5         3.5         3.5         3.5         3.5           All-Red Time (s)         0.5         0.5         0.5         0.5         0.5         0.5           Lead/Lag         Lead         Lag         Lead         Lead           Lead-Lag Optimize?         Vehicle Extension (s)         3.0         3.0         3.0         3.0         3.0           Minimum Gap (s)         3.0         3.0         3.0         3.0         3.0         3.0           Time Before Reduce (s)         0.0         0.0         0.0         0.0         0.0         0.0           Time To Reduce (s)         0.0         0.0         0.0         0.0         0.0         0.0							
Total Split (%)         28%         75%         48%         25%         25%         28%           Maximum Green (s)         18.0         56.0         34.0         16.0         16.0         18.0           Yellow Time (s)         3.5         3.5         3.5         3.5         3.5         3.5           All-Red Time (s)         0.5         0.5         0.5         0.5         0.5         0.5           Lead/Lag         Lead         Lag         Lead         Lead           Lead-Lag Optimize?         Vehicle Extension (s)         3.0         3.0         3.0         3.0         3.0           Minimum Gap (s)         3.0         3.0         3.0         3.0         3.0         3.0           Time Before Reduce (s)         0.0         0.0         0.0         0.0         0.0         0.0           Time To Reduce (s)         0.0         0.0         0.0         0.0         0.0         0.0							
Maximum Green (s)       18.0       56.0       34.0       16.0       18.0         Yellow Time (s)       3.5       3.5       3.5       3.5       3.5         All-Red Time (s)       0.5       0.5       0.5       0.5       0.5       0.5         Lead/Lag       Lead       Lag       Lead         Lead-Lag Optimize?       Vehicle Extension (s)       3.0       3.0       3.0       3.0       3.0         Minimum Gap (s)       3.0       3.0       3.0       3.0       3.0       3.0         Time Before Reduce (s)       0.0       0.0       0.0       0.0       0.0       0.0         Time To Reduce (s)       0.0       0.0       0.0       0.0       0.0       0.0							
Yellow Time (s)       3.5       3.0							
All-Red Time (s) 0.5 0.5 0.5 0.5 0.5 Lead/Lag Lead Lead-Lag Optimize?  Vehicle Extension (s) 3.0 3.0 3.0 3.0 3.0 3.0 Minimum Gap (s) 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 0.0 0.0 1.0 Time To Reduce (s) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.							
Lead/Lag         Lead         Lag         Lead           Lead-Lag Optimize?         Vehicle Extension (s)         3.0	* *						
Lead-Lag Optimize?         Vehicle Extension (s)       3.0       3.0       3.0       3.0       3.0       3.0         Minimum Gap (s)       3.0       3.0       3.0       3.0       3.0       3.0         Time Before Reduce (s)       0.0       0.0       0.0       0.0       0.0       0.0         Time To Reduce (s)       0.0       0.0       0.0       0.0       0.0       0.0	7 /		0.0		0.0	0.0	
Vehicle Extension (s)       3.0       3.0       3.0       3.0       3.0       3.0         Minimum Gap (s)       3.0       3.0       3.0       3.0       3.0       3.0         Time Before Reduce (s)       0.0       0.0       0.0       0.0       0.0       0.0         Time To Reduce (s)       0.0       0.0       0.0       0.0       0.0       0.0	_						
Minimum Gap (s)       3.0       3.0       3.0       3.0       3.0       3.0         Time Before Reduce (s)       0.0       0.0       0.0       0.0       0.0       0.0         Time To Reduce (s)       0.0       0.0       0.0       0.0       0.0       0.0		3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s) 0.0 0.0 0.0 0.0 0.0 0.0 1.0 0.0 0.0 0.0							
Recall Mode Max Max Max Max Max Max	Time To Reduce (s)	0.0	0.0		0.0	0.0	0.0
	Recall Mode	Max	Max	Max	Max	Max	Max

