

**FINAL
REPORT**

**Central Avenue Safety Improvement
Traffic Operations Analysis Report
(TOAR)**

Client: City of Alameda

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Central Avenue Safety Improvement TOAR Final Report

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- Appendix A SimTraffic Reports and Synchro Queue Reports
- Appendix B Volume Throughput Calibration and Synchro Reports
- Appendix C Crash Data

Section 1

Introduction

This document is the Traffic Operations Analysis Report (TOAR) for the Central Avenue Safety Improvement Project (EA 1Q390K – ID 0418000261) in the City of Alameda in Alameda County, California. The Central Avenue Safety Improvement Project is identified as a high-priority project in the City’s Transportation Choices Plan. The intersections of Central Avenue and Webster Street, Encinal Avenue/Sherman Street, Sixth Street, and Ninth Street were all identified in the top seven walking concern locations in the pedestrian and bicyclist public input survey conducted for the City of Alameda Pedestrian Plan. This project aims to improve safety, accessibility, and mobility through the corridor.

As part of the Project Initiation Document (PID) phase, a Transportation Engineering Performance Assessment (TEPA) report and Project Study Report-Project Development Support (PSR-PDS) report were prepared and approved by Caltrans in April 2020. This report documents the traffic operations analysis and safety assessment conducted for the PA&ED phase of the project.

1.1 Project Overview

The project extends for approximately 1.7 miles along Central Avenue from Encinal Avenue/Sherman Street (eastern limit) to Main Street/Pacific Avenue (western limit) (both directions). Central Avenue is an arterial route and a truck, transit, and bicycle priority route that provides access to multiple schools, Alameda Point, and ferry services. Central Avenue from Encinal Avenue/Sherman Street to Webster Street is within the California Department of Transportation’s (Caltrans) right of way and designated as SR-61; the portion of the project from Webster Street to Main Street/Pacific Avenue is within the City of Alameda’s right of way.

This project proposes to implement Complete Street elements to improve safety for pedestrians, bicyclists, and drivers, provide traffic calming, and provide multimodal access and regional bicycle and pedestrian facilities. A road diet would be implemented as part of the project to improve safety and create multimodal opportunities along Central Avenue. The project would include four new roundabouts, bicycle lanes and a two-way cycle track, shorter and higher visibility pedestrian crossings, accessible on-street parking, bike racks, signage, and bus stop improvements including bus stop boarding islands where needed.

Figure 1-1 shows the project location.

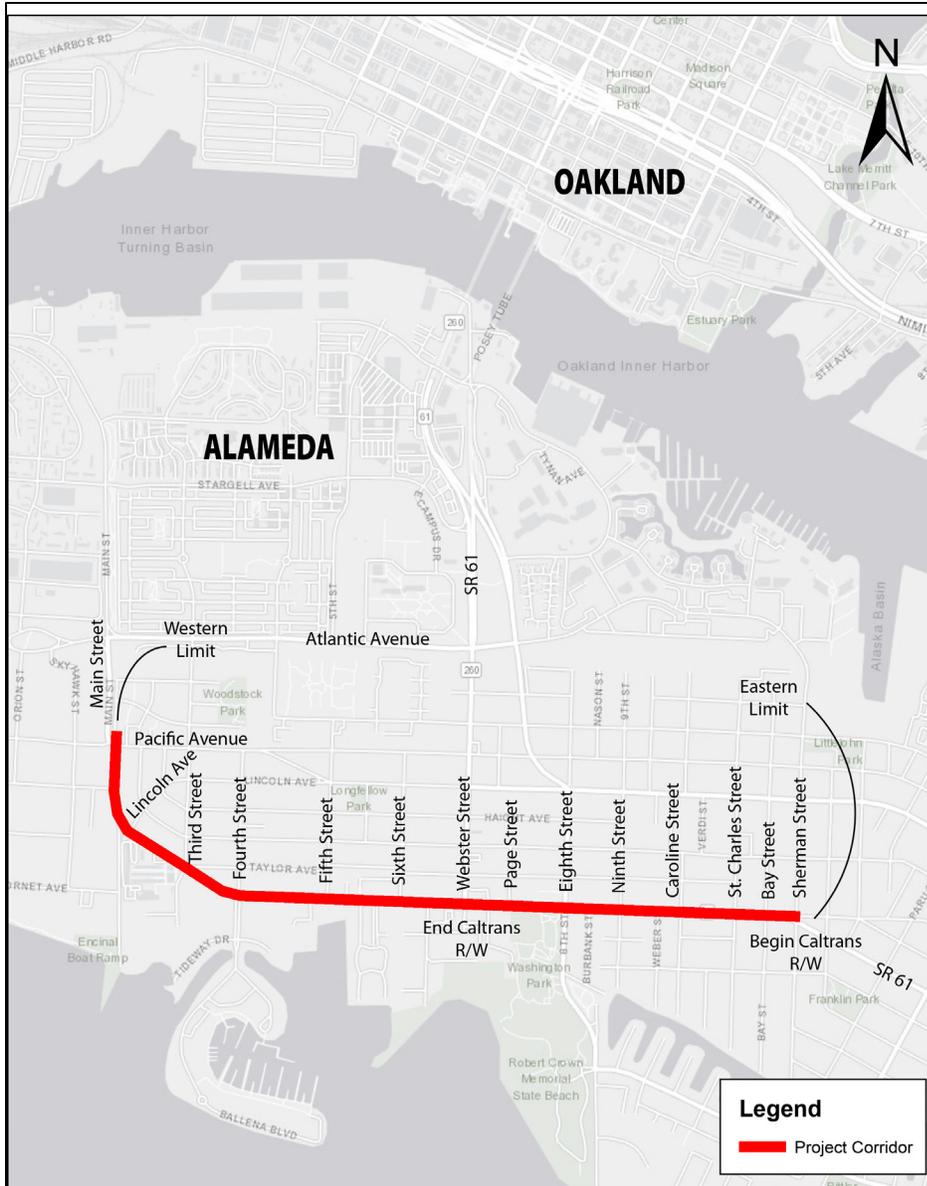


Figure 1-1
Project Location

1.2 Purpose of the Report

The purpose of this report is to document and present data collection, traffic volume development, traffic volume forecasting, traffic diversion analysis, existing and future year traffic analyses, and safety assessment for the Central Avenue Safety Improvement project. The following items are presented in this traffic and safety analysis report:

- Traffic counts collected as part of this project or from other sources
- Traffic analysis methodology

- Traffic volume development and forecasting
- Travel demand model outputs
- Traffic analyses for the existing year (2020) and future year (2045) conditions
- Crash history analysis and safety evaluation of proposed improvements

The report is organized as follows:

- Section 1 – Introduction
- Section 2 – Project Description
- Section 3 – Methodology
- Section 4 – Existing Year (2020) Traffic Operations
- Section 5 – Future Year (2045) Traffic Operations
- Section 6 – Parking Analysis
- Section 7 – Safety Assessment
- Section 8 – Conclusions

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Section 2

Project Description

This section presents the study area and describes the project to be evaluated in the traffic operations and safety analysis.

2.1 Study Area

For this PA&ED phase, the study intersections include seven intersections along Central Avenue already analyzed in the PID phase¹, and six additional intersections along Santa Clara Avenue and Lincoln Avenue (parallel streets for diversion analysis).

The thirteen study intersections are as follows:

1. Central Avenue at Main Street/Pacific Avenue
2. Central Avenue at Third Street/Taylor Avenue
3. Central Avenue at Fourth Street
4. Central Avenue at Fifth Street
5. Central Avenue at Webster Street
6. Central Avenue at Eighth Street
7. Central Avenue at Encinal Avenue/Sherman Street
8. Santa Clara Avenue at Webster Street
9. Santa Clara Avenue at Eighth Street
10. Santa Clara Avenue at Sherman Street
11. Lincoln Avenue at Webster Street
12. Lincoln Avenue at Eighth Street
13. Lincoln Avenue at Sherman Street

2.2 Existing / No Build / Build Conditions

The analysis covers the following conditions:

- **Existing Year (2020)** - Existing traffic volumes, existing geometry layouts and lane configurations.
- **Future Year (2045) No Build** - Future year traffic volumes (without diversion), existing geometry layouts and lane configurations. A refined version of the Alameda Countywide travel demand model for this project is utilized to estimate future traffic volume growth.
- **Future Year (2045) Build** - Future year traffic volumes (with diversion), proposed geometry layouts and lane configurations. The Build scenario reflects the proposed improvements along the study corridor

2.3 Project Description

The key design elements included in the project are as follows:

- **Road Diet:** Converting Central Avenue from four lanes to two lanes with a center two-way left-turn lane (TWLTL) between Third Street/Taylor Avenue and Encinal Avenue/Sherman Street (the proposed TWLTL extends to Lincoln Avenue, yet the segment between Lincoln Avenue and Third Street is a two-lane section currently).
- **Bicycle Facilities:** A Protected two-way cycle track, bike lane, or shared pedestrian/bicycle path along the study corridor between Pacific Avenue/Main Street and Encinal Avenue/Sherman Street (see **Table 2-1**).
- **Pedestrian Facilities:** Rectangular rapid flash beacon (RRFB), shorter crosswalk, pedestrian bulb-out curve, and high visibility crosswalk.
- **Roundabout:** Converting the Central Avenue intersections at Pacific Avenue/Main Street, Third Street/Taylor Avenue, Fourth Street, and Encinal Avenue/Sherman Street to roundabouts.
- **Turn Storage Bay Improvement:** Turn storage bays are provided or extended at the signalized study intersections to accommodate turning movement queues.

Three bicycle treatment alternatives were initially considered, with different bicycle treatments through Webster Street and Eighth Street. A Preferred Alternative was selected for this analysis. The bicycle treatment at the study intersections under the Build scenario are shown in Table 2-1.

Table 2-1 Bicycle Treatment at Central Avenue Intersections under Build Scenario

Int ID	Intersection Name	Treatment
1	Main St/Pacific Ave	Two-way cycle track
2	Third St/Taylor Ave	Two-way cycle track
3	Fourth St	Two-way cycle track
4	Fifth St	Two-way cycle track
5	Webster St	Two-way cycle track
6	Eighth St	Two-way cycle track
7	Encinal Ave/Sherman St	Shared pedestrian/bicycle path

Source: Study team analysis

RRFBs are proposed to be installed at the following intersections along Central Avenue for pedestrians to cross Central Avenue:

- Central Ave & Lincoln Ave
- Central Ave & Sixth St (already existing)
- Central Ave & Page St

All the crosswalks in the proposed design would be high-visibility crosswalks, while shorter crosswalks and pedestrian bulb-out curves are proposed to be installed at various locations along Central Avenue.

It is expected that with the road diet on Central Avenue in the Build scenario, some drivers will choose to travel on parallel streets such as Santa Clara Avenue and Lincoln Avenue. The refined Alameda Countywide travel demand model is used to estimate traffic diversion, as described in Section 5.

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Section 3

Methodology

This section documents the methodology used to assemble the relevant traffic data, perform the traffic analysis (including volume development, volume forecasts, and development of traffic models), conduct the parking analysis, and perform the safety assessment.

3.1 Traffic Data Collection

3.1.1 Data Availability

Table 3-1 shows the study area turning movement counts that were available prior to the data collection effort undertaken for this PA&ED phase. Those counts had been collected for the City of Alameda for other projects.

Table 3-1 Intersection Turning Movement Counts Available Prior to the PA&ED Phase

Int ID	Intersection Name	2012	2014	2015	2016	2018	2019
1	Central Ave & Main St/Pacific Ave	•					
2	Central Ave & Third St/Taylor Ave			•			
3	Central Ave & Fourth St			•			
4	Central Ave & Fifth St			•			
5	Central Ave & Webster St			•		•	
6	Central Ave & Eighth St			•		•	
7	Central Ave & Encinal Ave/Sherman St	•			•	•	
8	Santa Clara Ave & Webster St			•			•
9	Santa Clara Ave & Eighth St		•				
10	Santa Clara Ave & Sherman St						
11	Lincoln Avenue & Webster St						•
12	Lincoln Ave & Eighth St						
13	Lincoln Ave & Sherman St						

Source: City of Alameda; Study team analysis

It was determined that counts from 2015 or older should not be used and therefore new counts were required as part of the PA&ED phase at Intersections 1 through 4, 9, 10, 12 and 13.

3.1.2 Traffic Counts

New traffic counts conducted for this PA&ED phase include AM and PM peak hour turning movement counts and approach average daily traffic (ADT) counts. Even though the traffic analysis focuses on the AM and PM peak hours, daily volumes were assembled to study the daily level of traffic at the intersections along Central Avenue and parallel streets.

The turning movement counts were conducted from 7:00 to 9:00 AM and from 4:00 to 6:00 PM, at 15-minute intervals at the following intersections (with intersection ID numbers).

1. Central Avenue at Main Street/Pacific Avenue
2. Central Avenue at Third Street/Taylor Avenue
3. Central Avenue at Fourth Street
4. Central Avenue at Fifth Street
9. Santa Clara Avenue at Eighth Street
10. Santa Clara Avenue at Sherman Street
12. Lincoln Avenue at Eighth Street
13. Lincoln Avenue at Sherman Street

The collected counts include vehicle classification by cars, heavy vehicles (buses, single-unit trucks, articulated trucks), bicycles, and pedestrians.

In addition, daily counts without classification were conducted at 15-minute intervals at the following intersections.

1. Central Avenue at Main Street/Pacific Avenue
5. Central Avenue at Webster Street
7. Central Avenue at Encinal Avenue/Sherman Street
8. Santa Clara Avenue at Webster Street (Santa Clara Avenue only)
11. Lincoln Avenue at Webster Street (Lincoln Avenue only)

3.2 Traffic Analysis

3.2.1 Traffic Volume Development

Existing (2020) Volumes

Historical counts and 2020 counts were used to develop the balanced turning movement volumes in the AM and PM peak hours for the study intersections. The highest one-hour volumes were identified for each intersection. The predominant one-hour intervals during the AM and PM periods are 7:30 AM to 8:30 AM and 5 PM to 6 PM, respectively. For intersections without 2020 counts, two years of historical counts were compared to derive the growth rates and estimate existing year volumes.

Future (2045) No Build Volumes

Traffic volume forecasts for the AM and PM peak hours in 2045 were derived from the updated Alameda Countywide travel demand model developed by Caltrans for the Encinal Avenue project. The model files from the Encinal Avenue project were provided to the study team by Caltrans.

Prior to its application for developing future No Build and Build volumes, the Alameda Countywide travel demand model was modified by the project team to add Fifth Street and Taylor Avenue, and split up the land uses (transportation analysis zones) served by these two added streets.

The Alameda Countywide travel demand model years are 2020 and 2040. The difference between 2020 and 2040 model volume outputs was applied to the existing volumes to develop future turning movement volumes at the study intersections. The 2040 volumes were then further extrapolated to derive the 2045 volumes.

Future (2045) Build Volumes

For the future Build scenario, the Alameda Countywide travel demand model was refined and rerun to reflect the Build scenario roadway characteristics. A traffic diversion analysis was performed by reviewing traffic diversion predicted by the Alameda Countywide travel demand model as well as reasonableness check on the congestion levels at the study intersections on parallel routes including Santa Clara Avenue and Lincoln Avenue.

Even though there is no study intersection on Taylor Avenue (just north of and parallel to Central Avenue), the impact of potential diverted traffic on Taylor Avenue was assessed qualitatively.

3.2.2 Traffic Analysis Methodology and Models

Intersection delay and level of service (LOS) based on the Highway Capacity Manual (HCM) methodology were used as the metrics for traffic operations analysis. Delay is the average delay experienced by a vehicle. LOS is a qualitative measure representing the operating conditions of a transportation facility. LOS ratings range from A to F, with LOS A representing free flow conditions with minimal or no delay, while LOS F representing forced flow with heavy congestion and queues failing to clear. The LOS criteria for signalized and unsignalized intersections from the HCM, Sixth Edition are shown in **Table 3-2**.

Table 3-2 LOS Criteria for Signalized and Unsignalized Intersections

LOS	Average Control Delay (sec/veh)	
	Signalized	Unsignalized
A	0 - 10	0 - 10
B	> 10 - 20	> 10 – 15
C	> 20 - 35	> 15 – 25
D	> 35 - 55	> 25 – 35
E	> 55 - 80	> 35 – 50
F	> 80	> 50

Source: Highway Capacity Manual, Sixth Edition

The Synchro traffic analysis software (version 10) was used to analyze traffic operations at the study intersections. Traffic volumes developed as described in the previous section were imported into the Synchro models. Signal phasing and timings were based on the signal timing sheets provided by the City of Alameda to reflect actual operations under Existing conditions. In the future No Build and Build scenarios, splits were optimized using the Synchro optimization

function. In the Build scenario, the signalization control type of the study intersection along the Central Avenue corridor was set to “actuated-coordinated”, and offsets were further optimized to ensure coordination between intersections. The control type of the study intersections in the Existing/2045 No Build and 2045 Build scenarios is shown in **Table 3-3**.

Table 3-3 Intersection Control Type Comparison

ID	Location	Existing/ 2045 No Build	2045 Build
1	Central Ave at Main St/Pacific Ave	Signalized	Roundabout
2	Central Ave at Third St/Taylor Ave	Side-Street Stop	Roundabout
3	Central Ave at Fourth St	Signalized	Roundabout
4	Central Ave at Fifth St	All-Way Stop	All-Way Stop
5	Central Ave at Webster St	Signalized	Signalized
6	Central Ave at Eighth St	Signalized	Signalized
7	Central Ave at Encinal Ave/Sherman St	Signalized	Roundabout
8	Santa Clara Ave at Webster Street	Signalized	Signalized
9	Santa Clara Ave at Eighth St	Signalized	Signalized
10	Santa Clara Ave at Sherman St	All-Way Stop	All-Way Stop
11	Lincoln Ave at Webster St	Signalized	Signalized
12	Lincoln Ave at Eighth St	Signalized	Signalized
13	Lincoln Ave at Sherman St	Signalized	Signalized

Source: Study team analysis

In general, the reported delay is based on the HCM Sixth Edition methodology. When the HCM Sixth Edition methodology is not applicable due to its limitations for certain geometry, lane configuration, or signal phasing, the reported delay is instead based on the HCM 2000 methodology. The proposed roundabouts in the Build scenario were also coded and analyzed in Synchro. The reported delay is based on the HCM Sixth Edition methodology for roundabouts.

In general, the average delay is reported for the entire intersection, except at one side-street stop-controlled intersection: Third Street under existing conditions. In this case, the delay of the worst stop-controlled side street approach is reported. In addition to average intersection delays, the 95th-percentile queue lengths for lane groups at the signalized intersections are also reported from Synchro to analyze the congestion level for each intersection approaches and evaluate the required turn storage length.

The Synchro models developed in the previous PID phase were updated with the new volumes and revised design layouts to analyze traffic conditions for the study intersections along Central Avenue. In addition, intersections along Santa Clara Avenue and Lincoln Avenue were added to the Synchro models for the diversion analysis.

For corridor travel time analysis, SimTraffic models were developed based on Synchro models for the PM peak hour. The SimTraffic existing PM model was calibrated by checking vehicle throughput and comparing the reported corridor travel time against typical weekday travel time as reported by Google Maps. Travel times along Central Avenue between Pacific Avenue/Main

Street and Webster Street and between Webster Street and Sherman Street/Encinal Avenue were evaluated with SimTraffic.

3.3 Parking Analysis

The availability of on-street parking was analyzed by comparing the approximate number of parking spaces on major blocks available between the No Build conditions and the Build alternative.

3.4 Safety Assessment

The safety assessment includes an evaluation of the crash history along the study corridor, and an analysis of the anticipated impact of the proposed improvements.

3.4.1 Crash History

Historical crash data was assembled from two sources – Caltrans TASAS accidents reports and City of Alameda’s police reports.

Caltrans TASAS Data

The crash and roadway records from California State’s Traffic Accident Surveillance and Analysis System (TASAS) were collected and compiled for the 5-year period from 01/01/2014 to 12/31/2018 for the SR-61 portion of the study corridor (Central Avenue from Sherman Street/Encinal Avenue to Webster Street).

Crash rates, crash severity, and crash type were analyzed.

City of Alameda’s Police Reports

An additional crash dataset from the police reports was provided by the City of Alameda. It includes crashes along the entire corridor (including those within Caltrans ROW) from 01/01/2009 to 12/31/2018. Crash severity, crash type, and contributing factor for the crashes during a 5-year period from 01/01/2014 to 12/31/2018 were analyzed.

3.4.2 Safety Evaluation of Proposed Improvements

The anticipated safety impact of the proposed improvements (road diet, pedestrian crossing features, bicycle facilities, and roundabouts) was evaluated based on the Highway Safety Manual² (HSM)’s method for estimating the safety effectiveness of a proposed project. The method is described as Method 4 under Section C.7 of the manual.

The method starts with observed crash frequency under existing condition, and then applies an appropriate crash modification factor (CMF) from Part D of the HSM to derive the estimated expected average crash frequency for the proposed improvement.

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Section 4

Existing Year (2020) Traffic Operations

This section documents the development of existing year traffic volume, the calibration of Synchro/SimTraffic models, and the results of the traffic operations analysis under existing conditions for the AM and PM peak hours.

4.1 Traffic Volumes

4.1.1 AM and PM Peak Hour Volumes

As mentioned in Section 3.1.1, 2020 counts were not available at all study intersections. In absence of 2020 counts, two years of historical counts were used to derive 2020 volumes from older counts by estimating annual average growth rates. This happened at three intersections: Central Avenue & Webster Street, Central Avenue & Eighth Street, and Central Avenue & Encinal Avenue/Sherman Street. At these locations, compound annual growth rates (CAGRs) for two approaches on one roadway were averaged to derive the total CAGR for that roadway, unless the CAGR for one of the approaches was significantly different. If historical counts showed declining volumes, no growth was applied.

For the Central Avenue & Webster Street intersection, 2015 and 2018 counts along Central Avenue and Webster Street were compared to derive the CAGRs. The Central Avenue CAGR was also used for the Santa Clara Avenue approaches at Webster Street and Lincoln Avenue at Webster Street.

For the Central Avenue & Eighth Street intersection, the 2016 and 2018 counts along Central Avenue were compared to derive the CAGR in the AM peak hour; and, 2012 and 2018 counts were used to derive the CAGR for Eighth Street intersection because the 2016 count on the northbound approach of Eighth Street appeared to be an anomaly. In the PM peak hour, 2012 and 2018 counts along Central Avenue and Eighth Street were compared to derive the CAGRs.

For the Central Avenue & Encinal Avenue/Sherman Street intersection, 2015 and 2018 counts along Central Avenue/Encinal Avenue and Sherman Street were compared to derive the CAGRs

Table 4-1 shows the growth rates used to grow historical volumes to 2020 volumes for the intersection approaches.

Table 4-1 Growth Rates from Historical to Existing Year

Location	From Historical Year	To Existing Year	AM CAGR	PM CAGR
Central Ave at Webster St	2018	2020	3%	0%
Central Ave at Eighth St	2018	2020	3%	1%
Central/Encinal Ave at Sherman	2018	2020	4%	1%
Webster St at Central Ave	2018	2020	5%	3%
Eighth St at Central Ave	2018	2020	0%	0%
Sherman St at Central Ave	2018	2020	3%	0%
Santa Clara Ave at Webster St	2019	2020	3%	0%
Webster St at Santa Clara Ave	2019	2020	5%	3%
Lincoln Ave at Webster St	2019	2020	3%	0%
Webster St at Lincoln Ave	2019	2020	5%	3%

Source: Study team analysis

A reasonableness check was performed to review the volume differences between two adjacent intersections. Due to the presence of driveways, streets, and school entrances/exits, upstream and downstream volumes do not necessarily have to match between two intersections.