Lanes, \	0	lumes,	Tim	ings
----------	---	--------	-----	------

	4	×	2	1	×		7	×	a	4	K	×
Lane Group	SEL	SET	SER	NWL	<b>NWT</b>	NWR	NEL	NET	NER	SWL	SWT	SWR
Walk Time (s)	5.0	5.0		5.0	5.0	-	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Lane Grp Cap (vph)		332			1931		196	857	878	149	857	730
v/s Ratio Prot								0.41			0.33	
v/s Ratio Perm		0.15			0.43		0.50		0.15	0.44		0.39
Critical LG?					Yes		Yes					
Act Effct Green (s)		21.0			21.0		23.0	23.0	23.0	23.0	23.0	23.0
Actuated g/C Ratio		0.42			0.42		0.46	0.46	0.46	0.46	0.46	0.46
v/c Ratio		0.37			1.01		1.08	0.88	0.32	0.97	0.71	0.84
Uniform Delay, d1		8.0			14.3		13.5	12.3	0.0	13.1	10.8	11.8
Percentile Delay		9.2			35.3		86.9	21.8	1.5	73.2	12.3	19.2
Percentile LOS		Α			D		F	C	Α	E	В	В
Uniform Delay, d1		8.0			14.3		13.5	12.3	0.0	13.1	10.8	11.8
Platoon Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incr. Delay, d2		3.1			23.6		86.1	12.7	0.9	65.3	5.0	11.0
Webster Delay		11.1			37.9		99.6	24.9	0.9	78.5	15.8	22.8
Webster LOS		В			D		F	C	Α	E	В	C

Area Type:

Other

Cycle Length: 50

Actuated Cycle Length: 50

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

Natural Cycle: 50 Control Type: Pretimed Total Lost Time: 6

Sum of Critical v/s Ratios: 0.92 Intersection v/c Ratio: 1.05

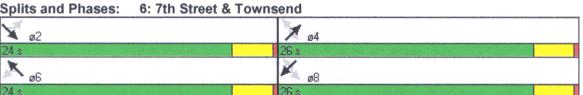
Intersection Percentile Signal Delay: 28.8

Intersection Percentile LOS: C

Intersection Webster Signal Delay: 32.1

Intersection LOS: C

Splits and Phases:



Lanes, volumes, rimin	- 77			- /······								
	4	X	j	~	X	₹	<b>7</b>	×	1	4	K	*
Lane Group	SEL	SET	SER	NWL	NWI	<b>NWR</b>	NEL	NET	<b>NER</b>	SWL	<u>SWT</u>	<u>SWR</u>
Lane Configurations		4			<b>ብ</b> ተኩ		ሻ	<b>↑</b>	7	7	<b>↑</b>	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	11	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		· 0	1		1	1		1
Total Lost Time (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
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt Protected		0.876			0.991				0.850			0.850
Fit Protected		0.987			0.999		0.950			0.950		
Satd. Flow (prot)	0	1557	0	0	4867	0	1770	1863	1583	1770	1863	1583
Frt Perm.		0.876			0.991				0.850			0.850
Fit Perm.		0.482			0.937		0.228			0.174		
Satd. Flow (perm)	. 0	760	0	0	4565	0	425	1863	1583	324	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			23				278			3
Headway Factor	1.00	1.04	1.00	1.00	1,04	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Volume (vph)	30	60	20	20	1640	100	190	680	250	130	550	550
Confl. Peds. (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	33	67	22	22	1822	111	211	756	278	144	611	611
Lane Group Flow (vph)	0	122	0	0	1955	0	211	756	278	144	611	611
Turn Type	Perm			Perm			Perm		Perm	Perm		Perm
Protected Phases		2			6			4			8	
Permitted Phases	. 2			6	,		4		4	8		8
Detector Phases	2	2		6	6		4	4	4	8	8	8
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	24.0	24.0	0.0	24.0	24.0	0.0	26.0	26.0	26.0	26.0	26.0	26.0
Total Split (%)	48%	48%	0%	48%	48%	0%	52%	52%	52%	52%	52%	52%
Maximum Green (s)	20.0	20.0		20.0	20.0		22.0	22.0	22.0	22.0	22.0	22.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag												
Lead-Lag Optimize?							*					
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
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	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max		Max	Max		Max	Max	Max	Max	Max	Max

## APPENDIX C

Synchro Analysis of Three Scenarios for Southbound 7<sup>th</sup> Street at Townsend

One lane southbounds PM projected volumes.

## 6: 7th Street & Townsend

Baseline

5/24/2001

Lanes, Volumes, Timir	ngs											
	4	×	7	~	K	7	ን	1	~	4	K	K
Lane Group	'SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		1			414		7	<b>A</b>	7	ሻ	<b>A</b>	7
Ideal Flow (vphpl)	1900		1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	11	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%	• • •		0%	12
Storage Length (ft)	0		0	0	• • • • • • • • • • • • • • • • • • • •	0	0		0	0	0 70	0
Storage Lanes	0		Ō	Ö		Ö	1		1	1		1
Total Lost Time (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
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15	_	9	15	•	9	15	·	9	15	U	9
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt Protected		0.876	1.00	0.01	0.991	0.51	1.00	1.00	0.850	1.00	1.00	0.850
Fit Protected		0.987			0.999		0.950		0.030	0.950		0.650
Satd. Flow (prot)	0	1557	0	0	4867	0	1770	1863	1583	1770	1863	1583
Frt Permi.	•	0.876	. •	U	0.991	U	1770	(1003	0.850		1003	
Fit Perm.		0.482			0.937		0.228		0.650_	0.174		0.850
Satd. Flow (perm)	Ó	760	0	0	4565	0	425	1062	1583		inen	4500
Right Turn on Red	U	700	Yes	U	4505		425	1863		324	1863	1583
Satd. Flow (RTOR)		22	165		22	Yes			Yes			Yes
Headway Factor	1.00	1.04	4.00	4.00	23	4.00	4.00	4.00	278	4.00		3
•			1.00	1.00	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Volume (vph)	<b>1000</b>	. 60	.:: .: 20	20	1640	100	190	680	250	130	550	550
Confl. Peds. (#/hr)	0.00	0.00	0.00									
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	- 0
Parking (#/hr)		00/										
Mid-Block Traffic (%)	00	0%			0%			0%			0%	
Adj. Flow (vph)	33	67	22	22	1822	111	211	756	278	144	611	611
Lane Group Flow (vph)	_ 0	122	0	0	1955	0	211	756	278	144	611	611
Turn Type	Perm	_		Perm		•	Perm		Perm	Perm		Perm
Protected Phases	_	2			6			4			8	
Permitted Phases	2	_		6			4		4	8		8
Detector Phases	2	2		6	6		4	4	4	8	8	8
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	24.0	24.0	0.0	24.0	24.0	0.0	26.0	26.0	26.0	26.0	26.0	26.0
Total Split (%)	48%	48%	0%	48%	48%	0%	52%	52%	52%	52%	52%	52%
Maximum Green (s)	20.0	20.0		20.0	20.0		22.0	22.0	22.0	22.0	22.0	22.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag									_			
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
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	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max		Max	Max		Max	Max	Max	Max	Max	Max
							MAN				MAX	.,,,,,,,

Synchro 4 Report



	<b>4</b>	X	, in the same	~	X	*	7	A	~	4	K	×
Lane Group	SEL	SET	SER	NWL	<u>NWT</u>	NWR	NEL	NET	NER	SWL	CHE	0117
Walk Time (s)	5.0	5.0		5.0	5.0	1	5.0	5.0	5.0		SWI	SWR
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		5.0	5.0	5.0
Pedestrian Calls (#/hr)	0	0		0	0				11.0	11.0	11.0	11.0
Lane Grp Cap (vph)	•	332		U			0	0	0	0	0	0
v/s Ratio Prot		002			1931		196	857	878	149	857	730
v/s Ratio Perm		0.15			0.40			0.41			0.33	
Critical LG?		0.15			0.43		0.50		0.15	0.44		0.39
		04.0			Yes		Yes					
Act Effct Green (s)		21.0			21.0	•	23.0	23.0	23.0	23.0	23.0	23.0
Actuated g/C Ratio		0.42			0.42		0.46	0.46	0.46	0.46	0.46	0.46
v/c Ratio		0.37			1.01		1.08	0.88	0.32	0.97	0.71	0.40
Uniform Delay, d1		8.0			14.3		13.5	12.3	0.0	13.1		
Percentile Delay		9.2			35.3		86.9	21.8	1.5		10.8	11.8
Percentile LOS		Α			D		50.9 F			73.2	12.3	19.2
Uniform Delay, d1		8.0			14.3		•	C	A	E	В	В
Platoon Factor		1.00					13.5	12.3	0.0	13.1	10.8	11.8
Incr. Delay, d2					1.00		1.00	1.00	1.00	1.00	1.00	1.00
Webster Delay		3.1	,*		23.6		86.1	12.7	0.9	65.3	5.0	11.0
		11.1			37.9		99.6	24.9	0.9	78.5	15.8	22.8
Webster LOS		# B ↑			D		F	С	Α	Е	В	C

Area Type:

Other

Cycle Length: 50

Actuated Cycle Length: 50

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

Natural Cycle: 50 Control Type: Pretimed Total Lost Time: 6

Sum of Critical v/s Ratios: 0.92 Intersection v/c Ratio: 1.05

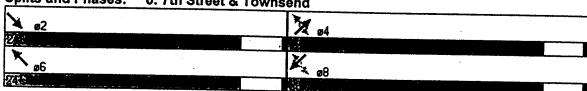
Intersection Percentile Signal Delay: 28.8

Intersection Percentile LOS: C

Intersection Webster Signal Delay: 32.1

Intersection LOS: C -

Splits and Phases: 6: 7th Street & Townsend



One lane southbound,
PM projected volumes doubled for SB approach.

5/24/2001

Lanes, Volumes, Timings

Lailes, Volumes, Timi	ngs			<del></del>		············						
	:- ====:	A. 16. 16. 16. 16. 16. 16. 16. 16. 16. 16	**************************************	F	*	Ţ	7	×	~	(	K	K
Lane Group	SEL	SET	= SER	NWL	TWN	<b>NWR</b>	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	4000	4			444		¥	<b>↑</b>	7	ሻ	<b>A</b>	7
ldeal Flow (vphpl) Lane Width (ft)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)	12	11	12	12	11	12	12	12	12	12	12	12
Storage Length (ft)	^	0%	•	_	0%			0%			0%	
Storage Lanes	0		0	0		0	0		0	0		0
Total Lost Time (s)	0	2.0	0	0		0	1		1	1		1
Leading Detector (ft)	3.0 50	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Trailing Detector (ft)	0	50		50	50		50	50	50	50	50	50
Turning Speed (mph)	15	0	^	0	0	_	0	0	0	0	0	0
Lane Util. Factor	1.00	1.00	9	15		9	15		9	15		9
Frt Protected	1.00	1.00	1.00	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected		0.876 0.986			0.991				0.850			0.850
Satd. Flow (prot)	0	1555	^	•	0.999		0.950			0.950		
Frt Perm.	U	0.876	0	0	4867	0	1770	1863	1583	1770	1863	1583
Fit Perm.		0.876			0.991				0.850			0.850
Satd. Flow (perm)	. 0	532		•	0.936	_	0.228			0.174		
Right Turn on Red	. 0	33Z	0	0	4560	0	425	1863	1583	324	1863	1583
Satd. Flow (RTOR)		27	Yes			Yes			Yes			Yes
Headway Factor	1.00	1.04	4.00	4.00	23				278			3
Volume (vph)	60	1.04	1.00	1.00	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Confl. Peds. (#/hr)		120	40.	20	1640	100	190	680	250	130	550	550
Peak Hour Factor	0.90	0.90	0.90	0.00	0.00							
Growth Factor	100%	100%	100%	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Bus Blockages (#/hr)	0	0	2%	· 2%	2%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)	•	U	U	U	0	0	0	0	0	0	0	. 0
Mid-Block Traffic (%)		0%			00/			001				
Adj. Flow (vph)	67	133	44	22	0%	444	044	0%			0%	
Lane Group Flow (vph)	0	244	0	0	1822	111	211	756	278	144	611	611
Turn Type	Perm	277	U	Perm	1955	0	211	756	278	_144	611	611
Protected Phases	. 0	2		Lemi	6	•	Perm	4	Perm	Perm		Perm
Permitted Phases	2	_		6	6			4			8	
Detector Phases	2	2		6	6		4		4	8		8
Minimum Initial (s)	4.0	4.0		4.0	4.0		4	4	4	8	8	8
Minimum Split (s)	20.0	20.0		20.0	4.0 20.0		4.0	4.0	4.0	4.0	4.0	4.0
Total Split (s)	24.0	24.0	0.0	24.0	24.0	0.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (%)	48%	48%	0%	48%	48%	0.0	26.0	26.0	26.0	26.0	26.0	26.0
Maximum Green (s)	20.0	20.0	0 /0	20.0		0%	52%	52%	52%	52%	52%	52%
Yellow Time (s)	3.5	3.5		3.5	20.0		22.0	22.0	22.0	22.0	22.0	22.0
All-Red Time (s)	0.5	0.5		0.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5
Lead/Lag	0.0	0.0		0.5	0.5		0.5	0.5	0.5	0.5	0.5	0.5
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	2.0	0.0			
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
Time Before Reduce (s)	0.0	0.0		0.0	0.0		3.0	3.0	3.0	3.0	3.0	3.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Max	Max		Max	Max		0.0	0.0	0.0	0.0	0.0	0.0
					WIGA	-	Max	Max	Max	Max	Max	Max