Conflicting bicycle and pedestrian volumes, peak hour factors, and heavy vehicle percentages were also identified from the turning movement counts for the study intersections and coded into the Synchro models. The only exception is heavy vehicle percentages at the study intersection for which no turning movement count was conducted in 2020. For the intersections of Central Avenue & Webster Street, Central Avenue & Eighth Street, and Central Avenue & Encinal Avenue/Sherman Street, two percent was used based on reviewing the heavy vehicle percentages at the SR 61 locations on 2016 Caltrans Truck Traffic Book. For the Santa Clara Avenue & Webster Street and Lincoln Avenue & Webster Street intersection approaches, truck percentages from adjacent intersections were used. The resulting 2020 AM and PM peak hour volumes are shown in **Figure 4-1**.

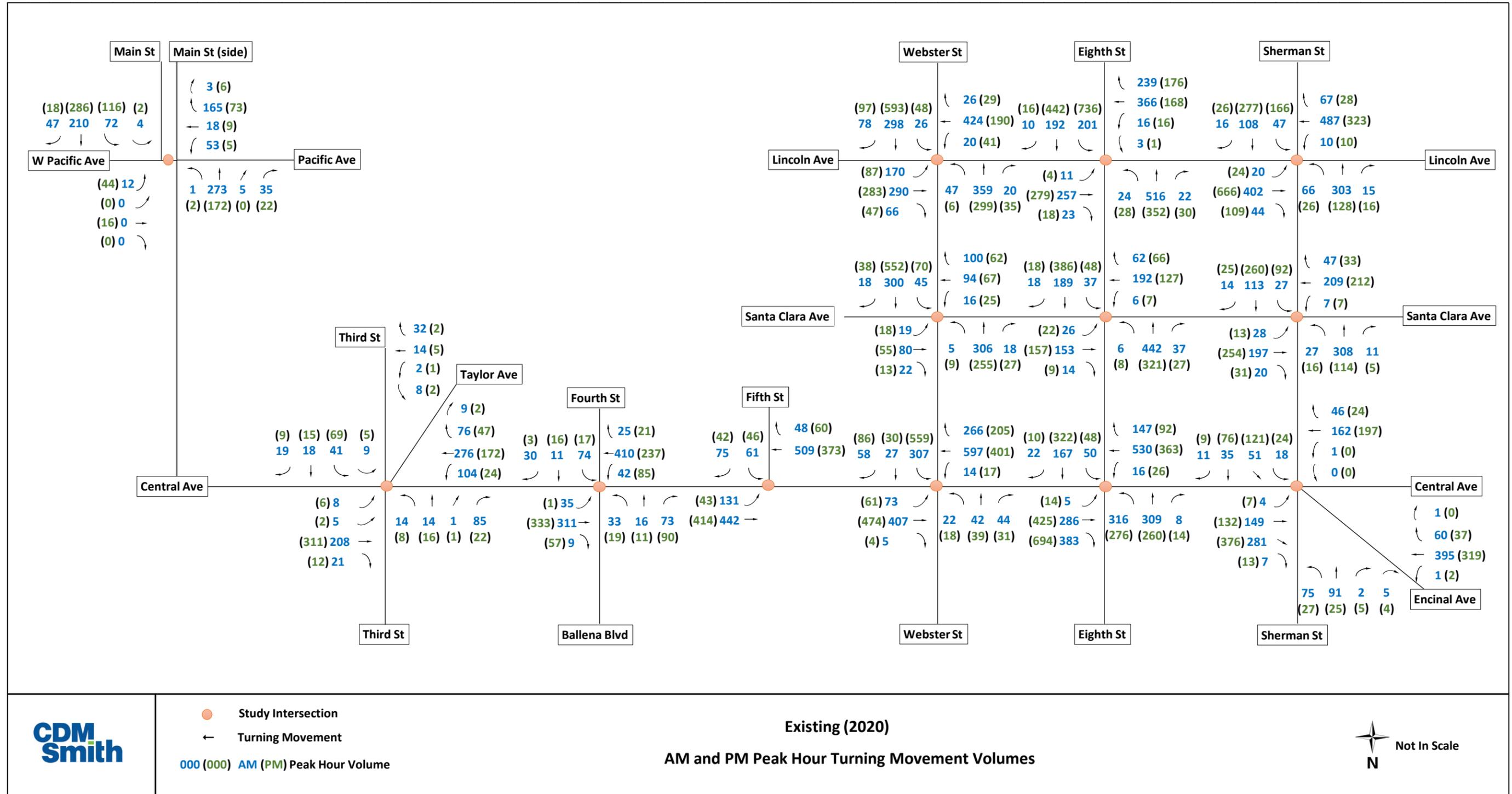


Figure 4-1
 Existing Year AM and PM Peak Hour Volumes

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4.1.2 Daily Volumes

In order to analyze daily congestion levels at key intersections along Central Avenue, Santa Clara Avenue and Lincoln Avenue, daily approach volumes were collected as part of this project at the following intersections (with intersection ID):

1. Central Avenue & Pacific Avenue/Main Street
5. Central Avenue & Webster Street
7. Central Avenue & Encinal Avenue/Sherman Street
8. Webster Street & Santa Clara Ave (eastbound and westbound only)
11. Webster Street & Lincoln Avenue (eastbound and westbound only)

In addition, northbound and southbound segment counts on Webster Street north of Lincoln Avenue and north of Central Avenue were available from the Webster Street Signal Coordination project.

The daily volumes at these locations are shown in **Figure 4-2**.

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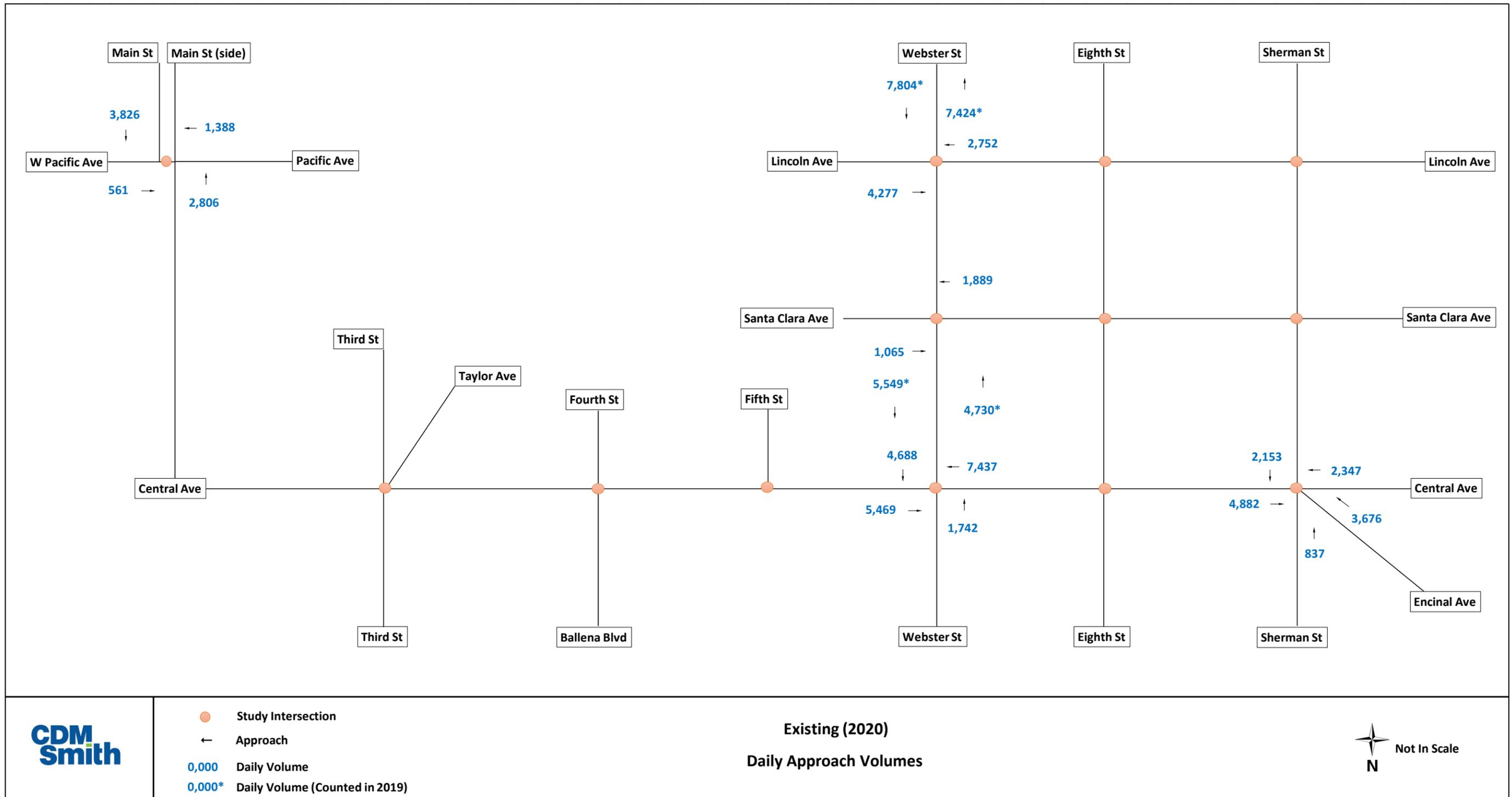


Figure 4-2
Existing Year Daily Volumes

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For a four-lane urban street, the LOS thresholds recommended in the Highway Capacity Manual¹ are shown in **Table 4-2**. The daily volumes at key intersections along Central Avenue and Webster Street and the resulting LOS are shown in **Table 4-3**. All these locations operate at LOS C at the daily level.

Table 4-2 LOS Thresholds for Urban Four-Lane Urban Street Facilities

K-Factor	D-Factor	LOS B	LOS C	LOS D	LOS E
Posted Speed = 30 mph ¹					
0.10 ²	0.55 ²	NA	2,000	22,300	32,200

¹ Only 30 mph and 45 mph are available. 30 mph was used (closest to the posted speed limit of 25 mph on the study corridor)

² K-Factor is the proportion of AADT that occurs during the peak hour; a value of 0.10 was assumed. D-Factor is the proportion of traffic moving in the peak direction of travel on a given roadway during the peak hour; a value of 0.55 was assumed.

Source: Exhibit 16-16 of Highway Capacity Manual, Sixth Edition

Table 4-3 Daily Volumes and LOS for Key Intersections on Central Avenue and Webster Street

Location	Number of Lanes	Existing Daily Volume*	Level of Service*
Central Ave/Main St at Pacific Ave	4	6,632	C
Central Ave at Webster St	4	12,906	C
Central Ave/Encinal Ave at Sherman St	4	8,558	C
Webster St between Santa Clara Ave and Central Ave	4	10,279	C
Webster St north of Lincoln Ave	4	15,228	C

*Approach volumes on both sides added for an intersection location

Source: Study team analysis

4.2 Model Calibration

The level of calibration of the SimTraffic model for existing PM peak hour conditions was checked against criteria provided by FHWA in the Guidelines for Applying Traffic Microsimulation Modeling Software³. Those calibration criteria focus on volume throughput and corridor travel times.

4.2.1 Volume Throughput

The intersection turning movement volumes from the SimTraffic reports (output) were compared to the developed volumes (input) for each movement for volume throughput check. The calibration criteria for volume throughput are as follows:

- GEH Statistic < 5 for Individual Link Flows, > 85% of cases
- Sum of All Link Flows, within 5% of sum of all link counts

Individual turning movement volumes are treated as individual links in this check. **Table 4-4** shows the summary of the volume throughput check for the existing PM SimTraffic model. Both criteria were met. The detailed numbers are shown in **Appendix B**.

Table 4-4 Volume Throughput Calibration Summary

Calibration Criterion	Result	Meeting the Criteria?
Percent cases with GEH statistic < 5	99%	Yes
Difference in Sum of all flows	2%	Yes

Source: Study team analysis

4.2.2 Corridor Travel Time

Eastbound and westbound travel times across the Central Avenue corridor were collected from SimTraffic’s arterial reports based on five simulation runs. They were compared to typical weekday PM peak hour travel time from Google Maps. The FHWA’s calibration criteria for travel time is as follows:

- Travel Times, Model Versus Observed Journey Times, Network: Within 15% (or 1 min, if higher), > 85% of cases

Google Maps provides a range of travel time estimates, rather than one average travel time. Both the eastbound and westbound travel times from SimTraffic output meet the FHWA calibration criterion when compared to the travel time upper limits. **Table 4-5** shows the summary of the travel time check for the existing PM SimTraffic model. The SimTraffic arterial report is shown in **Appendix A**.

Table 4-5 Travel Time Calibration Summary

Corridor Segment	Distance (mi)	Google Maps Travel Time Lower Limit (sec)	Google Maps Travel Time Upper Limit (sec)	SimTraffic Output (sec)	Meeting the Criteria?
Central Ave Eastbound from Main St/Pacific Ave to Sherman St	1.7	300	540	554	Yes
Central Ave Westbound from Sherman St to Main St/Pacific Ave	1.7	240	480	487	Yes

Source: Study team analysis

4.3 Traffic Operations Analysis

This section presents the traffic operations analysis results from the Synchro/SimTraffic study. Intersection delay and LOS for each study intersection and 95th-percentile queue length for each lane group at the study intersections are reported from the Synchro models. The travel times along Central Avenue between Webster Street and Sherman Street/Encinal Avenue during the PM peak hour are reported using SimTraffic.

4.3.1 Intersection Operating Conditions

Because this is not a demand-inducing project, the Vehicle Miles Traveled (VMT) at the regional level is not expected to change. Therefore, LOS analysis is used to see how traffic operates at the study intersections and along the study corridor in scenarios with and without the proposed improvements, instead of VMT analysis for this project.

The intersection control types and operating conditions for the existing year (2020) scenario are summarized in **Table 4-6**. The Synchro reports with delay/LOS reports are shown in **Appendix B**.

Table 4-6 Intersection Delay and LOS Summary for Existing Year (2020)

ID	Location	Control Type	AM Peak Hour		PM Peak Hour	
			Delay (sec)	LOS	Delay (sec)	LOS
1	Central Ave at Main St/Pacific Ave	Signalized	77.6	E	115.2	F
2	Central Ave at Third St/Taylor Ave	Side-Street Stop	76.6 (SB) ¹	F	27.8 (SB) ¹	D
3	Central Ave at Fourth St	Signalized	10.2	B	9.3	A
4	Central Ave at Fifth St	All-Way Stop	17.6	C	11.1	B
5	Central Ave at Webster St	Signalized	120.4	F	113.9	F
6	Central Ave at Eighth St	Signalized	46.3	D	206.9	F
7	Central Ave at Encinal Ave/Sherman St	Signalized	22.7	C	22.3	C
8	Santa Clara Ave at Webster St	Signalized	10.7	B	7.8	A
9	Santa Clara Ave at Eighth St	Signalized	16.2	B	19.5	B
10	Santa Clara Ave at Sherman St	All-Way Stop	19.2	C	18.3	C
11	Lincoln Ave at Webster St	Signalized	14.2	B	10.3	B
12	Lincoln Ave at Eighth St	Signalized	23.7	C	18.5	B
13	Lincoln Ave at Sherman St	Signalized	13.0	B	16.9	B

Source: Study team analysis

¹ Side-street stop-controlled intersection. Worst delay of the stop-controlled approaches (southbound in this case) is reported.

In the AM peak hour, the Central Avenue & Third Street/Taylor Avenue intersection operates at LOS F. This is a side-street stop-controlled intersection. The long delay occurring on the southbound approach is primarily a result of heavy pedestrian volumes crossing the north and west crosswalks during the AM peak hour. The Central Avenue & Webster Street intersection also operates at LOS F; delays for the eastbound and westbound approaches are high. The Central Avenue & Main Street/Pacific Avenue intersection operates at LOS E while the Central Avenue & Eighth Street intersection operates at LOS D. All other intersections operate at LOS C or better during the AM peak hour.

In the PM peak hour, the highest overall delay occurs at the Central Avenue & Eighth Street intersection, with a delay of over 200 seconds (LOS F). At the movement level, the highest delay was found to occur on the eastbound-right turn movement, with a delay of over 600 seconds. Other intersections operating at LOS F are the Central Avenue & Main Street/Pacific Avenue and Central Avenue & Webster Street intersections, both with a delay of over 100 seconds. The southbound approach of the Central Avenue & Third Street/Taylor Avenue stop-controlled intersection operates at LOS D. All other intersections operate at LOS C or better during the PM peak hour.

4.3.2 Queuing Analysis

The 95th-percentile queue lengths are reported from the Synchro models for the signalized intersections. **Table 4-7** summarizes the 95th-percentile queue lengths during the AM and PM

peak hours and can be compared with the available turning bay storage length (where available, measured in Google Earth) at the study intersections. The queue lengths that exceed storage lengths are highlighted in red. The Synchro queuing reports are shown in **Appendix A**.

Within the study area, the longest queues are observed at the Central Avenue & Eighth Street intersection. In the AM peak hour, the westbound-through movement queue length is over 300 feet, while the northbound-left and northbound-through queues are over 200 feet long. In the PM peak hour, the southbound-through queue is over 300 feet, while the eastbound-right queue is close to 300 feet. Note that the eastbound-right storage length is significantly shorter than the queue length in the PM peak hour, and the northbound-left storage length is significantly shorter than the queue length in both AM and PM peak hours.

At the Lincoln Avenue & Eighth Street intersection outside the Central Avenue corridor, the southbound-left movement queue length is over 300 feet in the PM peak hour and exceeds the storage length of 200 feet. This is a movement with heavy left-turn traffic; dual left turn lanes are available at this location.

Table 4-7 95th-Percentile Queue Lengths (in feet) at Signalized Intersections (2020)¹

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NWL
1. Central Ave at Main St/Pacific Ave													
Storage Length													
AM		21			86	94		254	0	141	216		
PM		122			28	18		158	0	232	268		
3. Central Ave at Fourth St													
Storage Length	50			95									
AM	43	84		53	118			42	18		74		
PM	5	101		110	66			31	30		31		
5. Central Ave at Webster St													
Storage Length													
AM		343			567			117		153	138		
PM		428			407			95		351	338		
6. Central Ave at Eighth St													
Storage Length			100				85						
AM		122	71		351		248	244			199		
PM		174	270		191		215	208			346		
7. Central Ave at Encinal Ave/Sherman St													
Storage Length		50											
AM		109	38		144			129			91		104
PM		99	52		154			53			227		96
8. Santa Clara Ave at Webster Street													
Storage Length													
AM		55			83			57			78		
PM		43			62			49			44		

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NWL
9. Santa Clara Ave at Eighth St													
Storage Length													
AM		93			117			260			126		
PM		115			108			223			314		
11. Lincoln Ave at Webster St													
Storage Length	165			140									
AM	132	61		15	86			104			72		
PM	46	58		26	41			91			150		
12. Lincoln Ave at Eighth St													
Storage Length										200			
AM		108			206			246		90	192		
PM		125			88			193		345	547		
13. Lincoln Ave at Sherman St													
Storage Length	60												
AM	12	60			75			250			86		
PM	12	105			50			85			350		

Source: Study team analysis

Note:

¹ Storage length information is provided for all approaches where turn bays are available. When there is no turn bay, the cell is left blank.

Unit: feet

4.3.3 Corridor Travel Times

The corridor travel times in the eastbound and westbound directions along Central Avenue between Pacific Avenue/Main Street and Webster Street (City of Alameda portion) and between Webster Street and Sherman Street/Encinal Avenue (Caltrans portion) were reported from the SimTraffic existing PM model. The results of five runs were averaged and are shown in **Table 4-8**. It takes approximately three to five minutes to travel between Pacific Avenue/Main Street and Webster Street, and between Webster Street and Encinal Avenue/Sherman Street during the PM peak hour. The travel time along the entire Central Avenue is approximately eight to nine minutes. The full SimTraffic arterial report is provided as **Appendix A** to this report.

Table 4-8 Corridor Travel Time

Direction	Corridor Segment	Distance (mi)	SimTraffic Output (min)
Eastbound	From Pacific Ave/Main St to Webster St	1.0	5.2
	From Webster St to Encinal Ave/ Sherman St	0.7	4.1
	Total	1.7	9.2
Westbound	From Encinal Ave/ Sherman St to Webster St	0.7	5.1
	From Webster St to Pacific Ave/Main St	1.0	3.0
	Total	1.7	8.1

Source: Study team analysis

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Section 5

Future Year (2045) Traffic Operations

This section documents the development of future year (2045) traffic volumes, development of the Synchro/SimTraffic models and the results of the traffic operations analysis under future year No Build and Build conditions for the AM and PM peak hours.

5.1 Traffic Volumes

5.1.1 2045 No Build Volumes

As mentioned in Section 3.2.1, the difference between 2020 and 2040 No Project volumes from the Alameda Countywide travel demand model outputs was applied to the existing volumes to develop future turning movement volumes at the study intersections. The resulting 2040 turning movement volumes were then further extrapolated to derive the 2045 volumes.

The resulting 2045 No Build AM and PM peak hour volumes are shown in **Figure 5-1**.

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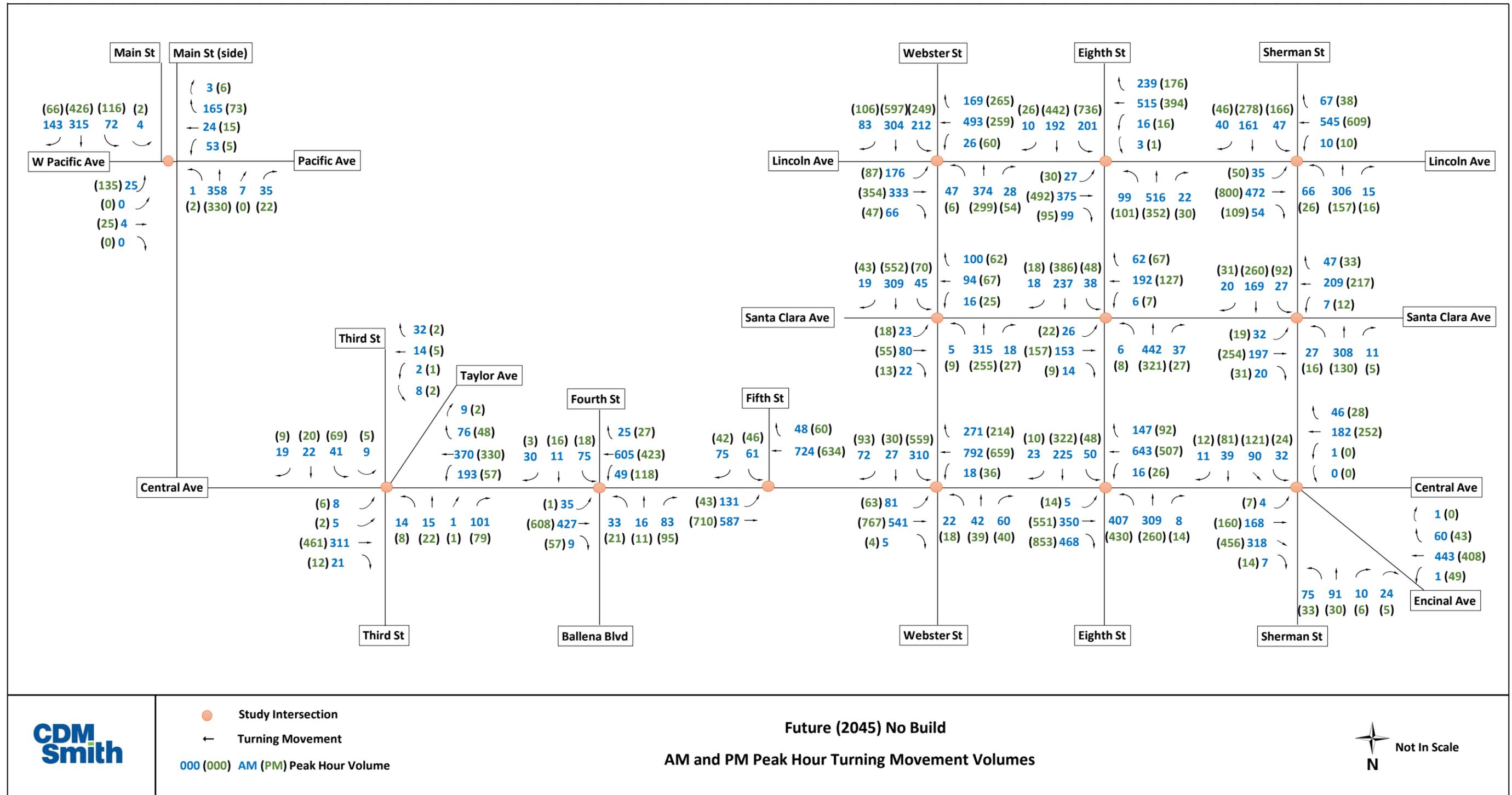


Figure 5-1
 Future Year No Build AM and PM Peak Hour Volumes

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5.1.2 2045 Build Volumes

As mentioned in Section 3.2.1, the Alameda Countywide travel demand model was refined and rerun to reflect the Build scenario roadway characteristics. The study team reviewed the traffic diversion predicted by the model and found the amount and pattern of diversion to be reasonable.

Figure 5-2 shows a screenshot of the 2040 PM peak hour traffic diversion volumes predicted by the model. The width of a line represents the magnitude of volume difference between No Build and Build condition, while red color represents an increase in traffic volume while green represents a decrease in traffic volume. The model shows that the primary diversion route would be Ralph Appezato Memorial Parkway via portions of Eighth Street and Webster Street. For the streets parallel to Central Avenue in the study area, Lincoln Avenue receives the most traffic diverted away from Central Avenue, especially between Webster Street and Eighth Street. Santa Clara and Taylor Avenue also receive some diverted traffic between Fourth Street and Webster Street, but the magnitude is much lower than on Lincoln Avenue.

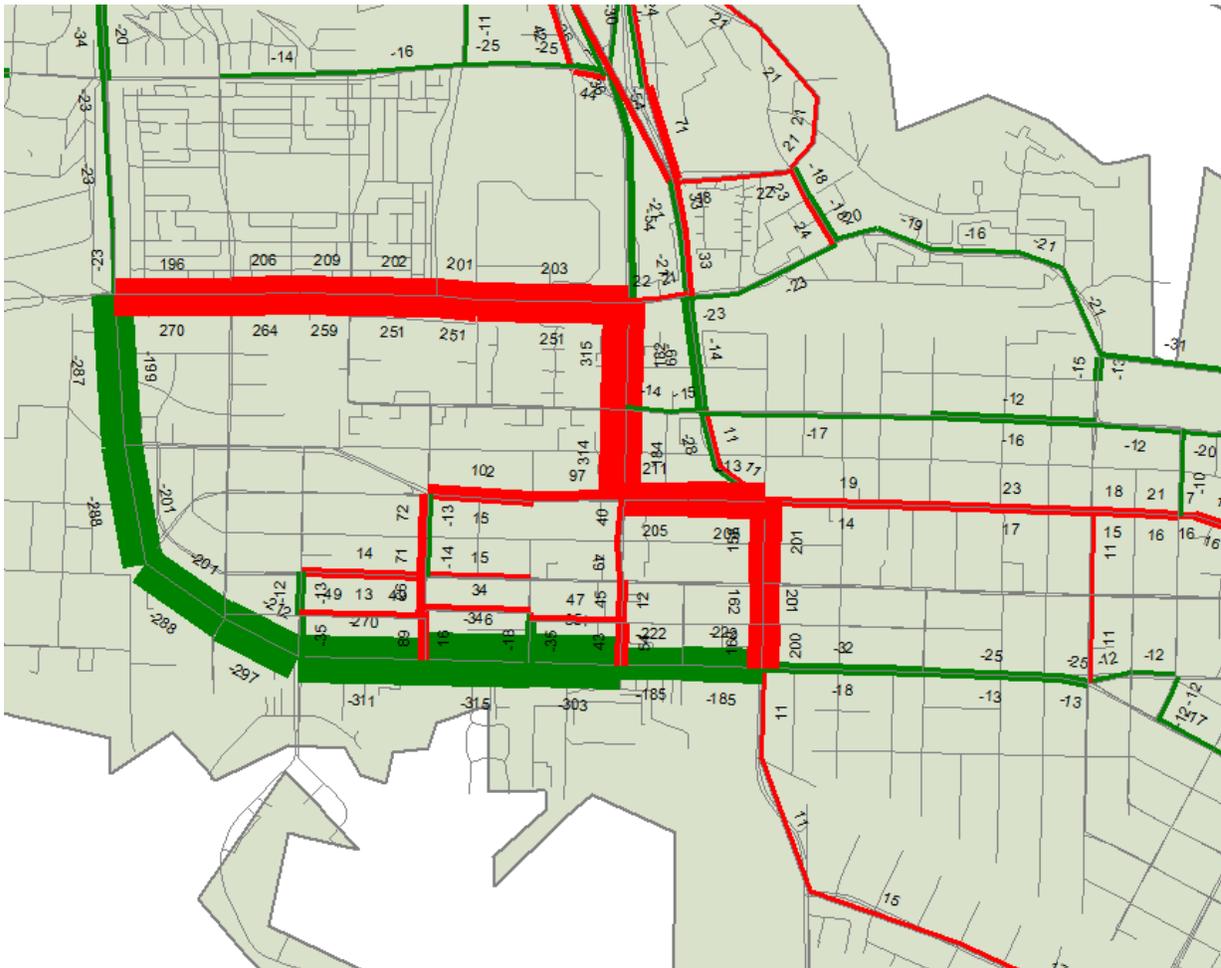


Figure 5-2
Traffic Diversion (PM Peak Hour) Predicted by the Alameda Model

It was found from the 2040 PM model outputs that the diverted traffic on Santa Clara Avenue and Taylor Avenue would not be through traffic but rather neighborhood traffic choosing to use those streets rather than Central Avenue. In addition, the peak hour traffic volumes on these parallel streets would remain well below street capacity according to the model.

As for the 2045 No Build volumes, the difference between the 2020 Existing and 2040 With Project volumes from the model was applied to the existing volumes to develop 2040 Build turning movement volumes at the study intersections. The 2040 Build turning movement volumes were then further extrapolated to derive the 2045 volumes.

The resulting 2045 Build AM and PM peak hour volumes are shown in **Figure 5-3**.

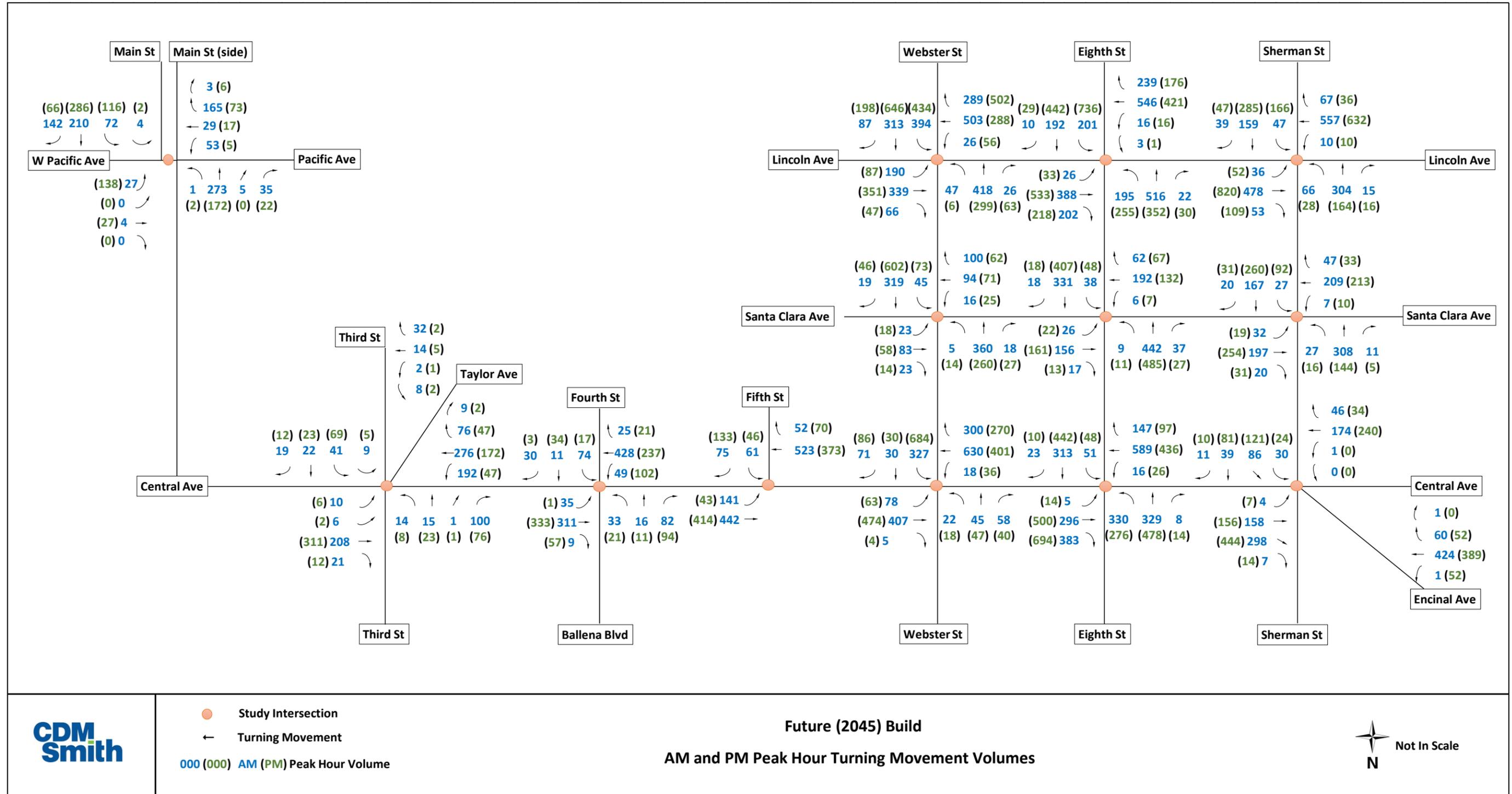


Figure 5-3
 Future Year Build AM and PM Peak Hour Volumes

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5.2 Synchro/SimTraffic Model Development

The development of the Synchro/SimTraffic models for 2045 No Build and Build is described in this section.

5.2.1 2045 No Build

The AM and PM peak hour volumes developed for 2045 No Build conditions were imported into Synchro. The signal timings, including splits and offsets for the coordinated intersections along Webster Street, were optimized using the Synchro optimization function.

5.2.2 2045 Build

Similarly, the AM and PM peak hour volumes developed for 2045 Build conditions were imported into Synchro.

The network geometry in the Synchro models were modified to reflect the proposed improvements under the Build scenario. One of the main changes is the implementation of road diet (converting from four to two lanes with a center left-turn lane) along the Central Avenue corridor from Third Street/Taylor Avenue to Encinal Avenue/Sherman Street. Turn storage bays are provided or extended to accommodate turning movement volumes for the signalized study intersections.

In conjunction with the proposed improvements along Central Avenue, the signal phasings for the intersections along Central Avenue were redesigned. The main difference is the introduction of a protected bicycle signal phase at all signalized study intersections along Central Avenue with the two-way cycle track: Central Avenue & Webster Street and Central Avenue & Eighth Street. The protected bicycle signal phase must not conflict with any vehicular movement. Therefore, apart from the signal phasing changes, Right Turn on Red was prohibited for the eastbound-right and northbound-right movements at these two intersections. The proposed signal phasings for these intersections are shown in **Figure 5-4**.

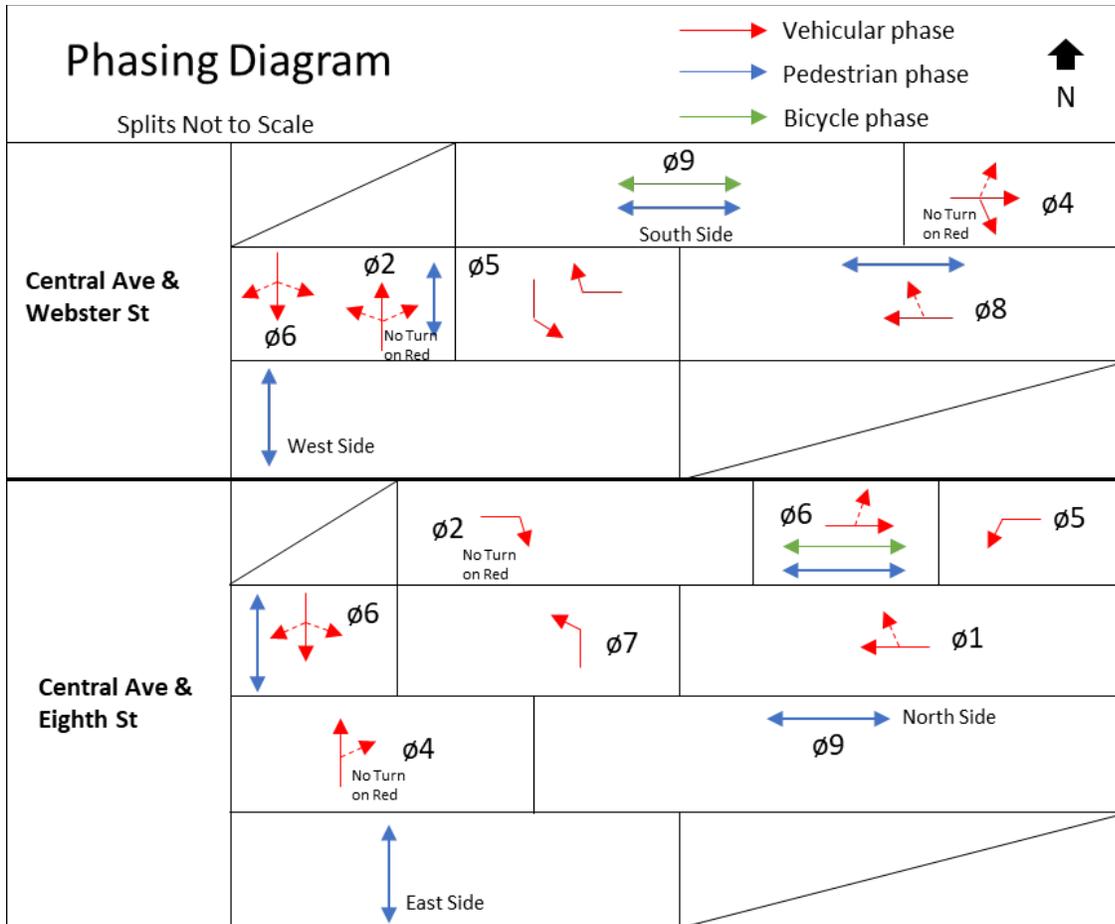


Figure 5-4
Proposed Phasing Diagram for Intersections with Bicycle Signal Phase

Also, a cycle length of 90 seconds was set for the intersections of Central Avenue & Webster Street and Central Avenue & Eighth Street with coordination along Central Avenue. The signal timings, including splits and offsets for the coordinated intersections along Central Avenue and Webster Street, were re-optimized by Synchro.

In addition, four intersections are proposed to be converted into roundabouts in the 2045 Build scenario: Central Avenue & Main Street/Pacific Avenue, Central Avenue & Third Street/Taylor Avenue, Central Avenue & Fourth Street, and Central Avenue & Encinal Avenue/Sherman Street.

5.3 Traffic Operations Analysis

The results from the Synchro/SimTraffic traffic operations analysis are presented in this section. Intersection delays, LOS, and 95th-percentile queue lengths (for signalized intersections only) at the study intersections are reported from the Synchro models. The travel times along Central Avenue between Pacific Avenue/Main Street and Webster Street (City of Alameda portion) and between Webster Street and Encinal Avenue/Sherman Street (Caltrans portion) during the PM peak hour are reported using SimTraffic.

5.3.1 Intersection Operating Conditions

Table 5-1 shows the control type and delay and LOS results from the Synchro models for the 2045 No Build and Build scenarios during the AM peak hour. The Synchro reports with delay/LOS reports are shown in **Appendix B**.

During the AM peak hour in the 2045 No Build scenario, the increased through traffic along Central Avenue causes the operations of the Central Avenue & Main Street/Pacific Avenue intersection to degrade to LOS F. The southbound side-street approach at the Central Avenue & Third Street/Taylor Avenue intersection already operates at LOS F in the existing conditions. The increased through traffic significantly increases the delay due to it is more difficult for drivers to find a gap to proceed.

The all-way stop-controlled Central Avenue & Fifth Avenue intersection operates at LOS E (compared to LOS C under existing conditions), while the Central Avenue & Eighth Street intersection operates at LOS D (no change from existing conditions). The Central Avenue & Webster Street intersection operates at LOS D, improved from existing conditions due to signal timing optimization. All other intersections operate at LOS C or better during the AM peak hour.

Comparing Build to No Build conditions, at most of the study intersections, the LOS either remains the same or improves. Due to conversion to roundabouts, average delays for the Central Avenue & Main Street/Pacific Avenue, Central Avenue at Third Street/Taylor Avenue, Central Avenue at Fourth Street, and Central Avenue & Encinal Avenue/Sherman Street intersections reduce noticeably, and the LOS is either A or B. The average delay for the Central Avenue & Webster Street intersection increases but the LOS does not exceed E.

At the Central Avenue & Eighth Street intersection, the proposed design includes a through lane on each approach and turn storage bay for the eastbound-left, eastbound-right, westbound-left, northbound-left, and southbound-left movements. As for the Central Avenue & Webster Street intersection, the average delay increases but the LOS does not exceed E. This is mainly attributable to increased delays for the westbound-through, northbound-left, and southbound-through movements.

These delay increases are primarily attributable to geometry changes and corresponding signal phases, including the need to provide a protected bicycle signal phase for the two-way cycle track.

It is expected that at the Central Avenue & Fifth Street intersection, there will be a delay increase of approximately 8.4 seconds comparing Build to No Build conditions, and LOS will change from E to F. The forecasted reduction in through traffic could not compensate for the lane reduction at this all-way stop controlled intersection. It is recommended this intersection be signalized as part of the Alameda Point development project.

The delay also increases at the intersections of Lincoln Avenue & Webster Street and Lincoln Avenue & Eighth Street due to traffic diversion onto Lincoln Avenue, Webster Street, and Eighth Street. However, the LOS at these intersections under Build AM peak conditions does not exceed LOS D. All other intersections operate at LOS C or better.

Table 5-1 Intersection Delay and LOS - 2045 AM Peak Hour - No Build and Build Condition

ID	Location	No Build			Build		
		Control Type	Delay (sec)	LOS	Control Type	Delay (sec)	LOS
1	Central Ave & Main St/Pacific Ave	Signalized	195.6	F	Roundabout	7.2	A
2	Central Ave & Third St/Taylor Ave	Side-Street Stop	946.2 (SB) ¹	F	Roundabout	8.1	A
3	Central Ave & Fourth St	Signalized	10.6	B	Roundabout	9.3	A
4	Central Ave & Fifth St	All-Way Stop	42.5	E	All-Way Stop	50.9	F
5	Central Ave & Webster St	Signalized	35.7	D	Signalized	78.8	E
6	Central Ave & Eighth St	Signalized	45.5	D	Signalized	73.9	E
7	Central Ave & Encinal Ave/Sherman St	Signalized	24.1	C	Roundabout	9.1	A
8	Santa Clara Ave & Webster St	Signalized	10.0	A	Signalized	8.5	A
9	Santa Clara Ave & Eighth St	Signalized	16.1	B	Signalized	16.3	B
10	Santa Clara Ave & Sherman St	All-Way Stop	23.0	C	All-Way Stop	22.8	C
11	Lincoln Ave & Webster St	Signalized	14.6	B	Signalized	46.1	D
12	Lincoln Ave & Eighth St	Signalized	25.8	C	Signalized	34.3	C
13	Lincoln Ave & Sherman St	Signalized	14.5	B	Signalized	14.6	B

Source: Study team analysis

¹Side-street stop-controlled intersection. Worst delay of the stop-controlled approaches (southbound in this case) is reported.

Table 5-2 shows the delay and LOS results from the Synchro models for the 2045 No Build and Build scenarios during the PM peak hour.

During the PM peak hour in the 2045 No Build scenario, the Central Avenue & Main Street/Pacific Avenue and Central Avenue & Eighth Street intersections operate at LOS F, the same as for existing conditions. The Central Avenue & Third Street/Taylor Avenue intersection degrades to LOS F. As for the AM peak hour, increased through traffic makes it more difficult for the drivers from the southbound stop-controlled approach to find a gap and proceed.

At the turning movement level, the eastbound-right turn movement at the Central Avenue/Eighth Street intersection has a delay of over 500 seconds. All other intersections operate at LOS C or better during the PM peak hour.

Comparing Build to No Build conditions, as for the AM peak hour, the LOS at most of the study intersections either remains the same or improves from No Build to Build PM peak conditions. Due to conversion to roundabouts, the average delay at the intersections of Central Avenue & Main Street/Pacific Avenue, Central Avenue at Third Street/Taylor Avenue, Central Avenue & Fourth Street, and Central Avenue & Encinal Avenue/Sherman Street reduces noticeably, and these intersections operate at LOS A or B under Build PM conditions. The average delay at the Central Ave at Webster St intersection increases but the LOS does not exceed E.

The Central Avenue & Eighth Street intersection operates at LOS F in both the Build and No Build PM conditions; however, the average delay is significantly reduced in the Build scenario. This is mainly attributable to the expected reduced volume for the eastbound-right movement, a

protected right turn phase to avoid conflict between the eastbound-right movement and bicycles and pedestrians, and the redesigned phasing to allow more split time for the northbound-through movement in a cycle.

On parallel streets, the delay and LOS remain the same at most of the intersections, except for the Lincoln Avenue & Webster Street and Lincoln Avenue & Eighth Street intersections. Even though the delay increases, the LOS at these intersections does not exceed D. All other intersections operate at LOS C or better.

Table 5-2 Intersection Delay and LOS - 2045 PM Peak Hour - No Build and Build Condition

ID	Location	No Build			Build		
		Control Type	Delay (sec)	LOS	Control Type	Delay (sec)	LOS
1	Central Ave at Main St/Pacific Ave	Signalized	241.5	F	Roundabout	6.1	A
2	Central Ave at Third St/Taylor Ave	Side-Street Stop	405.1 (SB) ¹	F	Roundabout	6.2	A
3	Central Ave at Fourth St	Signalized	9.8	A	Roundabout	6.4	A
4	Central Ave at Fifth St	All-Way Stop	22.4	C	All-Way Stop	19.7	C
5	Central Ave at Webster St	Signalized	41.9	D	Signalized	74.1	E
6	Central Ave at Eighth St	Signalized	191.5	F	Signalized	138.3	F
7	Central Ave at Encinal Ave/Sherman St	Signalized	22.8	C	Roundabout	11.6	B
8	Santa Clara Ave at Webster St	Signalized	7.6	A	Signalized	6.2	A
9	Santa Clara Ave at Eighth St	Signalized	16.2	B	Signalized	16.6	B
10	Santa Clara Ave at Sherman St	All-Way Stop	19.9	C	All-Way Stop	20.2	C
11	Lincoln Ave at Webster St	Signalized	16.6	B	Signalized	44.1	D
12	Lincoln Ave at Eighth St	Signalized	28.4	C	Signalized	45.2	D
13	Lincoln Ave at Sherman St	Signalized	19.1	B	Signalized	18.6	B

Source: Study team analysis

¹ Side-street stop-controlled intersection. Worst delay of the stop-controlled approaches (southbound in this case) is reported.

5.3.2 Queuing Analysis

This section focuses on the 95th-percentile queue lengths as reported from the Synchro models for the signalized intersections. The Synchro queuing reports are shown in **Appendix A**.

Table 5-3 shows the 95th-percentile queue lengths and turn bay storage capacity at the signalized intersections for the 2045 No Build and Build scenarios during the AM peak hour. The queue lengths that exceed storage lengths are highlighted in red.

In 2045 No Build conditions, the longest queues are reported at the Central Avenue & Webster Street and Central Avenue & Eighth Street intersections. At the Central Avenue & Webster Street intersection, the westbound-through movement queue length exceeds 400 feet.

At the Central Avenue & Eighth Street intersection, the northbound-left movement queue length exceeds 400 feet. As under existing conditions, the northbound-left storage length is significantly shorter than the queue length.

Queue lengths are no longer reported for the roundabouts in the Build scenario. Compared to No Build conditions, queue lengths under Build conditions are either shorter or do not increase significantly at any study intersection. The only exception is the westbound-through movement at the Central Avenue & Eighth Street intersection, where the queue length increases from 367 to 710 feet. However, the queue does not back up to the upstream Central Avenue & Encinal Avenue/Sherman Street intersection.

Table 5-3 95th-Percentile Queue Lengths (in feet) at Signalized Intersections for 2045 No Build and Build in AM Peak Hour¹

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NWL
1. Central Ave at Main St/Pacific Ave														
No Build	Storage													
	Queue		49			99	100		383	0	140	523		
Build	Storage	Roundabout; not a signalized intersection												
	Queue													
3. Central Ave at Fourth St														
No Build	Storage	50			95									
	Queue	43	113		60	177			42	23		73		
Build	Storage	Roundabout; not a signalized intersection												
	Queue													
5. Central Ave at Webster St														
No Build	Storage													
	Queue		283			436			136		184	161		
Build	Storage	140			80									
	Queue	149	285		4	324			122		254	57		
6. Central Ave at Eighth St														
No Build	Storage			100				85						
	Queue		138	67		367		443	286			308		
Build	Storage	50		400				85						
	Queue	5	217	281	31	710		423	270		78	366		
7. Central Ave at Encinal Ave/Sherman St														
No Build	Storage		50											
	Queue		126	58		167			130			126		130
Build	Storage	Roundabout; not a signalized intersection												
	Queue													

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		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NWL
8. Santa Clara Ave at Webster Street														
No Build	Storage													
	Queue		61			90			71			89		
Build	Storage													
	Queue		63			90			61			10		
9. Santa Clara Ave at Eighth St														
No Build	Storage													
	Queue		98			123			249			147		
Build	Storage													
	Queue		103			127			244			198		
11. Lincoln Ave at Webster St														
No Build	Storage	165			140									
	Queue	157	60		16	99			127			185		
Build	Storage	165			140									
	Queue	201	66		17	125			130			287		
12. Lincoln Ave at Eighth St														
No Build	Storage										200			
	Queue		194			297			283		90	193		
Build	Storage										200			
	Queue		231			317			365		90	193		
13. Lincoln Ave at Sherman St														
No Build	Storage	60												
	Queue	26	96			114			173			94		
Build	Storage	60												
	Queue	27	97			117			172			93		

Source: Study team analysis

Note:

¹ Storage length information is provided for all approaches where turn bays are available. When there is no turn bay, the cell is left blank.

Unit: feet

Table 5-4 shows the 95th-percentile queue lengths and turn bay storage capacity at the signalized intersections for the No Build and Build scenarios during the PM peak hour. The queue lengths that exceed storage lengths are highlighted in red.

In 2045 No Build conditions, the longest queues are reported at the Central Avenue & Webster Street and Central Avenue & Eighth Street intersections. At the Central Avenue & Webster Street intersection, the eastbound-through, westbound-through, southbound-left, and southbound-through queue lengths exceed 400 feet.

At the Central Avenue & Eighth Street intersection, the eastbound-right movement queue length exceeds 500 feet, while the queue lengths for the northbound-left and southbound through movements exceed 400 feet. As under existing conditions, at this intersection the eastbound-right and northbound left storage length is significantly shorter than the queue lengths.

As for the AM peak hour, queue lengths are no longer reported for the roundabouts under the Build scenario. Compared to No Build conditions, queue lengths under Build conditions are either shorter or do not increase significantly at any study intersection. The only exception is the Central Avenue & Webster Street intersection, where southbound-left queue length increases from 451 to 719 feet. This is attributable to the diverted traffic to Lincoln Avenue via Webster Street and the lane configuration in the proposed design (only one lane for the southbound-left movement). Even though the queue length for this specific movement increases significantly and the queue backs up to the upstream Santa Clara Avenue & Webster Street intersection, the overall intersection operates at a LOS not exceeding E.

Table 5-4 95th-Percentile Queue Lengths (in feet) at Signalized Intersections for 2045 No Build and Build in PM Peak Hour¹

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NWL
1. Central Ave at Main St/Pacific Ave														
No Build	Storage													
	Queue		308			34	18		326	0	233	605		
Build	Storage	Roundabout; not a signalized intersection												
	Queue													
3. Central Ave at Fourth St														
No Build	Storage	50			95									
	Queue	5	194		158	117			33	31		32		
Build	Storage	Roundabout; not a signalized intersection												
	Queue													
5. Central Ave at Webster St														
No Build	Storage													
	Queue		442			430			106		451	427		
Build	Storage	140			80									
	Queue	122	447		16	323			100		719	60		
6. Central Ave at Eighth St														
No Build	Storage			100				85						
	Queue		222	583		253		479	243			407		
Build	Storage	50		400				85						
	Queue	12	356	707	44	385		340	443		95	515		
7. Central Ave at Encinal Ave/Sherman St														
No Build	Storage		50											
	Queue		117	76		204			58			203		152
Build	Storage	Roundabout; not a signalized intersection												
	Queue													

		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NWL
8. Santa Clara Ave at Webster Street														
No Build	Storage													
	Queue		46			67			58			82		
Build	Storage													
	Queue		49			73			44			23		
9. Santa Clara Ave at Eighth St														
No Build	Storage													
	Queue		144			139			168			237		
Build	Storage													
	Queue		152			145			270			249		
11. Lincoln Ave at Webster St														
No Build	Storage	165			140									
	Queue	67	81		40	65			89			242		
Build	Storage	165			140									
	Queue	93	80		37	120			70			433		
12. Lincoln Ave at Eighth St														
No Build	Storage										200			
	Queue		271			220			228		345	567		
Build	Storage										200			
	Queue		344			231			302		373	588		
13. Lincoln Ave at Sherman St														
No Build	Storage	60												
	Queue	40	197			144			68			236		
Build	Storage	60												
	Queue	41	197			145			74			286		

Source: Study team analysis

Note:

¹ Storage length information is provided for all approaches where turn bays are available. When there is no turn bay, the cell is left blank.

Unit: feet

5.3.3 Corridor Travel Time

The corridor travel times in the eastbound and westbound directions along Central Avenue between Pacific Avenue/Main Street and Webster Street (City of Alameda portion) and between Webster Street and Encinal Avenue/Sherman Street (Caltrans portion) during the PM peak hour for No Build and Build conditions were reported from the SimTraffic models. The results of five runs were averaged and shown in **Table 5-5**.

In the eastbound direction, the travel times along Central Avenue from Pacific Avenue/Main Street to Webster Street and from Webster Street to Encinal Avenue/Sherman Street during the PM peak hour decrease by approximately 2 minutes under Build conditions. The travel time along the entire Central Avenue corridor decreases by approximately 4 minutes.

In the westbound direction along Central Avenue from Encinal Avenue/Sherman Street to Webster Street and from Webster Street to Pacific Avenue/Main Street, the travel times decrease by approximately 4 minutes and 1 minute respectively. The travel time along the entire Central Avenue corridor decreases by approximately 4 minutes. The SimTraffic arterial reports are shown in **Appendix A**.

Table 5-5 Corridor Travel Time

Direction	Corridor Segment	Distance (mi)	SimTraffic Output (min)		
			2045 No Build	2045 Build	Difference
Eastbound	From Pacific Ave/Main St to Webster St	1.0	5.1	3.0	-2.1
	From Webster St to Encinal Ave/ Sherman St	0.7	4.6	2.4	-2.2
	Total	1.7	9.7	5.5	-4.2
Westbound	From Encinal Ave /Sherman St to Webster St	0.7	6.4	2.7	-3.7
	From Webster St to Pacific Ave/ Main St	1.0	3.3	2.7	-0.6
	Total	1.7	9.7	5.4	-4.3

Source: Study team analysis

Section 6

Parking Analysis

The number of available parking spaces were counted for the Existing/No Build conditions and Build conditions. There is no difference in available parking spaces between existing and future No Build conditions. Each parking space takes approximately 20 feet in length. Driveways, loading and no-parking zones, and bus stop zones were considered not available for parking. The comparison of available on-street parking spaces between the No Build and Build conditions by major block and by direction is shown in **Table 6-1**.

In the eastbound direction, from Pacific Avenue/Main Street to Lincoln Avenue, there is currently no parking observed and parking is not assumed in the proposed design. From Lincoln Avenue to Fourth Street, the number of available parking spaces roughly remains the same. From Fourth Street to Webster Street, most of the available parking spaces would be removed in the proposed design due to the lane reconfiguration. The most significant reduction in available parking spaces occurs on the block from Fourth Street to Fifth Street – changing from 21 to zero. There are no retail businesses on this block and the apartments and Paden Elementary School south of Central Avenue provide off-street parking. Within one block of Webster Street (from McKay Ave to Webster Street), all of the available parking spaces would be removed. The commercial stores on this block provide off-street parking and can still be accessed via Central Avenue in the proposed design. From Webster Street to Page Street, one third of the available parking spaces would be preserved in the proposed design. In other sections, the number of available parking spaces on Central Avenue generally remains the same or is slightly reduced. Additional parking spaces are removed on side streets as they approach Central Avenue, due to lane reconfiguration, pedestrian bulb-outs, visibility improvements and/or additional space taken by roundabouts. Overall, the number of parking spaces decreases from 215 to 147 in the eastbound direction.

In the westbound direction, the number of parking spaces on the blocks generally remains the same between No Build and Build conditions except for visibility and bus stop improvements at intersections. From Encinal Avenue/Sherman Street to Bay Street, the number of available parking spaces increases slightly as a result of the road diet providing additional cross-sectional width for on-street parking. From Page Street to Webster Street, parking becomes unavailable on the entire block due to the lane reconfiguration and a new consolidated bus stop. Off-street parking is available in this area, allowing access to the commercial stores on this block. From Webster Street to Fifth Street, all of the available parking spaces would be preserved in the proposed design. From Fifth Street to Fourth Street, a few more parking spaces are available due to no stopping zone east of Fourth Street converted to parking allowed. From Fourth Street to Third Street, there are additional parking spaces available on the side of the proposed landscaped island just west of Fourth Street. Additional parking spaces are removed on side streets as they approach Central Avenue, due to lane reconfiguration, pedestrian bulb-outs, visibility improvements and/or additional space taken by roundabouts. Overall, the number of parking spaces decreases slightly from 293 to 249 in the westbound direction.

Table 6-1 Parking Spaces Available

Roadway	Location	Eastbound		Westbound	
		Existing/ No Build	Build	Existing/ No Build	Build
Pacific Ave	SW Side	0	4	-	-
	SE Side	-	-	6	4
	NE Side	-	-	8	4
Main St	NE Side	-	-	1	0
Central Ave	Pacific Ave – Lincoln Ave	0	0	31	28
Lincoln Ave	NW Side	-	-	4	3
	NE Side	-	-	4	2
Central Ave	Lincoln Ave – Third St	7	4	20	19
Third St	SW Side	4	1	-	-
	SE Side	4	2	-	-
	NW Side	-	-	2	1
	NE Side	-	-	3	1
Taylor Ave	S Side	-	-	1	1
	N Side	-	-	3	1
Central Ave	Third St – Fourth St	27	32	14	18
Fourth St	SW Side	2	0	-	-
	SE Side	2	0	-	-
	NW Side	-	-	1	0
Central Ave	Fourth St – Fifth St	21	0	24	30
Fifth St	NW Side	-	-	1	0
	NE Side	-	-	1	0
Hoover Ct	-	Propose conditions same as existing conditions			
Central Ave	Fifth St – Sixth St	20	15	22	24
Sixth St	-	Propose conditions same as existing conditions			
McKay Ave	-	0	0	-	-
Central Ave	Sixth St – Webster St	21	9	22	24
Webster St	SW Side	1	1	-	-
	SE Side	1	1	-	-
	NW Side	-	-	2	2
Central Ave	Webster St – Page St	9	3	13	0
Page St	-	Propose conditions same as existing conditions			
Central Ave	Page St – Eighth St	19	12	16	17
Eighth St	NW Side	-	-	8	2
	NE Side	-	-	6	1
Central Ave	Eighth St – Burbank St	6	4	7	4
Burbank St	SW Side	1	1	-	-
	SE Side	2	1	-	-

Roadway	Location	Eastbound		Westbound	
		Existing/ No Build	Build	Existing/ No Build	Build
Central Ave	Burbank St – Ninth St	8	8	8	8
Ninth St	SW Side	2	1	-	-
	SE Side	2	1	-	-
	NE Side	-	-	1	0
Central Ave	Ninth St – Weber St	11	11	9	9
Weber St	SW Side	2	2	-	-
	SE Side	2	0	-	-
Central Ave	Weber St – Caroline St	6	6	8	7
Caroline St	SW Side	1	0	-	-
	SE Side	1	0	-	-
	NW Side	-	-	1	0
	NE Side	-	-	1	0
Central Ave	Caroline St – St. Charles St	15	14	17	18
St. Charles St	-	Propose conditions same as existing conditions			
Central Ave	St. Charles St – Bay St	6	6	7	7
Bay St	-	Propose conditions same as existing conditions			
Central Ave	Bay St – Sherman St	3	0	4	5
Sherman St	SW Side	3	2	-	-
	SE Side	3	3	-	-
	NW Side	-	-	3	1
	NE Side	-	-	5	3
Encinal Ave	SE Side	3	3	-	-
	NE Side	-	-	1	1
Central Ave E Of Roundabout	SE Side	-	-	4	2
	NE Side	-	-	4	2
Total – Central Ave		179	124	222	218
Total – Side Streets		36	23	71	31
Grand Total		215	147	293	249

Source: Study team analysis

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Section 7

Safety Assessment

The results of the safety assessment, including analyzing the crash history and calculating the expected reduction of crashes as a result of implementing countermeasures are presented in this section.

7.1 Background

As mentioned in Part D of Caltrans' Article 5 – Traffic Engineering Performance Assessment⁴ document, the objectives of a traffic engineering study for the PA&ED phase should include the following safety-related items:

- Identify performance deficiencies - both existing and potential - based on the review, evaluation and analysis of collision data
- Predict and/or estimate the safety performance of proposed highway geometric design (for new infrastructure)
- Predict and/or estimate the safety performance impacts (i.e. benefits and disbenefits) of specific modifications to existing highway infrastructure or a base design
- Quantify the impact (benefits and disbenefits) of proposed infrastructure reconstruction, expansion, modification, etc. on the operational and safety performance of a highway segment, corridor or system

In this TOAR, safety effectiveness of the proposed improvements is evaluated based on the HSM's method (described as Method 4 under Section C.7) for estimating the safety effectiveness of a proposed project.

7.2 Crash History

The crash data were collected from two sources - For the corridor under Caltrans jurisdiction (SR-61, from Webster Street to Sherman Street), the crash records collected by Caltrans' Traffic Accident Surveillance and Analysis System (TASAS)⁵ were compiled and analyzed for a five-year period from January 2014 to December 2018. For the corridor under the City jurisdiction (from Pacific Avenue to Webster Street), the crash records provided by the City of Alameda were compiled and analyzed for a five-year period from January 2014 to December 2018. The raw crash data are shown in **Appendix C**.

7.2.1 SR-61 Portion

A summary of the crash records within the SR-61 portion of the study corridor are presented in **Table 7-1**. A total of 47 crashes occurred along the SR-61 portion during the five-year period. No fatal crashes were found but there were 13 crashes with injuries reported, and a total 19 people injured. Three crashes occurred in wet conditions and 12 crashes occurred in dark conditions. The annual daily traffic for this SR-61 is 12,600 (rounded to 100s), while the total million vehicle

miles (number of vehicles multiplied by distance expressed in miles) within the five-year period is 16.11.

Table 7-1 Summary of Number and Significance of Crashes

Location Milepost	Number of Crashes / Significance									ADT Main X-St	Total MVM
	Tot	Fatal	Injury	F+I	Multi Veh	Wet	Dark	Pers Kld	Pers Inj		
ALA 061 021.267 – ALA 061 021.966	47	0	13	13	36	3	12	0	19	12,600	16.11

Source: Caltrans TASAS data, Table B - Selective Accident Rate Calculation
 Note: F+I: Fatal+Injury; ADT: Annual Daily Traffic; Total MVM: Total Million Vehicle Miles

The crash rates are shown in **Table 7-2**. During this study period, the total crash rate of 2.92 per million vehicle miles (MVM) is higher than the statewide average of 1.98. However, the total fatal and injury combined crash rate of 0.81 is lower than the statewide average of 0.85.

Table 7-2 Summary of Crash Rates

Location Milepost	Crash Rates					
	Actual			Average		
	Fatal	Fatal + Injury	Total	Fatal	Fatal + Injury	Total
ALA 061 021.267 – ALA 061 021.966	0.000	0.81	2.92	0.014	0.85	1.98

Source: Caltrans TASAS data, Table B - Selective Accident Rate Calculation
 Note: Accident rates expressed as number of accidents per million vehicle miles

Table 7-3 shows the total number and percentages of the collision types of the crash records. The highest number of collisions were sideswipes, which included 20 crashes or 42.6 percent of the total crashes. Broadside collisions accounted for 10 crashes or 21.3 percent of the total crashes, while rear end collisions accounted for 7 crashes, or 14.9 percent of the total crashes. These are typical intersection-related collisions. It is worth noting that the summary table provided in the TASAS Selective Accident Retrieval (TSAR) – Accident Summary, included four auto-pedestrian crashes, but the TSAR – Accident Detail data notes that one crash identified as ‘head on’ is actually a vehicle hitting a pedestrian. Therefore, this crash is considered as an auto-pedestrian crash instead of a head-on collision crash. As a result, there were a total of 5 auto-pedestrian collisions, accounting for 10.6 percent of the total crashes.

Table 7-3 Collision Types

Collision Type	Number	Percentage
Sideswipe	20	42.6%
Broadside	10	21.3%
Rear End	7	14.9%
Auto-Pedestrian	5	10.6%
Head-On	2	4.3%
Hit Object	3	6.4%
Overturn	0	0.0%
Other	0	0.0%
Total	47	100%

Note: TASAS data, TSAR - Accident Summary, TSAR – Accident Detail, Study team analysis

Thirteen injury crashes occurred within the SR-61 portion during 2014-2018. Of these injury crashes, eleven occurred at an intersection, while two occurred on a mid-block segment.

One injury crash occurred at the Central Avenue/Sherman Street intersection involving two vehicles T-boning each other (broadside type of collision). One injury crash occurred just west of the Central Avenue/Sherman Street intersection. It involved a single vehicle traveling eastbound and hitting the curb as a result of the driver under the influence of alcohol. This crash occurred in the curve section between Bay Street and Sherman Street; improvements such as road diet and channelization that could potentially reduce travel speeds would help drivers navigate through this curve section more safely.

Four injury crashes occurred at the Central Avenue/Webster Street intersection. One involved a vehicle making a westbound left turn, failing to yield to a through-traveling vehicle. One involved a vehicle making a southbound left turn, failing to yield to a through-traveling vehicle. Both crashes were broadside collisions. Another two are pedestrian-related crashes. One involved an eastbound-right turn vehicle hitting a pedestrian, and another involved a northbound through traveling vehicle hitting two pedestrians traveling in the eastbound direction. The primary contributing factor for both is failure to yield.

Two injury crashes at St. Charles Street were the result of failure to yield, one of which was a pickup/panel truck hitting a pedestrian while making a left turn and the other was a northbound passenger vehicle failing to yield at the stop sign. It resulted in broadside collision and involved other two vehicles, including one parked car.

One injury crash occurred at the Caroline Street intersection involved a driver traveling southbound with an unknown impairment hitting a bicyclist traveling westbound. Another injury crash occurred at the Ninth Street intersection involved two vehicles hitting each other as a result of a driver under the influence of alcohol.

One injury crash at the Burbank Street intersection was a broadside collision caused by a northbound left turning vehicle failing to yield to a vehicle traveling westbound. One injury crash occurred just west of Burbank Street was a result of westbound-traveling bus rear-ending a stopped passenger car, and then getting two additional stopped vehicles involved.

Of the head-on crashes, one crash at Eighth Street involved a southbound left-turning vehicle hitting an eastbound through-traveling vehicle on the south side of Central Avenue. One at Webster Street involved an eastbound left-turning vehicle hitting a westbound through traveling vehicle on the north side. The primary contributing factor for all these three crashes is failure to yield. No injuries were reported from these head-on crashes.

Six pedestrians were hit by vehicles as a result of drivers failing to yield on the SR-61 portion of the study corridor during the period of 2014-2018, three of them reported injuries. One bicyclist was hit and injured by a driver with an unknown impairment. Another bicyclist was hit but not injured as a result of a driver making an improper turn.

7.2.2 City of Alameda Portion

The crash data for the City portion of the project segment were obtained from the City database⁶ which includes primary road and secondary road information. Sixteen crashes were reported along the City portion of the study corridor and a summary of the crash data is shown in **Table 7-4**. Of these crashes, three included visible injuries, nine included a complaint of pain (possible injury), and four were property damage only (PDO) crashes. No fatalities were reported. Three crashes involved bicyclists while one crash involved a pedestrian. Eleven occurred at intersections, while five occurred on a mid-block segment.

Table 7-4 Summary of Number and Significance of Crashes

Primary Road	Secondary Road	Total	Fatal	Visible Injury	Complaint of Pain	PDO	Pedestrian-Related	Bicycle-Related
Central Ave	Third St	11	0	2	5	4	0	2
	Fifth St	3	0	1	2	0	1	1
	Sixth St	2	0	0	2	0	0	0
Total		16	0	3	9	4	1	3

Source: City of Alameda

The ADT and Total MVM numbers were estimated from the available daily traffic count data, and the crash rates expressed as number of accidents per million vehicle miles were calculated accordingly, as shown in **Table 7-5**. Compared to the Caltrans' SR 61 portion, the injury crash rate is slightly lower, while the total crash rate is less than half of the crash rate for the SR-61 portion.

Table 7-5 Summary of Crash Rates

Location Milepost	ADT ¹	Total MVM ²	Crash Rates		
			Fatal	Fatal + Injury	Total
Pacific Ave/Main St to Webster St	8,300	14.95	0.000	0.80	1.07

Source: City of Alameda, Study team analysis

¹ Estimated from adding the 2020 daily northbound approach count at Pacific Ave/Main St and eastbound approach count at Webster St, rounded to the nearest 100s

² Calculated from the estimated ADT and distance from Pacific Ave/Main St to Webster St

Note: Accident rates expressed as number of accidents per million vehicle miles

Of the crashes that occurred at or close to the Third Street intersection, one involved the driver being under the influence of alcohol or drugs and resulted in an overturned vehicle located approximately 240 feet from the intersection. The other crashes at Third Street were caused by right-of-way violations that led to broadside collisions, and included two bicycle related crashes.

Of the crashes that occurred at or close to the Fifth Street intersection, the contributing factor to one crash is improper turning that resulted in a rear end collision. A crash caused by a driver violating the right-of-way of a cyclist resulted in a broadside type of collision. Another crash involving a driver violating the pedestrian right-of-way and hitting a pedestrian.

Of the two crashes that occurred at or close to the Sixth Street intersection, one crash involved a driver traveling at unsafe speed rear-ending another vehicle, while the cause of another broadside collision is unknown.

7.2.3 Corridor-wide

The corridor-wide crash data are summarized by location (at or nearby an intersection) in **Table 7-6**. Overall sixty three crashes occurred along the study corridor, with nearly half of them including an injury or possible injury (as identified as “compliant of pain”) crashes.

It was found that the highest number of crashes (thirteen) occurred at or near the Webster Street intersection. Seven of these crashes were primarily caused by failing to yield, five by improper turning movements, and one by another violation. Multiple collision types included:

- Four sideswipe collisions, no injuries reported;
- Three broadside collisions, two injuries reported;
- Three auto-pedestrian collisions, two injuries reported;
- Two hit object collisions, no injuries reported; and
- One head-on collisions, no injuries reported

A total of two pedestrians were injured in the three auto-pedestrian collisions, all caused by vehicles failing to yield to pedestrians.

Six pedestrian-related crashes, (a total of seven pedestrians were involved) were reported along the study corridor. All of these crashes occurred at intersections and were a result of violating pedestrian right-of-way (failure to yield).

As to bicycle-related crashes, one occurred at the Third Street intersection while one occurred close to the Third Street intersection. One occurred close to the Fifth Street intersection, and one occurred at the Caroline Street intersection. The collision type of all these bicycle-related crashes are broadside collision. Three were caused by right-of-way violations while one was caused by an unknown driver impairment.

Table 7-6 Summary of Crashes along the Corridor

Location	Total	Fatal	Injury	PDO	Pedestrian-Related	Bicycle-Related
Third St	11	0	7	4	0	2
Fifth St	3	0	3	0	1	1
Sixth St	2	0	2	0	0	0
Webster St	13	0	4	9	3	0
Page St	4	0	0	4	0	0
Eighth St	7	0	0	7	1	1
Burbank St	7	0	2	5	0	0
Ninth St	2	0	1	1	0	0
Caroline St	4	0	1	3	0	1
St Charles St	5	0	2	3	1	0
Bay St	2	0	1	1	0	0
Sherman St	3	0	2	1	0	0
Total	63	0	25	38	6	5

Source: TASAS data, City of Alameda, Study team analysis

7.3 Evaluation of Proposed Improvements

Five elements of the proposed improvements are considered countermeasures in the evaluation of expected reduction in number of crashes – road diet, bicycle facility, pedestrian crossing treatment, high-visibility crosswalk, and roundabout. The applicable crash modification factors (CMFs) for these countermeasures are discussed below.

7.3.1 Road Diet

Road diet typically refers to converting a four-lane undivided highway into a three-lane highway – two through lanes plus a center two-way left-turn lane. The remaining roadway width may be used as bicycle lanes, sidewalks, or on-street parking. Chapter 13 of Highway Safety Manual (HSM)² includes road diet as a crash countermeasure for roadway segments. The effect on crash frequency of removing two through lanes on urban four-lane undivided roads and adding a center two-way left-turn lane is shown in **Table 7-7**.

Table 7-7 Potential Crash Effect of Road Diet

Treatment	Road Type	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
Four to three lane conversion	Urban (Arterials)	Unspecified	All types (All severities)	0.71	0.02
Base Condition: Four-lane roadway cross section					

Source: Table 13-6 of Highway Safety Manual, First Edition with Supplement 2014

This CMF will be applied to the observed crash frequencies on the roadway segments where the road diet is proposed to estimate crash reductions attributable to these proposed improvements.

7.3.2 Bicycle facility

Providing dedicated bicycle lanes is listed as a countermeasure in Chapter 13 of HSM; however, no CMF is provided. The following qualitative analysis on potential trends in crashes and user behavior is provided: “installing pavement markings to delineate a dedicated bicycle lane appears to reduce erratic maneuvers by drivers and bicyclists. Dedicated bicycle lanes may also lead to higher levels of comfort for both bicyclists and motorists.”

It is also mentioned that three types of bicycle-vehicle crashes may be unaffected by bicycle lanes: (1) where a bicyclist fails to stop or yield at a controlled intersection, (2) where a driver fails to stop or yield at a controlled intersection, and (3) where a driver makes an improper left-turn.

The CMF for installing bicycle lanes was therefore collected from the Crash Modification Factors Clearinghouse⁷, a resource repository of CMFs funded by the FHWA and maintained by the University of North Carolina Highway Safety Research Center. The identified CMF (CMF ID: 4103) was from a study conducted in Montreal, Canada based on a sample size of 256 crashes during a period from 1999 to 2008 and is shown in **Table 7-8**.

Table 7-8 Potential Crash Effect of Installing Bike Lanes

Treatment	Area Type	Road Type	Road Type	Crash Type	Severity	Number of Lanes	CMF
Cycle Tracks, Bike Lanes, or On-Street Cycling	Urban	Unspecified	Urban	Vehicle/bicycle	A (serious injury), B (minor injury), C (possible injury)	1 to 3	0.41

Source: CMF Clearinghouse (CMF ID: 4103)

This CMF will be applied to the observed vehicle/bicycle crash frequencies on the roadway segments where bicycle sharrow markings, bike lanes, or a two-way cycle track is proposed to estimate crash reductions attributable to these proposed improvements.

It should be noted that even though the CMF used for bicycle facility does not differentiate among cycle tracks, bike lanes, and sharrow bike lanes (on-street cycling), there are still differences among these types of bicycle facilities. Research suggests that separated bike lanes often receive the most support from bicyclists, and in some cases drivers, due to the increased protection and comfort that these types of facilities can provide. These facilities are generally considered to be the safest on-street corridor treatment for bicyclists, both in terms of proven safety outcomes and perceived safety.⁸

The proposed preferred alternative provides a two-way protected cycle track between Pacific/Main Street and Eighth Street, and bike lanes between Eighth Street and Sherman Street.

7.3.3 Pedestrian Crossing Treatment

Dedicated pedestrian crossing treatments, such as rectangular rapid flashing beacons (RRFBs) are listed as countermeasures in Chapter 13 of HSM; however, no CMF is provided. Therefore, the CMF for RRFBs was obtained from the Crash Modification Factors Clearinghouse. The identified CMF (CMF ID: 9024) was from a study conducted in multiple states (AZ, FL, IL, MA, NY, NC, OR, VA, and WI) based on a sample size of 1928 site-years during a period from 2004 to 2013, and is shown in **Table 7-9**.

Table 7-9 Potential Crash Effect of Installing RRFB

Treatment	Area Type	Road Type	Road Type	Crash Type	Severity	Number of Lanes	CMF
Installing Rectangular Rapid Flashing Beacon (RRFB)	Urban/suburban	Minor Arterial	Urban/suburban	Vehicle/pedestrian	All	2 to 8	0.526

Source: CMF Clearinghouse (CMF ID: 9024)

This CMF will be applied to the observed vehicle/ pedestrian crash frequencies on the roadway segments where RRFBs are proposed to estimate crash reductions attributable to these proposed improvements.

7.3.4 High-Visibility Crosswalk

The CMF for installing a high-visibility crosswalk was also obtained from the Crash Modification Factors Clearinghouse. The identified CMF (CMF ID: 4123) was from a study conducted in New York City based on a sample size of 63 crash records before and 15 crashes after during a period from 1998 to 2008, and is shown in **Table 7-10**.

Table 7-10 Potential Crash Effect of Installing High-Visibility Crosswalk

Treatment	Area Type	Road Type	Crash Type	Severity	Number of Lanes	CMF
Install high-visibility crosswalk	Urban	Not Specified	Vehicle/pedestrian	All	Not Specified	0.6

Source: CMF Clearinghouse (CMF ID: 4123)

This CMF will be applied to the observed vehicle/ pedestrian crash frequencies on the roadway segments where high-visibility crosswalks are proposed to estimate crash reductions attributable to these improvements.

7.3.5 Roundabout

The CMFs for converting a signalized intersection and a minor-road stop-controlled intersection into a modern roundabout were obtained from Chapter 14 of the HSM and are shown in **Tables 7-11** through **7-12**.

Table 7-11 Potential Crash Effect of Converting Signalized Intersection into Roundabout

Treatment	Road Type	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
Convert signalized intersection to modern roundabout	Urban (One or two lanes)	Unspecified	All types (All severities)	0.99	0.1
			All types (Injury)	0.40	0.1
Base Condition: Signalized intersection					

Source: Table 14-3 of Highway Safety Manual, First Edition with Supplement 2014

Table 7-12 Potential Crash Effect of Converting Minor-Road Stop-Controlled Intersection into Roundabout

Treatment	Road Type	Traffic Volume	Crash Type (Severity)	CMF	Std. Error
Convert intersection with minor-road stop control to modern roundabout	Urban (One lane)	Unspecified	All types (All severities)	0.61	0.1
			All types (Injury)	0.22	0.1
Base Condition: Stop-controlled intersection					

Source: Table 14-4 of Highway Safety Manual, First Edition with Supplement 2014

This CMF will be applied to the observed all crash frequencies of injuries and property damage only (PDO) types at the intersections where roundabouts are proposed to estimate crash reductions attributable to these improvements.

7.4 Analysis Results

The following sections present the results of the crash reduction analysis.

7.4.1 Expected Crash Reduction

The road diet (converting four-lane highway to three-lane highway, including a TWLTL) is proposed for the segment between Third Street and Sherman Street (the proposed TWLTL extends to Lincoln Avenue, yet the segment between Lincoln Avenue and Third Street is a two-lane section currently). The CMF for the road diet countermeasure was applied to the crashes that occurred within this portion of the corridor to derive the estimated reduction in crashes, excluding the crashes that occurred within the Third Street intersection and Sherman Street intersection. 50 crashes were found to be applicable for potential reduction as a result of implementing road diet.

Bicycle facilities are proposed to be installed for the entire corridor. Even though the facility type is different in the section between McKay Avenue and Eighth Street (bike lane vs. cycle track), the CMF does not differentiate between the two. Therefore, the two options are evaluated based on the same CMF for bike lanes/cycle track. As noted in the HSM, bicycle-vehicle crashes where a driver fails to yield to bicyclists at a controlled intersection, or when a driver makes an improper left-turn, may be unaffected by bicycle facilities. Therefore, the applicable vehicle/bicycle crashes were only those that involved a vehicle and bicycle traveling in the same direction of the roadway. Two applicable vehicle/bicycle crashes were found - one near the Third St intersection and one near the Fifth St intersection.

The RRFB treatment is proposed to be installed at the following two locations:

- At Lincoln Avenue
- At Page Street

No crashes related to pedestrians crossing Central Avenue were found at these locations; therefore, no crash reduction estimate resulting from the installation of the RRFB treatments was possible.

In addition to the proposed improvements along the corridor, roundabouts are proposed at the following four intersections:

- At Pacific Avenue/Main Street
- At Third Street
- At Fourth Street
- At Sherman Street/Encinal Avenue

The CMFs for the countermeasure of converting signalized intersection and side-street stop-controlled intersection into modern roundabout were applied to the crashes by severity type that occurred within these intersections to derive the estimated crash reductions. Six injury crashes and five PDO crashes were found to be applicable for potential reduction attributable to converting intersection to roundabout.

The expected reductions resulting from the implementation of the countermeasures described above, and based on the 2014-2018 crash data, are presented in **Tables 7-13** and **7-14**.

Table 7-13 Expected Crash Reductions due to Countermeasures along the Corridor Based on the 2014-2018 Crash Data

Counter-measure	Road Diet		Bike Lane/ Cycle Track		RRFB		High-Visibility Crosswalk	
Applicable Crash Type	All Types		Vehicle/Bicycle		Vehicle/ Pedestrian		Vehicle/ Pedestrian	
CMF	0.71		0.41		0.526		0.6	
Location	Applicable Crashes	Expected Reduction	App. #	Exp. #	App. #	Exp. #	App. #	Exp. #
Third St	0	0	1	0.6	0	0	0	0
Fifth St	3	0.9	1	0.6	0	0	0	0
Sixth St	2	0.6	0	0	0	0	0	0
Webster St	13	3.8	0	0	0	0	0	0
Page St	4	1.2	0	0	0	0	0	0
Eighth St	7	2.0	0	0	0	0	1	0.4
Burbank St	7	2.0	0	0	0	0	0	0
Ninth St	2	0.6	0	0	0	0	0	0
Caroline St	4	1.2	0	0	0	0	0	0
St Charles St	5	1.5	0	0	0	0	0	0
Bay St	2	0.6	0	0	0	0	0	0
Sherman St	1	0.3	0	0	0	0	0	0
Total	50.0	14.5	2.0	1.2	0	0	1.0	0.4

Source: TASAS data, City of Alameda, Study team analysis

Table 7-14 Expected Crash Reductions due to Roundabouts Based on the 2014-2018 Crash Data

Counter-measure	Convert Signalized Intersection to Modern Roundabout				Convert Intersection with Minor-Road Stop Control to Modern Roundabout			
	Injury Crashes		PDO Crashes		Injury Crashes		PDO Crashes	
Applicable Crash Type	0.40		0.99		0.22		0.61	
CMF	0.40		0.99		0.22		0.61	
Location	Applicable Crashes	Expected Reduction	App. #	Exp. #	App. #	Exp. #	App. #	Exp. #
Pacific Ave/ Main St*	0	0	0	0	-	-	-	-
Third St	-	-	-	-	5	3.9	4	1.6
Sherman St	1	0.6	1	0.0	-	-	-	-
Total	1	0.6	1	0.0	5	3.9	4	1.6

Source: TASAS data, City of Alameda, Study team analysis

Note: No crash records were found at this intersection

The expected crash reductions of all types due to the countermeasures based on the 2014-2018 crash data are presented in **Figure 7-1** graphically. It is expected that road diet would significantly reduce crashes along the corridor, while the roundabouts would significantly reduce the crashes at the three intersections where roundabouts are proposed.

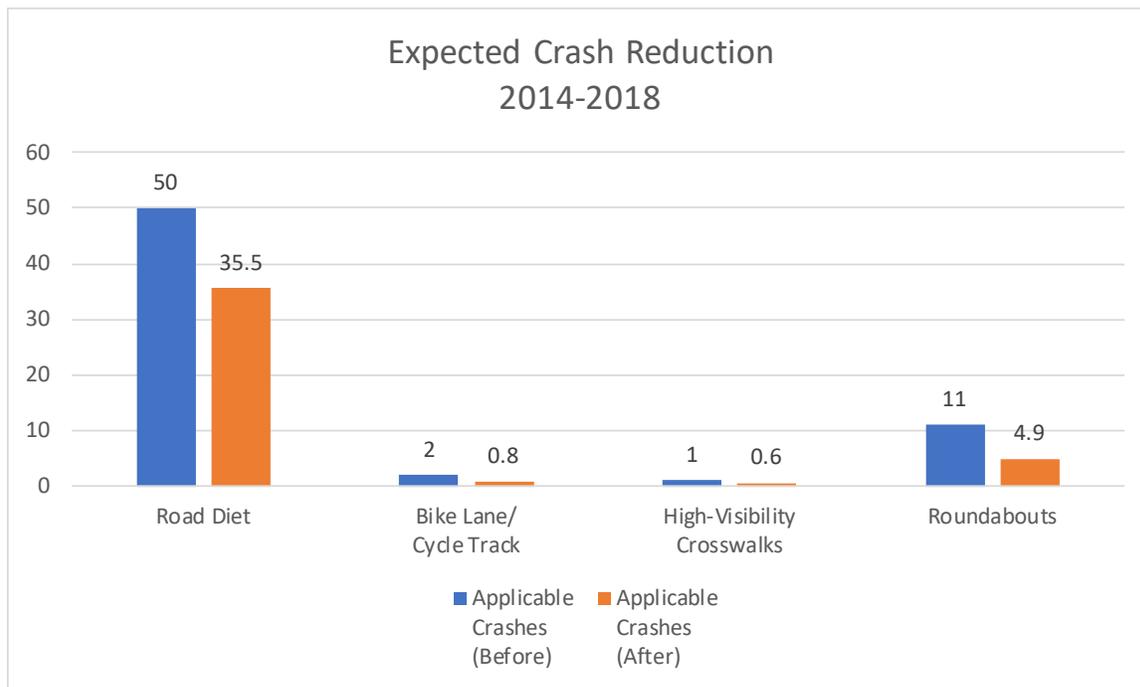


Figure 7-1
Expected Crash Reductions due to Countermeasures based on 2014-2018 Data

7.4.2 Expected Crash Reduction in 2045

In order to derive the expected number of crashes in the future horizon year 2045, the observed number of crashes need to be proportionately increased for the future year using the assumption that crash frequencies remain the same. Approach volumes at each intersection where crashes were observed in the AM and PM peak hours were compared, and a combined growth factor averaging the growth factors observed in the AM and PM peak hours was used to project the number of crashes for the future year at each intersection. **Table 7-15** shows the calculations and the growth factors used to grow the observed crashes into year 2045.

Table 7-15 Growth Factors for Projecting Crash Frequencies

Location	Approach	2020 AM	2045 Build AM	Growth Factor	2020 PM	2045 Build PM	Growth Factor	Combined Growth Factor
Third St	Eastbound	242	245	1.13	331	331	1.04	1.08
	Westbound	465	553		245	268		
Fifth St	Eastbound	573	583	1.02	457	457	1.01	1.02
	Westbound	557	575		433	443		
Sixth St	Eastbound	503	503	1.04	460	460	1.00	1.02
	Westbound	678	723		505	505		
Webster St	Eastbound	485	490	1.06	539	541	1.07	1.06
	Westbound	877	948		623	707		
Page St	Eastbound	758	792	1.07	1,064	1,198	1.12	1.09
	Westbound	868	942		649	722		
Eighth St	Eastbound	674	684	1.05	1,133	1,208	1.10	1.07
	Westbound	692	751		480	559		
Burbank St ¹	Eastbound	344	355	1.05	487	562	1.19	1.12
	Westbound	642	683		552	672		
Ninth St ¹	Eastbound	344	355	1.05	487	562	1.19	1.12
	Westbound	642	683		552	672		
Caroline St ¹	Eastbound	344	355	1.05	487	562	1.19	1.12
	Westbound	642	683		552	672		
St Charles St ¹	Eastbound	344	355	1.05	487	562	1.19	1.12
	Westbound	642	683		552	672		
Bay St ¹	Eastbound	344	355	1.05	487	562	1.19	1.12
	Westbound	642	683		552	672		
Sherman St	Eastbound	441	468	1.06	528	621	1.26	1.16
	Westbound	457	486		358	493		

Source: Study team analysis

¹Traffic volumes were not developed for these non-study intersections. Volumes for the approach link and receiving link of the adjacent Eighth Street and Sherman Street intersections were used.

The expected crash reductions in 2045 resulting from the application of the proposed countermeasures are presented in **Tables 7-16** and **7-17**. Overall, it is expected that there will be a reduction of approximately 16 crashes as a result of implementing road diet. There will be a

reduction of approximately one vehicle/bicyclist crash and one vehicle/pedestrian crash as a result of installing the bicycle and pedestrian safety treatments. There will be a reduction of nearly five injury crashes as a result of converting signalized intersection or side-road stop-controlled intersection into a roundabout.

Table 7-16 Expected Crash Reductions within a Five-Year Period in 2045 due to Countermeasures along the Corridor

Counter-measure	Road Diet		Bike Lane/ Cycle Track		RRFB		High-Visibility Crosswalk	
Applicable Crash Type	All Types		Vehicle/Bicycle		Vehicle/ Pedestrian		Vehicle/ Pedestrian	
CMF	0.71		0.41		0.526		0.6	
Location	Applicable Crashes	Expected Reduction	App. #	Exp. #	App. #	Exp. #	App. #	Exp. #
Third St	0	0	1.1	0.6	0	0	0	0
Fifth St	3.1	0.9	1.0	0.6	0	0	0	0
Sixth St	2.0	0.6	0	0	0	0	0	0
Webster St	13.8	4.0	0	0	0	0	0	0
Page St	4.4	1.3	0	0	0	0	0	0
Eighth St	7.5	2.2	0	0	0	0	1.1	0.4
Burbank St	7.8	2.3	0	0	0	0	0	0
Ninth St	2.2	0.6	0	0	0	0	0	0
Caroline St	4.5	1.3	0	0	0	0	0	0
St Charles St	5.6	1.6	0	0	0	0	0	0
Bay St	2.2	0.6	0	0	0	0	0	0
Sherman St	1.2	0.3	0	0	0	0	0	0
Total	54.4	15.8	2.1	1.2	0	0	1.1	0.4

Source: TASAS data, City of Alameda, Study team analysis

Table 7-17 Expected Crash Reductions within a Five-Year Period in 2045 due to Roundabouts

Counter-measure	Convert Signalized Intersection to Modern Roundabout				Convert Intersection with Minor-Road Stop Control to Modern Roundabout			
Applicable Crash Type	Injury Crashes		PDO Crashes		Injury Crashes		PDO Crashes	
CMF	0.40		0.99		0.22		0.61	
Location	Applicable Crashes	Expected Reduction	App. #	Exp. #	App. #	Exp. #	App. #	Exp. #
Pacific Ave/ Main St	0	0	0	0	-	-	-	-
Third St	-	-	-	-	5.4	4.2	4.3	1.7
Sherman St	1.2	0.7	1.2	0.0	-	-	-	-
Total	1.2	0.7	1.2	0.0	5.4	4.2	4.3	1.7

Source: TASAS data, City of Alameda, Study team analysis

The expected crash reductions of all types within a five-year period in 2045 due to the countermeasures are presented in **Figure 7-2** graphically. As in the existing year, it is expected that road diet would significantly reduce crashes along the corridor, while the roundabouts would significantly reduce the crashes at the three intersections where roundabouts are proposed.

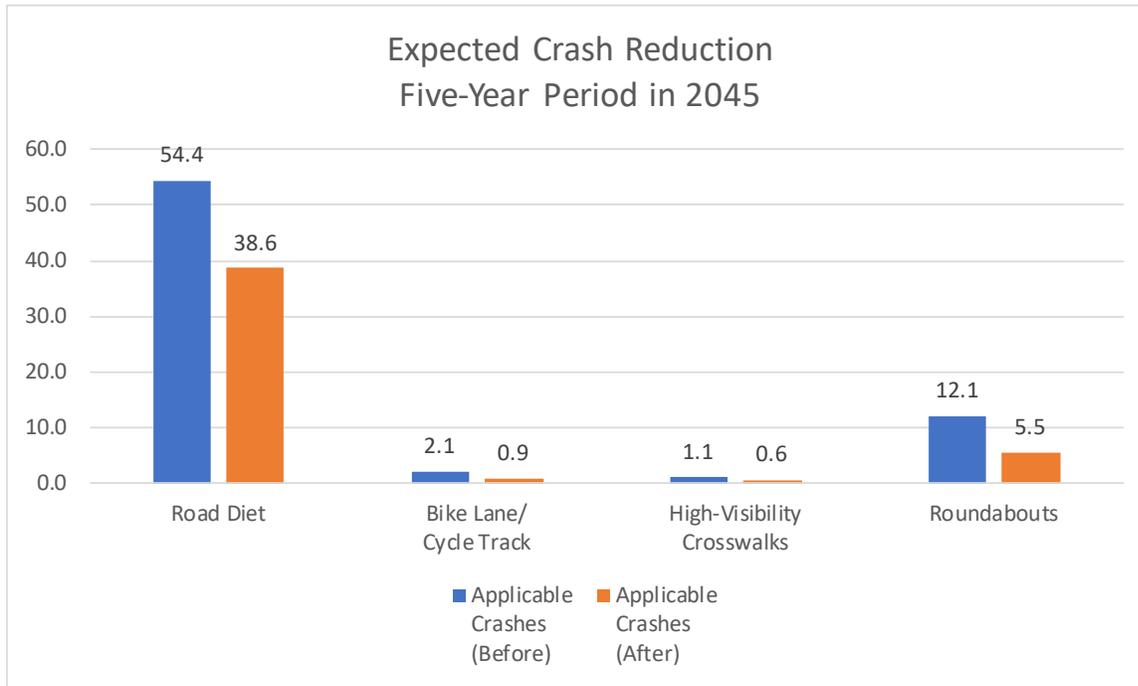


Figure 7-2 Expected Crash Reductions within a Five-Year Period in 2045 due to Countermeasures

7.4.3 Expected Benefits in 2020

Crash benefits in 2020 were derived by estimating the reduction in societal costs due to installing the countermeasures. The societal cost information was obtained from the California Highway Patrol’s Statewide Integrated Traffic Records System (SWITRS 2017) Annual Report⁹ and summarized into **Table 7-18**.

Table 7-18 Societal Cost by Crash Severity Type

Unit	Severity Type	Cost per Unit
Per Person	Killed	\$3,981,000
	Severe Injury	\$276,000
	Other Visible Injury	\$55,000
	Complaint of Pain	\$29,000
Per Crash	Property Damage Only	\$3,000

Source: SWITRS 2017 Annual Report, Table 7C
 Cost in 2017 dollars

The number of injured victims and PDO crashes associated with the applicable crashes for the countermeasures were identified to estimate the benefits (societal cost savings) due to installing the countermeasures. Because the TASAS data for the Caltrans portion of the Alameda corridor

does not further differentiate severity types under injury crash, the information of injury type distributions was gathered from the SWITRS 2017 Annual Report to estimate the number of crashes by injury severity type for the total crashes, pedestrian-related crashes, and bicycle-related crashes.

The number of injuries by severity type are presented in **Tables 7-19** through **7-21**.

Table 7-19 Persons Killed and Injured by Extent of Injury in Alameda County

County	Total Killed and Injured	Total Killed	Total Injured	Severe Injury	Visible Injury	Complaint of Pain	Suspected Serious Injury	Suspected Minor Injury	Possible Injury
Alameda	11,124	101	11,023	381	2,010	7,229	81	365	957

Source: SWITRS 2017 Annual Report, Table 8C

Table 7-20 Persons Killed and Injured by Extent of Injury in Statewide Pedestrian-Related Crashes

Crash Type	Total Killed and Injured	Total Killed	Total Injured	Severe Injury	Visible Injury	Complaint of Pain	Suspected Serious Injury	Suspected Minor Injury	Possible Injury
Auto/ Pedestrian	13,992	891	13,101	1,740	4,892	5,815	182	308	164

Source: SWITRS 2017 Annual Report, Table 4C

Table 7-21 Persons Killed and Injured by Extent of Injury in Statewide Bicycle-Related Crashes

Statewide Vehicle Type	Total Killed and Injured	Total Killed	Total Injured	Severe Injury	Visible Injury	Complaint of Pain	Suspected Serious Injury	Suspected Minor Injury	Possible Injury
Bicycle	11,278	162	11,116	870	5,282	4471	104	267	122

Source: SWITRS 2017 Annual Report, Table 4D

The calculated distribution of injuries by severity type for the total crashes, pedestrian-related crashes, and bicycle-related crashes are shown in **Table 7-22**. It should be noted that the injury status boxes of some data previously read “Severe Injury”, “Other Visible Injury”, and “Complaint of Pain” have been updated to “Suspected Serious Injury”, “Suspected Minor Injury”, and “Possible Injury” to be in compliance with the crash severity types in Model Minimum Uniform Crash Criteria (MMUCC) Guideline 5th Edition.¹⁰

Therefore, the calculated distribution of “Severe Injury” includes “Suspected Serious Injury”, “Visible Injury” includes “Suspected Minor Injury”, and “Complaint of Pain” includes “Possible Injury”.

Table 7-22 Distribution of Injuries by Severity Type for Total Crashes

Severity Type	Percentage of Total Injuries		
	Total Crashes	Pedestrian-Related Crashes	Bicycle-Related Crashes
Severe Injury	4.2%	14.7%	8.8%
Other Visible Injury	21.5%	39.7%	49.9%
Complaint of Pain	74.3%	45.6%	41.3%

Source: Study team analysis

These distributions of injuries by severity type were applied to the injuries from the crashes associated with the countermeasures to estimate the number of crashes by injury type.

The societal cost by crash severity type shown in Table 7-18 was then applied to the number of injured persons and PDO crashes to calculate the “before” and “after” societal costs of the applicable crashes for each countermeasure. The resulting reduction in societal cost for Road Diet, Bike Lane/Cycle Track, RRFB, and High-Visibility Crosswalk countermeasures are shown in **Table 7-23**.

Table 7-23 Expected Societal Cost Reductions due to Countermeasures along the Corridor Based on the 2014-2018 Crash Data

Counter-measure	Road Diet	Bike Lane/ Cycle Track	RRFB	High-Visibility Crosswalk
Applicable Crash Type	All Types	Vehicle/Bicycle	Vehicle/ Pedestrian	Vehicle/ Pedestrian
CMF	0.71	0.41	0.526	0.6
Location	Reduction in Societal Cost	Reduction in Societal Cost	Reduction in Societal Cost	Reduction in Societal Cost
Third St	\$0	\$22,550	\$0	\$0
Fifth St	\$32,770	\$22,550	\$0	\$0
Sixth St	\$16,820	\$0	\$0	\$0
Webster St	\$59,977	\$0	\$0	\$0
Page St	\$3,480	\$0	\$0	\$0
Eighth St	\$6,090	\$0	\$0	\$1,200
Burbank St	\$69,534	\$0	\$0	\$0
Ninth St	\$13,907	\$0	\$0	\$0
Caroline St	\$15,647	\$0	\$0	\$0
St Charles St	\$67,794	\$0	\$0	\$0
Bay St	\$13,907	\$0	\$0	\$0
Sherman St	\$26,943	\$0	\$0	\$0
Total	\$326,868	\$45,100	\$0	\$1,200

Source: TASAS data, City of Alameda, SWITRS 2017 Annual Report, Study team analysis
Values in 2017 dollars

The resulting reduction in societal cost for each countermeasure is shown in **Table 7-24**.

**Table 7-24 Expected Societal Cost Reductions due to Countermeasures due to Roundabouts
Based on the 2014-2018 Crash Data**

Counter-measure	Convert Signalized Intersection To Roundabout		Convert TWSC Intersection To Roundabout	
	Injury	PDO	Injury	PDO
CMF	0.4	0.99	0.22	0.61
Location	Reduction in Societal Cost	Reduction in Societal Cost	Reduction in Societal Cost	Reduction in Societal Cost
Third St	\$0	\$0	\$113,100	\$4,680
Fifth St	\$0	\$0	\$0	\$0
Sixth St	\$0	\$0	\$0	\$0
Webster St	\$0	\$0	\$0	\$0
Page St	\$0	\$0	\$0	\$0
Eighth St	\$0	\$0	\$0	\$0
Burbank St	\$0	\$0	\$0	\$0
Ninth St	\$0	\$0	\$0	\$0
Caroline St	\$0	\$0	\$0	\$0
St Charles St	\$0	\$0	\$0	\$0
Bay St	\$0	\$0	\$0	\$0
Sherman St	\$26,973	\$30	\$0	\$0
Total	\$26,973	\$30	\$113,100	\$4,680

Source: TASAS data, City of Alameda, SWITRS 2017 Annual Report, Study team analysis
Values in 2017 dollars

The total reduction for a five-year period in 2020 is \$517,951.

7.4.4 Expected Benefits in 2045

Similar to calculating the reductions in 2045, the growth factors for the intersections were applied to the “before” and “after” societal costs of the applicable crashes for each countermeasure to derive the “before” and “after” societal costs in 2045. The resulting reduction in societal cost for Road Diet, Bike Lane/Cycle Track, RRFB, and High-Visibility Crosswalk countermeasures for a five-year period in 2045 are shown in **Table 7-25**.

Table 7-25 Expected Crash Reductions within A Five-Year Period in 2045 due to Countermeasures along the Corridor

Counter-measure	Road Diet	Bike Lane/ Cycle Track	RRFB	High-Visibility Crosswalk
Applicable Crash Type	All Types	Vehicle/Bicycle	Vehicle/ Pedestrian	Vehicle/ Pedestrian
CMF	0.71	0.41	0.526	0.6
Location	Reduction in Societal Cost	Reduction in Societal Cost	Reduction in Societal Cost	Reduction in Societal Cost
Third St	\$0	\$24,451	0	\$0
Fifth St	\$33,360	\$22,956	0	\$0
Sixth St	\$17,140	\$0	0	\$0
Webster St	\$63,870	\$0	0	\$0
Page St	\$3,806	\$0	0	\$0
Eighth St	\$6,535	\$0	0	\$1,288
Burbank St	\$77,892	\$0	0	\$0
Ninth St	\$15,578	\$0	0	\$0
Caroline St	\$17,528	\$0	0	\$0
St Charles St	\$75,943	\$0	0	\$0
Bay St	\$15,578	\$0	0	\$0
Sherman St	\$31,250	\$0	0	\$0
Total	\$358,481	\$47,408	\$0	\$1,288

Source: TASAS data, City of Alameda, SWITRS 2017 Annual Report, Study team analysis
Values in 2017 dollars

The resulting reduction in societal cost for each countermeasure is shown in **Table 7-26**.

Table 7-26 Expected Crash Reductions within A Five-Year Period in 2045 due to Roundabouts

Counter-measure	Convert Signalized Intersection To Roundabout		Convert TWSC Intersection To Roundabout	
	Injury	PDO	Injury	PDO
CMF	0.4	0.99	0.22	0.61
Location	Reduction in Societal Cost	Reduction in Societal Cost	Reduction in Societal Cost	Reduction in Societal Cost
Third St	\$0	\$0	\$122,637	\$5,075
Fifth St	\$0	\$0	\$0	\$0
Sixth St	\$0	\$0	\$0	\$0
Webster St	\$0	\$0	\$0	\$0
Page St	\$0	\$0	\$0	\$0
Eighth St	\$0	\$0	\$0	\$0
Burbank St	\$0	\$0	\$0	\$0
Ninth St	\$0	\$0	\$0	\$0
Caroline St	\$0	\$0	\$0	\$0
St Charles St	\$0	\$0	\$0	\$0
Bay St	\$0	\$0	\$0	\$0
Sherman St	\$31,284	\$35	\$0	\$0
Total	\$31,284	\$35	\$122,637	\$5,075

Source: TASAS data, City of Alameda, SWITRS 2017 Annual Report, Study team analysis
Values in 2017 dollars

The total reduction for a five-year period in 2045 is \$566,206.

7.5 Summary

A total of sixty three crashes were reported within the project corridor between 2014 and 2018. Twenty nine of them included at least one injury, but no fatalities occurred. Six pedestrian-related crashes occurred, one at Fifth Street, three at Webster Street, one at Eighth Street, and one at Saint Charles Street. A total of four pedestrians were injured. A total of five bicycle-related crashes occurred, two at Third Street, one at Fifth Street, one at Eighth Street, and one at Caroline Street. Four of them involved a cyclist being injured.

Four countermeasures related to the proposed design layouts along the study corridor were identified – Road Diet, Bike Lane/Cycle Track, Rapid Rectangular Flashing Beacon, and High-Visibility Crosswalk. Road diet has the most noticeable impact on expected crash occurrence – 29% reduction in crashes of all types. **Table 7-27** summarizes the crash reductions and benefits due to countermeasures along the corridor within a five-year period in 2020 and 2045.

Based on the observed number of applicable crashes, it is expected that there would be a reduction of close to 16 crashes of all types within a five-year period in 2045. Bicycle-related and pedestrian-related crashes would reduce by one each. It is expected the societal benefits due to the countermeasures along the corridor within a five-year period would be approximately \$373,000 in 2020 and \$407,000 in 2045.

Table 7-27 Expected Crash Reductions and Benefits due to Countermeasures along the Corridor within A Five-Year Period in 2020 and 2045

Countermeasure	2020		2045	
	Crash Reductions	Benefits ¹	Crash Reductions	Benefits ¹
Road Diet	14.5	\$326,868	15.8	\$358,481
Bike Lane/Cycle Track	1.2	\$45,100	1.2	\$47,408
RRFB	0	\$0	0	\$0
High-Visibility Crosswalk	0.4	\$1,200	0.4	\$1,288
Total	16.1	\$373,168	17.4	\$407,177

Source: TASAS data, City of Alameda, SWITRS 2017 Annual Report, Study team analysis

¹ in 2017 dollars

Even though there is no differentiation in terms of expected number of crashes due to the countermeasure among the types of bicycle facilities being evaluated, it is expected that separated bike lane facilities, such as the proposed two-way protected cycle track, provide the most comfort to both bicyclists and drivers and are generally considered to be the safest on-street corridor treatment for bicyclists.

Roundabouts are proposed at four intersections within the study corridor – Pacific Avenue/Main Street, Third Street, Fourth Street, and Sherman Street/Encinal Avenue. Based on the CMFs from the HSM, converting a signalized or minor-road stop-controlled intersection to a roundabout would effectively reduce crash frequencies at the intersection, especially injury crashes.

Table 7-28 summarizes the crash reductions and benefits due to roundabouts within a five-year period in 2025 and 2045.

Based on the observed number of applicable crashes, it is expected that there would be a reduction of more than six crashes within a five-year period in 2045. It is expected the benefits due to roundabouts within a five-year period would be approximately \$145,000 in 2020 and \$159,000 in 2045.

Table 7-28 Expected Crash Reductions and Benefits due to Roundabouts within A Five-Year Period in 2020 and 2045

Countermeasure	2020		2045	
	Crash Reductions	Benefits ¹	Crash Reductions	Benefits ¹
Convert Signalized Intersection to Roundabout	0.6	\$27,003	0.7	\$31,319
Convert TWSC Intersection to Roundabout	5.5	\$117,780	5.9	\$127,712
Total	6.1	\$144,783	6.6	\$159,031

Source: TASAS data, City of Alameda, SWITRS 2017 Annual Report, Study team analysis

¹ in 2017 dollars

Section 8

Conclusions

This section summarizes the main findings from the traffic operations analysis, parking analysis, and safety assessment presented in this report.

8.1 Safety Assessment

The crash data analysis revealed that 63 crashes were reported within the project corridor between 2014 and 2018. Out of this total, 29 crashes involved at least one injured person, but no fatalities occurred. Six pedestrian-related crashes occurred, while five bicycle-related crashes occurred. The crash reductions expected from all the safety improvements within a five-year period would be approximately 22 crashes in 2020 and 24 crashes in 2045. The total societal benefits within a five-year period would be approximately \$517,951 in 2020 and \$566,206 in 2045.

The proposed project includes several elements expected to improve safety conditions: road diet, bike lane/cycle track, rapid rectangular flashing beacons, high-visibility crosswalks, and roundabouts. Among these elements, a road diet is expected to have the highest impact on expected crash occurrence, a 29 percent reduction in crashes of all types. Based on the crash history in the corridor and the CMFs, it is estimated that there could be a reduction of approximately 16 crashes of all types, one bicycle-related, and one pedestrian-related crash within a five-year period in 2045.

Based on the CMFs from the HSM, converting a signalized or minor-road stop-controlled intersection to a roundabout would effectively reduce crash frequencies at the intersection, especially injury crashes. Roundabouts are proposed at four intersections within the study corridor – Pacific Avenue/Main Street, Third Street/Taylor Avenue, Fourth Street, and Encinal Avenue/Sherman Street. Based on the crash history and the CMF, it is expected that there would be a reduction of approximately five injury crashes within a five-year period in 2045.

8.2 Traffic Operations Analysis

The results of the traffic operations analysis show that 4 out of the 13 study intersections operate at LOS E or F during the AM or PM peak hour in the existing conditions, and there will be several more intersections at LOS E or F in the future year (2045) No Build scenario. Most notably, the Central Avenue & Pacific Avenue/Main Street and Central Avenue & Third Street/Taylor Avenue intersections will operate at LOS F during both AM and PM peak hours. Due to increase in through traffic along Central Avenue, traffic on the southbound side street approach at the Central Avenue & Third Street/Taylor Avenue intersection is expected to experience delays close to 1,000 seconds during the AM peak hour and 500 seconds during the PM peak hour. The Central Avenue & Eighth Street intersection will operate at LOS F with an overall delay of nearly 200 seconds during the PM peak hour.

In the Build scenario, delay increases at a few locations but decreases at most locations. Converting to roundabouts significantly reduces delays at the four intersections, especially the Central Avenue & Pacific Avenue/Main Street and Central Avenue & Third Street/Taylor Avenue intersections. The Central Avenue & Fifth Street intersection operates at LOS E during the AM peak hour. It is recommended that this intersection be signalized as part of the Alameda Point development project.

During the AM peak hour, compared to No Build, the delays for the Central Avenue & Webster Street and Central Avenue & Eighth Street intersections increase and LOS changes from D to E. This is primarily attributable to geometry changes and corresponding signal phases, including the need to provide a protected bicycle signal phase for the two-way cycle track.

During the PM peak hour, the Central Avenue & Webster Street intersection operates at LOS E, while the Central Avenue & Eighth Street intersection operates at LOS F. At the Central Avenue & Eighth Street intersection, the delay is reduced significantly compared to No Build. All other study intersections along Central Avenue operate at LOS C or better.

Due to the road diet implemented on Central Avenue between Third Street/Taylor Avenue and Encinal Avenue/Sherman Street, it is projected that some traffic would be diverted from Central Avenue to Lincoln Avenue, via Webster Street and Eighth Street. The diversion has little impact on Santa Clara Avenue and Taylor Avenue. Due to diversion, delay for the Lincoln Ave & Webster St and Lincoln Ave & Eighth St intersections increases during both AM and PM peak hours but LOS does not exceed D.

Therefore, even with diversion, there is no significant LOS impact found on key intersections on streets parallel to Central Avenue.

In the existing PM peak hour conditions, it takes approximately eight to nine minutes to travel along the entire Central Avenue. In the future PM peak hour No Build conditions, the corridor travel time is expected to increase slightly in each direction. The project is expected to decrease the corridor travel time by approximately four minutes in each direction.

8.3 Parking Analysis

The parking analysis results show that when comparing Build to No Build conditions, the number of available parking spaces are reduced in both eastbound and westbound directions.

In the eastbound direction, total parking spaces are reduced by approximately one third, from 215 to 147. The major difference is on the blocks from Fourth Street to Webster Street where most of the available parking spaces would be removed due to the geometry changes. From McKay Avenue to Webster Street, all of the available parking spaces would be removed. However, the commercial stores on this block provide off-street parking and all of the parking spaces on the westbound side are preserved in the proposed design. Additional parking spaces are removed on side streets as they approach Central Avenue, due to lane reconfiguration, pedestrian bulb-outs, visibility improvements and/or additional space taken by roundabouts.

In the westbound direction, the total number of available parking spaces reduces by approximately 15 percent from 293 to 249. On a block by block basis, parking spaces remain generally the same along Central Avenue. From Page Street to Webster Street, parking becomes unavailable on the entire block due to the lane reconfiguration and the new consolidated bus stop. Off-street parking is available in this area, providing access to the commercial stores on this block, and visitors can still utilize some remaining parking spaces on the eastbound side. From Fourth Street to Third Street, there are additional parking spaces available on the side of the proposed landscaped island just west of Fourth Street. As in the eastbound direction, additional parking spaces are removed on side streets as they approach Central Avenue, due to lane reconfiguration, pedestrian bulb-outs, visibility improvements and/or additional space taken by roundabouts.

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Section 9

Bibliography of Data Sources

¹ The Central Avenue Safety Improvement Transportation Engineering Performance Assessment (TEPA) and Project Study Report-Project Development Support (PSR-PDS) reports submitted in July 2019 by CDM Smith

² Highway Safety Manual, 1st Edition with Supplement 2014, published by American Association of State Highway and Transportation Officials (AASHTO)

³ Guidelines for Applying Traffic Microsimulation Modeling Software, published by Federal Highway Administration:
https://ops.fhwa.dot.gov/trafficanalysistools/tat_vol3/list_contents.htm, accessed February 26, 2020.

⁴ Appendix S Chapter 5 Scoping Tools – Article 5 - Traffic Engineering Performance Assessment Preparation Guidelines for Project Study Report-Project Development Support (PSR-PDS) Project Initiation Documents, September 30, 2011, published by Caltrans

⁵ Caltrans Traffic Accident Surveillance and Analysis System (TASAS) data, obtained from Caltrans on February 28, 2020

⁶ Alameda Statewide Integrated Traffic Records System (SWITRS) data, obtained from City of Alameda on February 11, 2020

⁷ Crash Modification Factors Clearinghouse: <http://www.cmfclearinghouse.org/>, accessed March 6, 2020

⁸ Research on Safety of Protected Bike Lanes, a memo from Toole Design to City of Alameda for the Alameda Active Transportation Plan project, obtained from City of Alameda on March 11, 2020

⁹ Statewide Integrated Traffic Records System (SWITRS) 2017 Annual Report, published by California Highway Patrol: <https://www.chp.ca.gov/programs-services/services-information/switrs-internet-statewide-integrated-traffic-records-system>, accessed May 11, 2020

¹⁰ Model Minimum Uniform Crash Criteria (MMUCC) Guideline, 5th Edition, published by National Highway Traffic Safety Administration (NHTSA)

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Appendix A

SimTraffic Reports and Synchro Queue Reports

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Appendix B

Volume Throughput Calibration and Synchro Reports

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Appendix C

Crash Data

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Arterial Level of Service: EB Central Ave

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	15	3.5	33.2	0.2	22
3rd St	2	2.8	22.7	0.1	24
	25	0.4	6.6	0.0	22
Ballena Blvd	3	8.6	21.9	0.1	16
5th St	4	8.9	37.7	0.2	19
	5	150.6	188.5	0.3	6
8th St	6	66.2	138.8	0.2	8
	21	2.1	20.3	0.1	22
	24	2.7	49.2	0.3	24
Sherman St	7	25.3	34.7	0.1	7
Total		271.1	553.6	1.7	12

Arterial Level of Service: WB Central Ave

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Sherman St	7	24.6	43.2	0.1	12
	24	1.4	11.7	0.1	20
	21	1.6	48.2	0.3	24
8th St	6	87.1	103.1	0.1	4
Webster St	5	115.7	143.5	0.2	6
5th St	4	10.4	51.1	0.3	21
4th St	3	6.2	32.0	0.2	23
	25	1.3	14.9	0.1	23
3rd St	2	1.0	6.9	0.0	21
	15	0.8	22.1	0.1	24
Pacific Ave	1	25.3	53.9	0.2	13
Total		275.3	530.6	1.9	13

Arterial Level of Service: EB Central Ave

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	15	3.6	33.4	0.2	22
3rd St	2	2.7	22.7	0.1	24
	25	0.4	6.6	0.0	22
Ballena Blvd	3	10.0	23.0	0.1	15
5th St	4	11.5	40.1	0.2	18
	5	136.7	180.6	0.3	6
8th St	6	48.1	171.8	0.2	10
	21	2.1	20.1	0.1	22
	24	2.9	49.6	0.3	24
Sherman St	7	25.3	34.7	0.1	7
Total		243.3	582.5	1.7	13

Arterial Level of Service: WB Central Ave

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Sherman St	7	26.4	45.2	0.1	11
	24	1.5	11.9	0.1	20
	21	94.6	140.5	0.3	8
8th St	6	154.3	170.3	0.1	3
Webster St	5	29.0	58.9	0.2	14
5th St	4	12.6	54.0	0.3	20
4th St	3	7.1	33.3	0.2	22
	25	1.9	15.5	0.1	22
3rd St	2	1.7	7.7	0.0	19
	15	1.1	22.3	0.1	24
Pacific Ave	1	37.9	66.3	0.2	11
Total		368.2	626.0	1.9	11

Arterial Level of Service: EB Central Ave

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
	15	0.8	31.5	0.2	23
3rd St	2	4.1	23.3	0.1	23
	25	0.4	9.1	0.0	16
Ballena Blvd	3	3.1	15.1	0.1	23
5th St	4	9.6	40.8	0.2	18
	5	22.8	62.4	0.3	18
8th St	6	24.3	55.0	0.2	15
	21	2.0	20.1	0.1	22
	24	4.7	51.4	0.3	23
Sherman St	7	9.9	18.6	0.1	13
Total		81.6	327.4	1.7	19

Arterial Level of Service: WB Central Ave

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Sherman St	7	5.5	24.2	0.1	21
	24	1.2	13.0	0.1	18
	21	2.6	49.1	0.3	24
8th St	6	19.7	36.2	0.1	12
Webster St	5	35.8	66.4	0.2	12
5th St	4	13.1	53.4	0.3	20
4th St	3	3.8	27.2	0.2	27
	25	0.4	16.3	0.1	21
	2	2.3	7.2	0.0	20
	15	0.5	24.7	0.1	22
Pacific Ave	1	4.0	31.8	0.2	23
Total		88.9	349.7	1.9	19

Queues

Central Avenue Safety Improvement

1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)

05/17/2020



Lane Group	EBT	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	24	107	255	347	50	117	395
v/c Ratio	0.39	0.69	0.91	0.76	0.11	1.56	0.81
Control Delay	55.1	65.6	58.1	46.0	0.5	339.8	47.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.1	65.6	58.1	46.0	0.5	339.8	47.4
Queue Length 50th (ft)	13	64	80	199	0	~103	223
Queue Length 95th (ft)	21	86	94	254	0	#141	216
Internal Link Dist (ft)	1064	807		980			694
Turn Bay Length (ft)							
Base Capacity (vph)	62	157	283	457	468	75	485
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.68	0.90	0.76	0.11	1.56	0.81

Intersection Summary

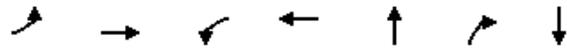
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Queues
3: Ballena Blvd/4th St & Central Ave



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	60	552	55	572	61	91	160
v/c Ratio	0.18	0.29	0.17	0.30	0.13	0.16	0.34
Control Delay	33.9	12.2	33.8	12.1	19.8	4.4	19.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.9	12.2	33.8	12.1	19.8	4.4	19.3
Queue Length 50th (ft)	22	55	20	57	21	0	49
Queue Length 95th (ft)	43	84	53	118	42	18	74
Internal Link Dist (ft)		421		986	394		254
Turn Bay Length (ft)	50		95				
Base Capacity (vph)	430	2369	434	2378	642	723	620
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.23	0.13	0.24	0.10	0.13	0.26
Intersection Summary							

Queues
5: Central Ave & Webster St



Lane Group	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	639	1031	123	227	219
v/c Ratio	1.55dl	1.18	0.45	0.29	0.29
Control Delay	164.5	130.1	39.2	22.6	20.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	164.5	130.1	39.2	22.6	20.5
Queue Length 50th (ft)	~326	~488	63	107	92
Queue Length 95th (ft)	#343	#567	117	153	138
Internal Link Dist (ft)	1522	1100	258		615
Turn Bay Length (ft)					
Base Capacity (vph)	512	873	463	774	752
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.25	1.18	0.27	0.29	0.29

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Queues
6: 8th St & Central Ave



Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	331	435	825	347	349	302
v/c Ratio	0.40	0.62	0.98	0.68	0.65	0.70
Control Delay	26.5	7.4	57.1	32.3	30.7	35.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.5	7.4	57.1	32.3	30.7	35.2
Queue Length 50th (ft)	64	0	186	144	142	122
Queue Length 95th (ft)	122	71	#351	248	244	199
Internal Link Dist (ft)	1100		576		671	623
Turn Bay Length (ft)		90		85		
Base Capacity (vph)	825	701	840	732	768	477
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.62	0.98	0.47	0.45	0.63

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
7: Sherman St & Encinal Ave & Central Ave



Lane Group	EBT	EBR	WBT	NBT	SBT	NWL
Lane Group Flow (vph)	163	306	232	244	148	538
v/c Ratio	0.36	0.18	0.52	0.76	0.57	0.45
Control Delay	24.7	4.7	25.8	43.8	33.5	15.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.7	4.7	25.8	43.8	33.5	15.8
Queue Length 50th (ft)	58	22	79	98	55	72
Queue Length 95th (ft)	109	38	144	129	91	104
Internal Link Dist (ft)	262		649	437	642	600
Turn Bay Length (ft)						
Base Capacity (vph)	451	1686	448	319	258	1186
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.18	0.52	0.76	0.57	0.45
Intersection Summary						

Queues
8: Webster St & Santa Clara Ave



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	176	236	370	460
v/c Ratio	0.39	0.50	0.19	0.25
Control Delay	16.4	13.6	11.4	6.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	16.4	13.6	11.4	6.4
Queue Length 50th (ft)	38	37	103	58
Queue Length 95th (ft)	55	83	m85	78
Internal Link Dist (ft)	665	1098	615	609
Turn Bay Length (ft)				
Base Capacity (vph)	622	631	1991	1832
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.28	0.37	0.19	0.25

Intersection Summary

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

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	265	377	515	284
v/c Ratio	0.37	0.50	0.65	0.40
Control Delay	14.5	15.7	19.6	15.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.5	15.7	19.6	15.1
Queue Length 50th (ft)	70	101	161	76
Queue Length 95th (ft)	93	117	260	126
Internal Link Dist (ft)	1098	580	623	604
Turn Bay Length (ft)				
Base Capacity (vph)	724	749	797	705
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.37	0.50	0.65	0.40
Intersection Summary				

Queues
11: Webster St & Lincoln Ave



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	221	463	25	555	463	479
v/c Ratio	0.93	0.38	0.09	0.44	0.29	0.29
Control Delay	63.2	12.5	11.3	14.9	9.9	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.2	12.5	11.3	14.9	9.9	9.0
Queue Length 50th (ft)	69	50	5	70	104	45
Queue Length 95th (ft)	#132	61	15	86	145	72
Internal Link Dist (ft)		662		1088	609	304
Turn Bay Length (ft)	165		140			
Base Capacity (vph)	293	1503	355	1539	1577	1637
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.31	0.07	0.36	0.29	0.29

Intersection Summary

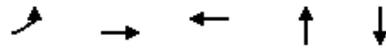
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
12: 8th St/Constitution Way & Lincoln Ave



Lane Group	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	378	781	598	254	256
v/c Ratio	0.37	0.71	0.68	0.36	0.66
Control Delay	20.6	22.5	28.2	25.9	35.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	20.6	22.5	28.2	25.9	35.2
Queue Length 50th (ft)	55	109	103	39	83
Queue Length 95th (ft)	108	206	246	90	192
Internal Link Dist (ft)	1088	590	604		503
Turn Bay Length (ft)				200	
Base Capacity (vph)	1026	1101	1403	1665	896
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.37	0.71	0.43	0.15	0.29
Intersection Summary					

Queues
13: Sherman St & Lincoln Ave



Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	24	531	783	452	228
v/c Ratio	0.08	0.29	0.45	0.84	0.51
Control Delay	7.3	7.3	8.6	34.8	19.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	7.3	8.6	34.8	19.1
Queue Length 50th (ft)	3	42	69	131	55
Queue Length 95th (ft)	12	60	75	#250	86
Internal Link Dist (ft)		466	474	587	490
Turn Bay Length (ft)	60				
Base Capacity (vph)	306	1861	1755	536	449
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.08	0.29	0.45	0.84	0.51

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues

Central Avenue Safety Improvement

1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)

05/17/2020



Lane Group	EBT	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	72	18	102	239	30	152	390
v/c Ratio	1.01	0.11	0.37	0.51	0.03	1.95	0.67
Control Delay	154.9	41.2	8.8	36.0	0.0	498.9	37.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	154.9	41.2	8.8	36.0	0.0	498.9	37.3
Queue Length 50th (ft)	~45	10	0	127	0	~151	217
Queue Length 95th (ft)	#122	28	18	158	0	#232	268
Internal Link Dist (ft)	1064	807		980			694
Turn Bay Length (ft)							
Base Capacity (vph)	71	186	291	465	960	78	581
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.01	0.10	0.35	0.51	0.03	1.95	0.67

Intersection Summary

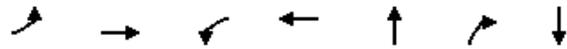
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Queues
3: Ballena Blvd/4th St & Central Ave



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	1	464	105	319	35	102	48
v/c Ratio	0.00	0.23	0.22	0.13	0.07	0.17	0.09
Control Delay	32.0	8.8	28.2	6.0	19.2	5.9	17.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.0	8.8	28.2	6.0	19.2	5.9	17.9
Queue Length 50th (ft)	0	33	17	11	6	0	7
Queue Length 95th (ft)	5	101	#110	66	31	30	31
Internal Link Dist (ft)		421		986	394		254
Turn Bay Length (ft)	50		95				
Base Capacity (vph)	598	2701	605	2901	776	883	820
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.17	0.17	0.11	0.05	0.12	0.06

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
5: Central Ave & Webster St



Lane Group	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	649	693	119	363	355
v/c Ratio	1.42	1.04	0.44	0.43	0.44
Control Delay	236.7	85.7	41.0	26.8	25.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	236.7	85.7	41.0	26.8	25.9
Queue Length 50th (ft)	~358	~283	64	268	253
Queue Length 95th (ft)	#428	#407	95	351	338
Internal Link Dist (ft)	1522	1100	258		615
Turn Bay Length (ft)					
Base Capacity (vph)	457	668	478	843	813
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.42	1.04	0.25	0.43	0.44

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Queues
6: 8th St & Central Ave



Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	563	890	529	325	322	395
v/c Ratio	0.67	1.01	0.67	0.66	0.63	0.80
Control Delay	31.7	43.1	30.6	33.0	31.1	39.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.7	43.1	30.6	33.0	31.1	39.9
Queue Length 50th (ft)	131	~136	116	146	142	171
Queue Length 95th (ft)	174	#270	191	215	208	#346
Internal Link Dist (ft)	1100		576		671	623
Turn Bay Length (ft)		100		85		
Base Capacity (vph)	840	879	786	721	755	524
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.67	1.01	0.67	0.45	0.43	0.75

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Queues
7: Sherman St & Encinal Ave & Central Ave

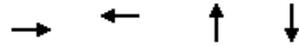


Lane Group	EBT	EBR	WBT	NBT	SBT	NWL
Lane Group Flow (vph)	147	414	260	72	255	389
v/c Ratio	0.33	0.24	0.58	0.22	0.83	0.34
Control Delay	24.3	5.1	28.5	23.6	51.1	18.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.3	5.1	28.5	23.6	51.1	18.2
Queue Length 50th (ft)	52	33	95	24	104	63
Queue Length 95th (ft)	99	52	154	53	#227	96
Internal Link Dist (ft)	262		649	437	642	600
Turn Bay Length (ft)						
Base Capacity (vph)	446	1715	451	323	307	1137
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.24	0.58	0.22	0.83	0.34

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
8: Webster St & Santa Clara Ave



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	111	174	334	688
v/c Ratio	0.26	0.39	0.17	0.37
Control Delay	14.1	12.2	9.7	5.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	14.1	12.2	9.7	5.1
Queue Length 50th (ft)	22	26	115	88
Queue Length 95th (ft)	43	62	m107	44
Internal Link Dist (ft)	665	1098	615	609
Turn Bay Length (ft)				
Base Capacity (vph)	603	619	1964	1854
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.18	0.28	0.17	0.37

Intersection Summary

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

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	205	216	413	538
v/c Ratio	0.27	0.28	0.50	0.69
Control Delay	16.1	13.8	19.5	25.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	16.1	13.8	19.5	25.2
Queue Length 50th (ft)	68	60	156	232
Queue Length 95th (ft)	115	108	223	314
Internal Link Dist (ft)	1098	580	623	604
Turn Bay Length (ft)				
Base Capacity (vph)	770	776	834	775
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.27	0.28	0.50	0.69
Intersection Summary				

Queues
11: Webster St & Lincoln Ave



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	93	351	47	251	361	785
v/c Ratio	0.32	0.37	0.19	0.27	0.18	0.41
Control Delay	17.8	15.6	15.3	14.0	14.8	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.8	15.6	15.3	14.0	14.8	8.8
Queue Length 50th (ft)	31	54	15	37	111	44
Queue Length 95th (ft)	46	58	26	41	168	150
Internal Link Dist (ft)		662		1088	609	304
Turn Bay Length (ft)	165		140			
Base Capacity (vph)	480	1530	410	1546	1996	1910
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.23	0.11	0.16	0.18	0.41
Intersection Summary						

Queues
12: 8th St/Constitution Way & Lincoln Ave

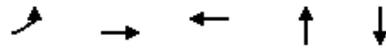


Lane Group	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	334	384	494	827	515
v/c Ratio	0.51	0.51	0.60	0.66	0.76
Control Delay	29.1	16.2	28.9	24.7	32.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	29.1	16.2	28.9	24.7	32.0
Queue Length 50th (ft)	63	36	91	122	156
Queue Length 95th (ft)	125	88	193	345	#547
Internal Link Dist (ft)	1088	590	604		503
Turn Bay Length (ft)				200	
Base Capacity (vph)	1145	1177	1651	1714	926
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.29	0.33	0.30	0.48	0.56

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
13: Sherman St & Lincoln Ave



Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	25	816	435	208	545
v/c Ratio	0.05	0.44	0.25	0.39	1.13
Control Delay	6.8	8.4	7.2	16.3	104.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.8	8.4	7.2	16.3	104.0
Queue Length 50th (ft)	4	71	34	48	~210
Queue Length 95th (ft)	12	105	50	85	#350
Internal Link Dist (ft)		466	474	587	490
Turn Bay Length (ft)	60				
Base Capacity (vph)	490	1854	1721	532	483
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.05	0.44	0.25	0.39	1.13

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Queues

Central Avenue Safety Improvement

1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)

05/19/2020



Lane Group	EBT	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	58	116	255	454	53	117	705
v/c Ratio	1.00	0.82	0.95	0.98	0.11	1.58	1.59
Control Delay	162.4	83.2	67.6	74.9	0.5	345.5	304.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	162.4	83.2	67.6	74.9	0.5	345.5	304.4
Queue Length 50th (ft)	36	71	81	279	0	~103	~621
Queue Length 95th (ft)	#49	#99	#100	#383	0	#140	#523
Internal Link Dist (ft)	1064	807		980			694
Turn Bay Length (ft)							
Base Capacity (vph)	58	142	268	463	472	74	443
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.82	0.95	0.98	0.11	1.58	1.59

Intersection Summary

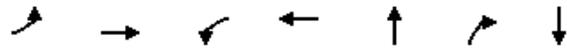
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Queues
3: Ballena Blvd/4th St & Central Ave



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	60	752	64	829	61	104	161
v/c Ratio	0.20	0.38	0.21	0.42	0.13	0.19	0.35
Control Delay	34.3	12.7	35.2	13.3	19.4	5.3	19.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.3	12.7	35.2	13.3	19.4	5.3	19.3
Queue Length 50th (ft)	22	83	24	95	21	0	49
Queue Length 95th (ft)	43	113	60	177	42	23	73
Internal Link Dist (ft)		421		986	394		254
Turn Bay Length (ft)	50		95				
Base Capacity (vph)	367	2376	336	2377	662	744	639
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.32	0.19	0.35	0.09	0.14	0.25
Intersection Summary							

Queues
5: Central Ave & Webster St



Lane Group	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	826	1272	141	236	229
v/c Ratio	1.20dl	0.83	0.56	0.53	0.52
Control Delay	45.5	30.8	44.4	34.6	30.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	45.5	30.8	44.4	34.6	30.8
Queue Length 50th (ft)	291	400	73	126	107
Queue Length 95th (ft)	283	436	136	#184	161
Internal Link Dist (ft)	1522	1100	258		615
Turn Bay Length (ft)					
Base Capacity (vph)	954	1624	315	446	437
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.87	0.78	0.45	0.53	0.52

Intersection Summary

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

Queue shown is maximum after two cycles.

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Queues
6: 8th St & Central Ave



Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	404	532	959	447	349	377
v/c Ratio	0.39	0.64	0.93	0.95	0.70	0.91
Control Delay	25.0	6.4	44.8	63.7	38.5	59.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.0	6.4	44.8	63.7	38.5	59.5
Queue Length 50th (ft)	88	0	253	248	177	208
Queue Length 95th (ft)	138	67	#367	#443	286	#308
Internal Link Dist (ft)	1100		576		671	623
Turn Bay Length (ft)		90		85		
Base Capacity (vph)	1138	857	1126	487	511	422
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.62	0.85	0.92	0.68	0.89

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
7: Sherman St & Encinal Ave & Central Ave

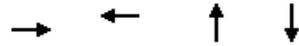


Lane Group	EBT	EBR	WBT	NBT	SBT	NWL
Lane Group Flow (vph)	183	345	254	288	224	594
v/c Ratio	0.46	0.24	0.64	0.64	0.67	0.60
Control Delay	28.3	7.7	31.8	27.8	32.8	20.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	7.7	31.8	27.8	32.8	20.9
Queue Length 50th (ft)	69	35	94	102	82	93
Queue Length 95th (ft)	126	58	#167	130	126	130
Internal Link Dist (ft)	262		649	437	642	600
Turn Bay Length (ft)						
Base Capacity (vph)	398	1453	397	451	334	990
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.24	0.64	0.64	0.67	0.60

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
8: Webster St & Santa Clara Ave



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	181	236	380	472
v/c Ratio	0.44	0.53	0.19	0.25
Control Delay	18.7	15.7	4.8	7.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	18.7	15.7	4.8	7.9
Queue Length 50th (ft)	42	41	40	73
Queue Length 95th (ft)	61	90	m71	89
Internal Link Dist (ft)	665	1098	615	609
Turn Bay Length (ft)				
Base Capacity (vph)	559	577	2054	1889
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.32	0.41	0.19	0.25

Intersection Summary

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

Queues
9: 8th St & Santa Clara Ave

Central Avenue Safety Improvement

05/19/2020

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	265	377	515	341
v/c Ratio	0.38	0.53	0.62	0.46
Control Delay	15.7	17.2	17.9	15.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.7	17.2	17.9	15.1
Queue Length 50th (ft)	73	105	154	92
Queue Length 95th (ft)	98	123	249	147
Internal Link Dist (ft)	1098	580	623	604
Turn Bay Length (ft)				
Base Capacity (vph)	690	713	833	746
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.38	0.53	0.62	0.46
Intersection Summary				

Queues
11: Webster St & Lincoln Ave



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	229	518	32	818	488	713
v/c Ratio	0.99	0.32	0.08	0.49	0.42	0.78
Control Delay	77.8	9.0	8.6	10.1	12.3	24.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.8	9.0	8.6	10.1	12.3	24.0
Queue Length 50th (ft)	71	47	6	77	86	115
Queue Length 95th (ft)	#157	60	16	99	127	#185
Internal Link Dist (ft)		662		1088	609	304
Turn Bay Length (ft)	165		140			
Base Capacity (vph)	247	1730	406	1762	1174	916
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.30	0.08	0.46	0.42	0.78

Intersection Summary

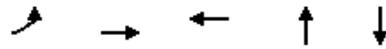
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
12: 8th St/Constitution Way & Lincoln Ave



Lane Group	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	651	967	677	254	257
v/c Ratio	0.72	0.85	0.73	0.37	0.70
Control Delay	27.5	31.4	32.3	30.1	41.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	27.5	31.4	32.3	30.1	41.3
Queue Length 50th (ft)	146	226	159	61	129
Queue Length 95th (ft)	194	297	283	90	193
Internal Link Dist (ft)	1088	590	604		503
Turn Bay Length (ft)				200	
Base Capacity (vph)	1111	1376	1182	1088	586
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.59	0.70	0.57	0.23	0.44
Intersection Summary					

Queues
13: Sherman St & Lincoln Ave



Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	42	626	864	456	331
v/c Ratio	0.25	0.44	0.64	0.64	0.47
Control Delay	15.3	12.3	15.1	16.7	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	12.3	15.1	16.7	12.8
Queue Length 50th (ft)	9	68	106	106	65
Queue Length 95th (ft)	26	96	114	173	94
Internal Link Dist (ft)		466	474	587	490
Turn Bay Length (ft)	60				
Base Capacity (vph)	171	1439	1356	717	702
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.25	0.44	0.64	0.64	0.47
Intersection Summary					

Queues

Central Avenue Safety Improvement

1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)

05/19/2020



Lane Group	EBT	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	193	25	102	455	30	152	631
v/c Ratio	2.57	0.15	0.37	0.97	0.03	1.95	1.26
Control Delay	765.3	42.0	8.8	71.2	0.0	497.3	165.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	765.3	42.0	8.8	71.2	0.0	497.3	165.8
Queue Length 50th (ft)	~201	14	0	278	0	~152	~529
Queue Length 95th (ft)	#308	34	18	#326	0	#233	#605
Internal Link Dist (ft)	1064	807		980			694
Turn Bay Length (ft)							
Base Capacity (vph)	75	169	276	471	952	78	500
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	2.57	0.15	0.37	0.97	0.03	1.95	1.26

Intersection Summary

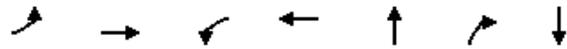
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Queues
3: Ballena Blvd/4th St & Central Ave



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	1	792	146	555	37	108	49
v/c Ratio	0.00	0.43	0.41	0.23	0.10	0.22	0.12
Control Delay	32.0	12.2	33.0	6.7	20.8	6.3	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.0	12.2	33.0	6.7	20.8	6.3	19.6
Queue Length 50th (ft)	0	75	31	21	8	0	10
Queue Length 95th (ft)	5	194	#158	117	33	31	32
Internal Link Dist (ft)		421		986	394		254
Turn Bay Length (ft)	50		95				
Base Capacity (vph)	310	2446	450	2718	553	663	586
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.32	0.32	0.20	0.07	0.16	0.08

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
5: Central Ave & Webster St



Lane Group	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	1005	1010	131	369	357
v/c Ratio	0.97	0.83	0.54	0.73	0.73
Control Delay	52.9	34.5	46.4	41.4	39.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	52.9	34.5	46.4	41.4	39.9
Queue Length 50th (ft)	383	335	74	209	191
Queue Length 95th (ft)	#442	430	106	#451	#427
Internal Link Dist (ft)	1522	1100	258		615
Turn Bay Length (ft)					
Base Capacity (vph)	1058	1235	308	505	490
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.95	0.82	0.43	0.73	0.73

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
6: 8th St & Central Ave



Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	724	1094	687	506	322	395
v/c Ratio	0.67	1.22	0.68	1.09	0.66	0.91
Control Delay	30.4	125.8	30.0	102.7	37.8	60.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.4	125.8	30.0	102.7	37.8	60.3
Queue Length 50th (ft)	190	~534	175	~348	170	220
Queue Length 95th (ft)	222	#583	253	#479	243	#407
Internal Link Dist (ft)	1100		576		671	623
Turn Bay Length (ft)		100		85		
Base Capacity (vph)	1088	894	1011	464	486	434
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.67	1.22	0.68	1.09	0.66	0.91

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Queues
7: Sherman St & Encinal Ave & Central Ave



Lane Group	EBT	EBR	WBT	NBT	SBT	NWL
Lane Group Flow (vph)	177	500	329	87	264	543
v/c Ratio	0.40	0.31	0.73	0.22	0.70	0.62
Control Delay	25.3	7.1	34.9	21.0	35.0	25.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.3	7.1	34.9	21.0	35.0	25.0
Queue Length 50th (ft)	64	50	127	28	101	103
Queue Length 95th (ft)	117	76	#204	58	#203	152
Internal Link Dist (ft)	262		649	437	642	600
Turn Bay Length (ft)						
Base Capacity (vph)	446	1589	452	393	376	877
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.31	0.73	0.22	0.70	0.62

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
8: Webster St & Santa Clara Ave

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	111	174	334	693
v/c Ratio	0.28	0.42	0.16	0.36
Control Delay	15.6	13.9	4.9	6.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	15.6	13.9	4.9	6.2
Queue Length 50th (ft)	24	29	34	95
Queue Length 95th (ft)	46	67	m58	82
Internal Link Dist (ft)	665	1098	615	609
Turn Bay Length (ft)				
Base Capacity (vph)	548	566	2028	1914
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.20	0.31	0.16	0.36

Intersection Summary

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

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	205	217	413	538
v/c Ratio	0.36	0.38	0.39	0.55
Control Delay	24.4	21.6	11.8	14.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	24.4	21.6	11.8	14.7
Queue Length 50th (ft)	85	78	117	175
Queue Length 95th (ft)	144	139	168	237
Internal Link Dist (ft)	1098	580	623	604
Turn Bay Length (ft)				
Base Capacity (vph)	569	578	1052	974
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.36	0.38	0.39	0.55
Intersection Summary				

Queues
11: Webster St & Lincoln Ave



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	93	427	69	603	381	1013
v/c Ratio	0.69	0.46	0.33	0.55	0.19	0.65
Control Delay	43.6	17.7	19.6	10.1	4.5	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.6	17.7	19.6	10.1	4.5	12.4
Queue Length 50th (ft)	31	65	21	47	2	95
Queue Length 95th (ft)	67	81	40	65	89	#242
Internal Link Dist (ft)		662		1088	609	304
Turn Bay Length (ft)	165		140			
Base Capacity (vph)	197	1357	308	1448	1976	1548
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.31	0.22	0.42	0.19	0.65

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
12: 8th St/Constitution Way & Lincoln Ave

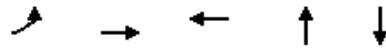


Lane Group	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	686	624	582	827	526
v/c Ratio	0.79	0.66	0.76	0.72	0.85
Control Delay	35.3	27.9	39.4	31.0	43.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	35.3	27.9	39.4	31.0	43.1
Queue Length 50th (ft)	181	143	161	199	259
Queue Length 95th (ft)	271	220	228	345	#567
Internal Link Dist (ft)	1088	590	604		503
Turn Bay Length (ft)				200	
Base Capacity (vph)	1052	1145	1073	1345	724
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.65	0.54	0.54	0.61	0.73

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
13: Sherman St & Lincoln Ave

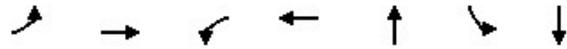


Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	53	957	792	243	569
v/c Ratio	0.35	0.77	0.69	0.29	0.76
Control Delay	21.1	20.6	18.6	8.9	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	21.1	20.6	18.6	8.9	19.6
Queue Length 50th (ft)	12	134	108	40	132
Queue Length 95th (ft)	40	197	144	68	#236
Internal Link Dist (ft)		466	474	587	490
Turn Bay Length (ft)	60				
Base Capacity (vph)	151	1240	1153	837	750
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.35	0.77	0.69	0.29	0.76

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
5: Central Ave & Webster St



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	103	543	21	1094	142	372	115
v/c Ratio	1.32	0.61	0.08	1.23	0.53	0.87	0.35
Control Delay	238.7	22.5	5.4	119.2	39.5	49.8	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	238.7	22.5	5.4	119.2	39.5	49.8	14.1
Queue Length 50th (ft)	~83	248	4	~805	69	152	15
Queue Length 95th (ft)	#149	285	m4	m#324	122	#254	57
Internal Link Dist (ft)		1522		1100	258		615
Turn Bay Length (ft)	140		80				
Base Capacity (vph)	78	884	260	893	346	430	404
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.32	0.61	0.08	1.23	0.41	0.87	0.28

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

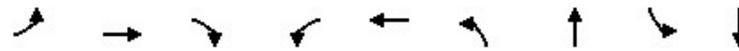
Queue shown is maximum after two cycles.

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

Queues
6: 8th St & Central Ave

Central Avenue Safety Improvement

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Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	6	336	435	19	876	363	371	65	425
v/c Ratio	0.08	0.46	0.81	0.17	1.09	1.20	0.52	0.62	1.07
Control Delay	35.0	21.8	35.2	42.8	86.3	153.1	26.2	59.9	100.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.0	21.8	35.2	42.8	86.3	153.1	26.2	59.9	100.0
Queue Length 50th (ft)	3	133	228	10	~564	~253	144	34	~268
Queue Length 95th (ft)	m5	m217	m281	31	#710	#423	270	#78	#366
Internal Link Dist (ft)		1100			576		671		623
Turn Bay Length (ft)	50		400	100		85		60	
Base Capacity (vph)	79	729	551	115	800	302	753	105	398
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.46	0.79	0.17	1.09	1.20	0.49	0.62	1.07

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Queues
8: Webster St & Santa Clara Ave



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	186	236	430	485
v/c Ratio	0.45	0.53	0.21	0.26
Control Delay	18.9	15.6	6.6	2.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	18.9	15.6	6.6	2.1
Queue Length 50th (ft)	44	41	39	10
Queue Length 95th (ft)	63	90	61	m10
Internal Link Dist (ft)	665	1098	615	609
Turn Bay Length (ft)				
Base Capacity (vph)	560	577	2053	1877
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.33	0.41	0.21	0.26

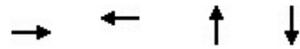
Intersection Summary

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

Queues
9: 8th St & Santa Clara Ave

Central Avenue Safety Improvement

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Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	273	377	519	450
v/c Ratio	0.41	0.55	0.61	0.57
Control Delay	16.6	18.2	17.0	16.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	16.6	18.2	17.0	16.5
Queue Length 50th (ft)	77	109	151	128
Queue Length 95th (ft)	103	127	244	198
Internal Link Dist (ft)	1098	580	623	604
Turn Bay Length (ft)				
Base Capacity (vph)	667	689	855	790
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.41	0.55	0.61	0.57
Intersection Summary				

Queues
11: Webster St & Lincoln Ave



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	247	526	32	978	533	946
v/c Ratio	1.44	0.33	0.09	0.59	0.49	1.50dl
Control Delay	248.3	9.7	9.7	11.0	15.7	89.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	248.3	9.7	9.7	11.0	15.7	89.9
Queue Length 50th (ft)	~125	52	6	100	76	~212
Queue Length 95th (ft)	#201	66	17	125	130	#287
Internal Link Dist (ft)		662		1088	609	304
Turn Bay Length (ft)	165		140			
Base Capacity (vph)	172	1616	373	1661	1095	846
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.44	0.33	0.09	0.59	0.49	1.12

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Queues
12: 8th St/Constitution Way & Lincoln Ave

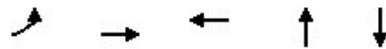


Lane Group	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	800	1006	779	254	257
v/c Ratio	0.81	0.85	0.83	0.38	0.72
Control Delay	29.3	31.7	38.2	31.0	43.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	31.7	38.2	31.0	43.4
Queue Length 50th (ft)	167	227	190	58	122
Queue Length 95th (ft)	231	317	#365	90	193
Internal Link Dist (ft)	1088	590	604		503
Turn Bay Length (ft)				200	
Base Capacity (vph)	1048	1253	1060	996	537
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.76	0.80	0.73	0.26	0.48

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
13: Sherman St & Lincoln Ave



Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	43	632	881	454	327
v/c Ratio	0.26	0.44	0.65	0.63	0.47
Control Delay	15.9	12.4	15.3	16.6	12.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	12.4	15.3	16.6	12.7
Queue Length 50th (ft)	9	70	110	105	64
Queue Length 95th (ft)	27	97	117	172	93
Internal Link Dist (ft)		466	474	587	490
Turn Bay Length (ft)	60				
Base Capacity (vph)	165	1439	1356	717	702
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.26	0.44	0.65	0.63	0.47
Intersection Summary					

Queues
3: Ballena Blvd/4th St & Central Ave

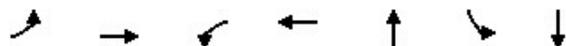


Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	1	396	68	126	319	144	72
v/c Ratio	0.01	0.54	0.11	0.48	0.45	0.43	0.20
Control Delay	28.0	17.4	13.1	33.3	15.8	22.3	17.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.0	17.4	13.1	33.3	15.8	22.3	17.9
Queue Length 50th (ft)	0	85	12	31	64	35	16
Queue Length 95th (ft)	5	212	43	#125	158	93	42
Internal Link Dist (ft)		421			986	394	254
Turn Bay Length (ft)	80		80	100			
Base Capacity (vph)	279	1610	625	272	1547	770	834
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.25	0.11	0.46	0.21	0.19	0.09

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
5: Central Ave & Webster St



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	76	576	40	746	142	728	123
v/c Ratio	0.96	0.87	0.44	1.10	0.48	1.13	0.36
Control Delay	128.5	43.1	20.4	75.1	37.2	106.5	13.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	128.5	43.1	20.4	75.1	37.2	106.5	13.4
Queue Length 50th (ft)	~45	311	13	~494	69	~446	14
Queue Length 95th (ft)	#122	#447	m16	m#323	100	#719	60
Internal Link Dist (ft)		1522		1100	258		615
Turn Bay Length (ft)	140		80				
Base Capacity (vph)	79	663	90	679	353	642	392
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.87	0.44	1.10	0.40	1.13	0.31

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

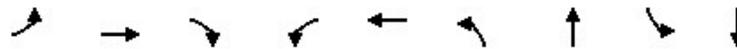
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Queues
6: 8th St & Central Ave



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	18	641	890	29	586	325	578	50	470
v/c Ratio	0.24	1.00	1.59	0.32	0.83	1.08	0.67	0.61	0.92
Control Delay	38.6	55.3	295.6	50.5	34.4	111.3	26.1	66.3	59.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.6	55.3	295.6	50.5	34.4	111.3	26.1	66.3	59.5
Queue Length 50th (ft)	9	350	~754	16	301	~207	214	24	247
Queue Length 95th (ft)	m12	m#356	m#707	44	385	#340	#443	#95	#515
Internal Link Dist (ft)		1100			576		671		623
Turn Bay Length (ft)	50		400	100		85		60	
Base Capacity (vph)	75	644	559	91	808	302	864	82	511
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	1.00	1.59	0.32	0.73	1.08	0.67	0.61	0.92

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Queues
8: Webster St & Santa Clara Ave



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	116	179	346	751
v/c Ratio	0.31	0.45	0.17	0.39
Control Delay	16.5	15.5	5.8	2.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	16.5	15.5	5.8	2.3
Queue Length 50th (ft)	26	33	28	18
Queue Length 95th (ft)	49	73	44	m23
Internal Link Dist (ft)	665	1098	615	609
Turn Bay Length (ft)				
Base Capacity (vph)	523	538	2022	1941
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.22	0.33	0.17	0.39

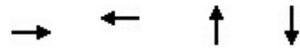
Intersection Summary

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

Queues
9: 8th St & Santa Clara Ave

Central Avenue Safety Improvement

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Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	213	222	608	563
v/c Ratio	0.39	0.40	0.57	0.58
Control Delay	25.5	22.7	14.2	14.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	25.5	22.7	14.2	14.8
Queue Length 50th (ft)	90	82	196	184
Queue Length 95th (ft)	152	145	270	249
Internal Link Dist (ft)	1098	580	623	604
Turn Bay Length (ft)				
Base Capacity (vph)	548	560	1074	970
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.39	0.40	0.57	0.58
Intersection Summary				

Queues
11: Webster St & Lincoln Ave



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	93	423	64	908	391	1360
v/c Ratio	0.75	0.37	0.23	0.71	0.22	1.03
Control Delay	54.4	14.6	15.3	13.0	8.0	50.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.4	14.6	15.3	13.0	8.0	50.3
Queue Length 50th (ft)	26	50	15	74	43	~311
Queue Length 95th (ft)	#93	80	37	120	70	#433
Internal Link Dist (ft)		662		1088	609	304
Turn Bay Length (ft)	165		140			
Base Capacity (vph)	147	1357	331	1456	1765	1326
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.31	0.19	0.62	0.22	1.03

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Queues
12: 8th St/Constitution Way & Lincoln Ave

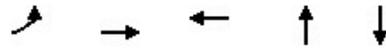


Lane Group	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	871	653	767	827	530
v/c Ratio	0.91	0.68	0.90	0.81	0.96
Control Delay	44.4	29.4	49.2	39.1	64.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	44.4	29.4	49.2	39.1	64.1
Queue Length 50th (ft)	253	165	233	238	313
Queue Length 95th (ft)	344	231	302	#373	#588
Internal Link Dist (ft)	1088	590	604		503
Turn Bay Length (ft)				200	
Base Capacity (vph)	994	1010	922	1051	567
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.88	0.65	0.83	0.79	0.93

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
13: Sherman St & Lincoln Ave



Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	55	978	816	254	579
v/c Ratio	0.35	0.76	0.68	0.31	0.80
Control Delay	20.6	19.3	17.8	9.6	22.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	20.6	19.3	17.8	9.6	22.7
Queue Length 50th (ft)	12	135	110	44	141
Queue Length 95th (ft)	41	197	145	74	#286
Internal Link Dist (ft)		466	474	587	490
Turn Bay Length (ft)	60				
Base Capacity (vph)	155	1292	1203	808	725
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.35	0.76	0.68	0.31	0.80

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side) Performance by movement

Movement	EBL2	EBT	WBL	WBT	WBR	WBR2	NBL	NBT	NBR2	SBL2	SBL	SBT
Vehicles Entered	41	14	4	9	75	6	2	169	20	1	109	297

1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side) Performance by movement

Movement	SBR	All
Vehicles Entered	20	767

2: 3rd St & Central Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vehicles Entered	9	314	16	22	178	44	9	16	22	71	17	11

2: 3rd St & Central Ave Performance by movement

Movement	All
Vehicles Entered	729

3: Ballena Blvd/4th St & Central Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vehicles Entered	1	349	59	76	298	21	19	12	95	17	15	4

3: Ballena Blvd/4th St & Central Ave Performance by movement

Movement	All
Vehicles Entered	966

4: Central Ave & 5th St Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Vehicles Entered	42	417	418	55	42	43	1017

5: Central Ave & Webster St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vehicles Entered	56	473	4	14	416	203	19	38	32	557	26	85

5: Central Ave & Webster St Performance by movement

Movement	All
Vehicles Entered	1923

6: 8th St & Central Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vehicles Entered	15	401	647	28	439	95	273	266	14	44	358	10

6: 8th St & Central Ave Performance by movement

Movement	All
Vehicles Entered	2590

7: Sherman St & Encinal Ave & Central Ave Performance by movement

Movement	EBL	EBT	EBR	EBR2	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	SBL
Vehicles Entered	8	123	349	14	207	22	28	22	4	5	26	125

7: Sherman St & Encinal Ave & Central Ave Performance by movement

Movement	SBT	SBR	NWL2	NWL	NWR	All
Vehicles Entered	142	9	2	317	38	1441

8: Webster St & Santa Clara Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vehicles Entered	17	56	12	30	62	58	7	257	25	71	562	40

8: Webster St & Santa Clara Ave Performance by movement

Movement	All
Vehicles Entered	1197

9: 8th St & Santa Clara Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vehicles Entered	24	157	9	9	129	67	6	341	27	52	421	15

9: 8th St & Santa Clara Ave Performance by movement

Movement	All
Vehicles Entered	1257

10: Sherman St & Santa Clara Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vehicles Entered	12	263	34	6	204	34	15	115	4	89	278	26

10: Sherman St & Santa Clara Ave Performance by movement

Movement	All
Vehicles Entered	1080

11: Webster St & Lincoln Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vehicles Entered	85	285	50	38	193	33	6	287	34	44	582	91

11: Webster St & Lincoln Ave Performance by movement

Movement	All
Vehicles Entered	1728

12: 8th St/Constitution Way & Lincoln Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vehicles Entered	3	342	20	15	172	182	30	370	29	727	456	15

12: 8th St/Constitution Way & Lincoln Ave Performance by movement

Movement	All
Vehicles Entered	2361

13: Sherman St & Lincoln Ave Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vehicles Entered	21	676	112	10	325	24	22	132	16	169	272	27

13: Sherman St & Lincoln Ave Performance by movement

Movement	All
Vehicles Entered	1806

Total Network Performance

Vehicles Entered	7904
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Int #	Intersection	Movement	Peak Hour Volume		Calibration Results	
			Input	SimTraffic	% Volume Difference	GEH Value
				Avg		
1	Central Ave at Main St/Pacific Ave	EBL2	44	41	-7%	0.5
		EBL	0	0	0%	0.0
		EBT	16	14	-13%	0.5
		EBR	0	0	0%	0.0
		WBL	5	4	-20%	0.5
		WBT	9	9	0%	0.0
		WBR	73	75	3%	0.2
		WBR2	6	6	0%	0.0
		NBL	2	2	0%	0.0
		NBT	172	169	-2%	0.2
		NBR	0	0	0%	0.0
		NBR2	22	20	-9%	0.4
		SBL2	2	1	-50%	0.8
		SBL	116	109	-6%	0.7
		SBT	286	297	4%	0.6
SBR	18	20	11%	0.5		
	Total	771	767	-1%	0.1	
2	Central Ave at Third St/Taylor Ave	EBL	8	9	13%	0.3
		EBT	311	314	1%	0.2
		EBR	12	16	33%	1.1
		WBL	24	22	-8%	0.4
		WBT	172	178	3%	0.5
		WBR	49	44	-10%	0.7
		NBL	8	9	13%	0.3
		NBT	16	16	0%	0.0
		NBR	23	22	-4%	0.2
		SBL	74	71	-4%	0.4
		SBT	15	17	13%	0.5
		SBR	9	11	22%	0.6
			Total	721	729	1%
3	Central Ave at Fourth St	EBL	1	1	0%	0.0
		EBT	333	349	5%	0.9
		EBR	57	59	4%	0.3
		WBL	85	76	-11%	1.0
		WBT	237	298	26%	3.7
		WBR	21	21	0%	0.0
		NBL	19	19	0%	0.0
		NBT	11	12	9%	0.3
		NBR	90	95	6%	0.5
		SBL	17	17	0%	0.0
		SBT	16	15	-6%	0.3
		SBR	3	4	33%	0.5
	Total	890	966	9%	2.5	

Int #	Intersection	Movement	Peak Hour Volume		Calibration Results	
			Input	SimTraffic	% Volume Difference	GEH Value
				Avg		
4	Central Ave at Fifth St	EBL	43	42	-2%	0.2
		EBT	414	417	1%	0.1
		WBT	373	418	12%	2.3
		WBR	60	55	-8%	0.7
		SBL	46	42	-9%	0.6
		SBR	42	43	2%	0.2
		Total	978	1,017	4%	1.2
5	Central Ave at Webster St	EBL	61	56	-8%	0.7
		EBT	474	473	0%	0.0
		EBR	4	4	0%	0.0
		WBL	17	14	-18%	0.8
		WBT	401	416	4%	0.7
		WBR	205	203	-1%	0.1
		NBL	18	19	6%	0.2
		NBT	39	38	-3%	0.2
		NBR	31	32	3%	0.2
		SBL	559	557	0%	0.1
		SBT	30	26	-13%	0.8
		SBR	86	85	-1%	0.1
		Total	1,925	1,923	0%	0.0
		6	Central Ave at Eighth St	EBL	14	15
EBT	425			401	-6%	1.2
EBR	694			647	-7%	1.8
WBL	26			28	8%	0.4
WBT	363			439	21%	3.8
WBR	92			95	3%	0.3
NBL	276			273	-1%	0.2
NBT	260			266	2%	0.4
NBR	14			14	0%	0.0
SBL	48			44	-8%	0.6
SBT	322			358	11%	2.0
SBR	10			10	0%	0.0
Total	2,544			2,590	2%	0.9
7	Central Ave at Encinal Ave/Sherman St	EBL	7	8	14%	0.4
		EBT	132	123	-7%	0.8
		EBR	376	349	-7%	1.4
		EBR2	13	14	8%	0.3
		WBL2	0	0	0%	0.0
		WBL	0	0	0%	0.0
		WBT	197	207	5%	0.7
		WBR	24	22	-8%	0.4
		NBL	27	28	4%	0.2
		NBT	25	22	-12%	0.6

Int #	Intersection	Movement	Peak Hour	Calibration Results		
			Volume	SimTraffic	% Volume	GEH Value
			Input	Avg	Difference	
8	Santa Clara Ave at Webster St	NBR	5	4	-20%	0.5
		NBR2	4	5	25%	0.5
		SBL2	24	26	8%	0.4
		SBL	121	125	3%	0.4
		SBT	76	142	87%	6.3
		SBR	9	9	0%	0.0
		NWBL2	2	2	0%	0.0
		NWBL	319	317	-1%	0.1
		NWBR	37	38	3%	0.2
		NWBR2	0	0	0%	0.0
		Total	1,398	1,441	3%	1.1
		EBL	18	17	-6%	0.2
		EBT	55	56	2%	0.1
		EBR	13	12	-8%	0.3
		WBL	25	30	20%	1.0
		WBT	67	62	-7%	0.6
		WBR	62	58	-6%	0.5
		NBL	9	7	-22%	0.7
		NBT	255	257	1%	0.1
		NBR	27	25	-7%	0.4
		SBL	70	71	1%	0.1
SBT	552	562	2%	0.4		
SBR	38	40	5%	0.3		
Total	1,191	1,197	1%	0.2		
9	Santa Clara Ave at Eighth St	EBL	22	24	9%	0.4
		EBT	157	157	0%	0.0
		EBR	9	9	0%	0.0
		WBL	7	9	29%	0.7
		WBT	127	129	2%	0.2
		WBR	66	67	2%	0.1
		NBL	8	6	-25%	0.8
		NBT	321	341	6%	1.1
		NBR	27	27	0%	0.0
		SBL	48	52	8%	0.6
		SBT	386	421	9%	1.7
		SBR	18	15	-17%	0.7
		Total	1,196	1,257	5%	1.7
		10	Santa Clara Ave at Sherman St	EBL	13	12
EBT	254			263	4%	0.6
EBR	31			34	10%	0.5
WBL	7			6	-14%	0.4
WBT	212			204	-4%	0.6
WBR	33			34	3%	0.2

Int #	Intersection	Movement	Peak Hour Volume		Calibration Results		
			Input	SimTraffic Avg	% Volume Difference	GEH Value	
11	Lincoln Ave at Webster St	NBL	16	15	-6%	0.3	
		NBT	114	115	1%	0.1	
		NBR	5	4	-20%	0.5	
		SBL	92	89	-3%	0.3	
		SBT	260