Synchro 4 Report



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5/24/2001

Lanes, Volumes, Timir	ngs										5/2	24/2001
	<b>4</b>	×	À	~	K	7	¥	#	. ~	C	~	
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NE	NET		~	_	,
Walk Time (s)	5.0	5.0		5.0	5.0	MIN	NEL	NET	NER	SWL	SWT	SWR
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		5.0	5.0	5.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	0	0		0	0		11.0	11.0	11.0	11.0	11.0	11.0
Lane Grp Cap (vph)		239		U			0	0	0	0	0	0
v/s Ratio Prot		200			1929		196	857	878	149	857	730
v/s Ratio Perm		0.43			0.40			0.41			0.33	
Critical LG?		Yes			0.43		0.50		0.15	0.44		0.39
Act Effct Green (s)		21.0					Yes					
Actuated g/C Ratio					21.0	÷	23.0	23.0	23.0	23.0	23.0	23.0
v/c Ratio		0.42			0.42		0.46	0.46	0.46	0.46	0.46	0.46
Uniform Delay, d1		1.02			1.01		1.08	0.88	0.32	0.97	0.71	0.84
Percentile Delay		12.8			14.3		13.5	12.3	0.0	13.1	10.8	11.8
Percentile LOS		69.3			35.5		86.9	21.8	1.5	73.2	12.3	19.2
		E			D		F	С	Α	E	B	В
Uniform Delay, d1		12.8			14.3		13.5	12.3	0.0	13.1	10.8	11.8
Platoon Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incr. Delay, d2		63.7			23.9		86.1	12.7	0.9	65.3	5.0	
Webster Delay		76.6			38.2		99.6	24 9	0.0	70 E	3.0	11.0

D

99.6

F

24.9

С

0.9

Α

78.5

Ε

15.8

В

22.8

C

Area Type: Other Cycle Length: 50

Actuated Cycle Length: 50

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

\*.E /

Natural Cycle: 40

Webster LOS

Control Type: Pretimed

Total Lost Time: 6

Sum of Critical v/s Ratios: 0.93 Intersection v/c Ratio: 1.05

Intersection Percentile Signal Delay: 31.5

Intersection Percentile LOS: C

Intersection Webster Signal Delay: 35.0

Intersection LOS: D -

Splits and Phases: 6: 7th Street & Townsend

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24.5	Zi.	

southbound (parking 6: 7th Street & Townsend lane added) second

For SB approvious increased to LOS D. volumes Baseline

Lanes, Volumes, Timings ን 1 6 Y 1 SET SER' Lane Group SEL **NWL IWN NER NWR NEL NET** SWL SWT **SWR** Lane Configurations 7577 ፈተኩ 7 1900 Ideal Flow (vphpl) 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 Lane Width (ft) 12 11 12 12 11 12 12 12 12 12 12 12 Grade (%) 0% 0% 0% 0% Storage Length (ft) 0 0 0 0 0 0 0 0 Storage Lanes 1 0 0 0 1 1 1 1 Total Lost Time (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 Leading Detector (ft) 50 50 50 50 50 50 50 50 50 50 Trailing Detector (ft) 0 0 0 0 0 0 0 0 0 0 Turning Speed (mph) 15 9 15 9 15 9 15 9 Lane Util. Factor 1.00 1.00 1.00 0.91 0.91 0.91 1.00 1.00 1.00 1.00 1.00 1.00 **Frt Protected** 0.991 0.991 0.850 0.850 Flt Protected 0.950 0.999 0.950 0.950 Satd. Flow (prot) 1770 1784 0 0 4867 1770 0 1863 1583 1770 1863 1583 Frt Perná. 0.991 0.991 0.850 0.850 Flt Perm. 0.190 0.814 0.228 0.174 Satd. Flow (perm) 354 1784 0 3965 0 425 1863 1583 324 1863 1583 Right Turn on Red Yes Yes Yes Yes Satd. Flow (RTOR) 8 23 113 3 **Headway Factor** 1.00 1.04 1.00 1.00 1.04 1.00 1.00 1.00 1.00 1.00 1.00 1.00 110 37650 2 40 Volume (vph) 20 1640 100 190 680 250 130 550 550 Confl. Peds. (#/hr) 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 **Growth Factor** 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% 100% Heavy Vehicles (%) 2% 2% 2% 2% 2% 2% 2% 2% 2% 2% 2% 2% Bus Blockages (#/hr) 0 0 0 0 0 0 0 0 0 0 0 0 Parking (#/hr) Mid-Block Traffic (%) 0% 0% 0% 0% Adj. Flow (vph) 122 722 44 22 1822 111 211 756 278 144 611 611 Lane Group Flow (vph) 122 766 0 0 1955 0 211 756 278 144 611 611 Turn Type Perm Perm Perm Perm Perm Perm **Protected Phases** 2 6 4 8 Permitted Phases 2 6 4 4 8 8 **Detector Phases** 2 2 6 6 4 4 4 8 8 8 Minimum Initial (s) 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 Minimum Split (s) 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 20.0 Total Split (s) 24.0 24.0 0.0 24.0 24.0 0.0 26.0 26.0 26.0 26.0 26.0 26.0 Total Split (%) 48% 48% 0% 48% 48% 0% 52% 52% 52% 52% 52% 52% Maximum Green (s) 20.0 20.0 20.0 20.0 22.0 22.0 22.0 22.0 22.0 22.0 Yellow Time (s) 3.5 3.5 3.5 3.5 3.5 3.5 3.5 3.5 3.5 3.5 All-Red Time (s) 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 Lead/Lag Lead-Lag Optimize? Vehicle Extension (s) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 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 0.0 0.0 0.0 0.0 0.0 0.0 Time To Reduce (s) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Recall Mode Max Max Max Max Max Max Max Max Max Max

Synchro 4 Report

5/24/2001

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lanes	Volumes,	Timinge
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	<b>'Y</b>	\ <u> </u>	3	<b></b>	×	• *	*					
Lane Group	SEL	SET		A 11 A 11	•		7		~	- 4	×	W.
Walk Time (s)	5.0	.∵ <b>9E1</b> .	SEK	NWL	NWI	NWR	NEL	NET	<u>NER</u>	SWL	SWT	<b>SWR</b>
Flash Dont Walk (s)				5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Pedestrian Calls (#/hr)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0
Lane Grp Cap (vph)	0	0		0	0		0	0	0	0	0	0
	149	754			1679		196	857	789	149	857	730
v/s Ratio Prot		0.43						0.41			0.33	
v/s Ratio Perm	0.34				0.49		0.50		0.16	0.44		0.39
Critical LG?					Yes		Yes					0.03
Act Effct Green (s)	21.0	21.0			21.0		23.0	23.0	23.0	23.0	23.0	23.0
Actuated g/C Ratio	0.42	0.42			0.42		0.46	0.46	0.46	0.46	0.46	0.46
v/c Ratio	0.82	1.02			1.16		1.08	0.88	0.35	0.97	0.40	0.46
Uniform Delay, d1	12.8	14.3			14.3		13.5	12.3	4.9	13.1	10.8	
Percentile Delay	48.6	46.9			83.0		86.9	21.8	5.3	73.2		11.8
Percentile LOS	D	D			F		60.5 F	21.0 C			12.3	19.2
Uniform Delay, d1	12.8	14.3			14.3		13.5	12.3	Α	E	В	В
Platoon Factor	1.00	1.00			1.00				4.9	13.1	10.8	11.8
Incr. Delay, d2	37.4	36.8					1.00	1.00	1.00	1.00	1.00	1.00
Webster Delay	50.2	51.2			80.9		86.1	12.7	1.2	65.3	્ 5.0	11.0
Webster LOS		51.2 D/			95.2		99.6	24.9	6.1	78.5	15.8	22.8
	. پ	U, U,			F		F	С	Α	E	В	С

Area Type:

Other

Cycle Length: 50

Actuated Cycle Length: 50

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

Natural Cycle: 100 Control Type: Pretimed Total Lost Time: 6

Sum of Critical v/s Ratios: 0.99 Intersection v/c Ratio: 1.12

Intersection Percentile Signal Delay: 49.5

Intersection Percentile LOS: D

Intersection Webster Signal Delay: 56.5

Intersection LOS: E

Splits and Phases: 6: 7th Street & Townsend

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## APPENDIX D

## Synchro Analysis of Southbound Through Capacity of 7<sup>th</sup> Street at The Commons

Lanes.	Volumes,	<b>Timings</b>
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	4	*	K	*	4	*
Lane Group	SEL :	SET	NWT	NWR	SWL	SWR
Lane Configurations	ካካ 🐇	1	<b>^</b>	7	7	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	14	11	10	. 11	11
Grade (%)		0%	0%		0%	_
Storage Length (ft)	180			0	0	0
Storage Lanes	2			1	1	2
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	0.97	1.00	0.95	1.00	1.00	0.88
Frt Protected				0.850		0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	3204	1987	3421	1478	1711	2694
Frt Permi.				0.850		0.850
Flt Perm.	0.950				0.950	
Satd. Flow (perm)	3204	1987	3421	1478	1711	2694
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				21		30
Headway Factor	1.09	0.92	1.04	1.09	1.04	1.04
Volume (vph)	620	280	1200	70	60	680
Confl. Peds. (#/hr)		,				
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%	•	0%	
Adj. Flow (vph)	689	311	1333	78		756
Lane Group Flow (vph)	689	311	1333	78		
Turn Type	Prot			Pm+Ov		Pm+Ov
Protected Phases	5	2	6	4	4	
Permitted Phases				6		4
Detector Phases	5	2	. 6	4	4	
Minimum Initial (s)	4.0	4.0	4.0			
Minimum Split (s)	8.0	20.0				
Total Split (s)	22.0	60.0				
Total Split (%)	28%	75%	48%			
Maximum Green (s)	18.0	56.0	34.0			
Yellow Time (s)	3.5	3.5	3.5			
All-Red Time (s)	0.5	0.5	0.5	5 0.5	5 0.5	
Lead/Lag	Lead		Lag	3		Lead
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0				
Minimum Gap (s)	3.0	3.0				
Time Before Reduce (	s) 0.0					
Time To Reduce (s)	0.0	0.0	0,			
Recall Mode	Ma	k Ma	х Ма	x Ma	x Ma	x Max

280 is volume provided by Catellos For 2015.

> Synchro 4 Report Page 1



	4	×	K	7	4	*
Lane Group	SEL	SET !	TWN	NWR	SWL	SWR
Walk Time (s)		5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0	0	0	0	
Lane Grp Cap (vph)	761	1416	1497	1023	364	1329
v/s Ratio Prot	0.22	0.16	0.39	0.02	0.04	0.14
v/s Ratio Perm				0.04		0.14
Critical LG?	Yes		Yes			Yes
Act Effct Green (s)	19.0	57.0	35.0	55.0	17.0	39.0
Actuated g/C Ratio	0.24	0.71	0.44	0.69	0.21	0.49
v/c Ratio	0.91	0.22	0.89	0.08	0.18	0.57
Uniform Delay, d1	29.6	3.9	20.7	3.0	25.8	13.9
Percentile Delay	39.6	4.0	24.6	3.3	26.3	14.2
Percentile LOS	D	Α	С	Α	С	В
Uniform Delay, d1	29.6	3.9	20.7	3.0	25.8	13.9
Platoon Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incr. Delay, d2	16.4	0.4	8.4	0.1	1.1	1.8
Webster Delay	46.0	4.3	29.1	3.1	26.9	15.6
Webster LOS	D	A f	С	$\mathbf{A}_{i}$	C	В

Area Type:

Other

Cycle Length: 80

Actuated Cycle Length: 80

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

Natural Cycle: 80 Control Type: Pretimed Total Lost Time: 9

Sum of Critical v/s Ratios: 0.73 Intersection v/c Ratio: 0.82

Intersection Percentile Signal Delay: 22.9

Intersection Percentile LOS: C

Intersection Webster Signal Delay: 26.5

Intersection LOS: C

Splits and Phases: 14: 7th Street & The Commons

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<b>72.</b>		

Lanes, Volumes, Timin	gs		· · · · · · · · · · · · · · · · · · ·		·	<u>.</u>	
	4	×	×	*	4	*	
Lane Group	SEL	SET'	TWM	NWR	SWL	SWR	
Lane Configurations	ሻሻ	127	<b>†</b> †	7	4	77	•
deal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	14	11	10	11	11	
Grade (%)	400	0%	0%	_	0%	_	
Storage Length (ft)	180			0	0	0	
Storage Lanes	2			1	1	2	
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	
eading Detector (ft)	50	50	50	50	50	50	
railing Detector (ft)	0	0	0	0	0	0	
Furning Speed (mph)	15			9	15	9	
ane Util. Factor	0.97	1.00	0.95	1.00	1.00	0.88	
rt Protected				0.850		0.850	
	0.950				0.950		
Satd. Flow (prot)	3204	1987	3421	1478	1711	2694	
Frt Permî.'				0.850		0.850	•
	0.950				0.950		
Satd. Flow (perm)	3204	1987	3421	1478	1711	2694	1350 is volume
Right Turn on Red				Yes		Yes	that brings the
Satd. Flow (RTOR)				21		30	that brings the
leadway Factor	1.09	0.92	1.04	1.09	1.04	1.04	<b>3</b> .
/olume (vph)	620	1350	1200	70	60	680	southbound thre
Confl. Peds. (#/hr)							<del>-</del> -
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	to LOS D, A
Frowth Factor	100%	100%	100%	100%	100%	100%	-(0 1
leavy Vehicles (%)	2%	2%	2%	2%	2%	2%	i acrose of 10°
Bus Blockages (#/hr)	0	0	0	0	0	0	1 - 51
Parking (#/hr)							until hour ow
Mid-Block Traffic (%)		0%	0%		0%		vehil hour our volume projected by catellos.
Adj. Flow (vph)	689	1500	1333	78	67	756	volume projected
ane Group Flow (vph)	689	1500	1333	78	67	756	00.0War / 0
Turn Type	Prot		F	m+Ov	ı	Pm+Ov	by Catelliss,
Protected Phases	5	2	6	4	4	5	3
Permitted Phases				6		4	
Detector Phases	5	2	6	4	4	5	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	
/linimum Split (s)	8.0	20.0	20.0	20.0	20.0	8.0	
Total Split (s)	22.0	60.0	38.0	20.0	20.0	22.0	
otal Split (%)	28%	75%	48%	25%	25%	28%	
Maximum Green (s)	18.0	56.0	34.0	16.0	16.0	18.0	
rellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	
_ead/Lag	Lead		Lag		- · -	Lead	
_ead-Lag Optimize?	=						•
/ehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	
Time Before Reduce (s)		0.0	0.0	0.0	0.0	0.0	
Fime To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Recall Mode	Max	Max	Max	Max	Max	Max	
	.7147	11147	WAX	ITIGA	max	MIGA	:

(SA)

Lanes, Volumes, Timings
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	<b>अ</b>	×	X	*	4	Y
Lane Group	SEL	SET '	<u>TWN</u>	NWR	SWL	<b>SWR</b>
Walk Time (s)		5.0	5.0	5.0	5.0	
Flash Dont Walk (s)		11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)		0	0	0	0	
Lane Grp Cap (vph)	761	1416	1497	1023	364	1329
v/s Ratio Prot	0.22	0.75	0.39	0.02	0.04	0.14
v/s Ratio Perm	• • • • • • • • • • • • • • • • • • • •			0.04		0.14
Critical LG?		Yes				Yes
Act Effct Green (s)	19.0	57.0	35.0	55.0	17.0	39.0
Actuated g/C Ratio	0.24	0.71	0.44	0.69	0.21	0.49
	0.91	1.06	0.89	0.08	0.18	0.57
v/c Ratio	29.6	11.5	20.7	3.0	25.8	13.9
Uniform Delay, d1	39.6	51.1	24.6	3.3	26.3	14.2
Percentile Delay	39.0 D	D	C	A	C	В
Percentile LOS	29.6	11.5	20.7	3.0	25.8	13.9
Uniform Delay, d1		1.00	1.00	1.00	1.00	1.00
Platoon Factor	1.00		8.4	0.1	1.1	1.8
Incr. Delay, d2	16.4	41.3			26.9	15.6
Webster Delay	46.0	52.9	29.1	3.1	_	13.0 B
Webster LOS	D	D:	, c	Α	С	D

Area Type:

Other

Cycle Length: 80

Actuated Cycle Length: 80

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

Natural Cycle: 90 Control Type: Pretimed Total Lost Time: 6

Sum of Critical v/s Ratios: 0.88 Intersection v/c Ratio: 0.95

Intersection Percentile Signal Delay: 33.8

Intersection Percentile LOS: C

Intersection Webster Signal Delay: 37.0

Intersection LOS: D

14: 7th Street & The Commons Splits and Phases:

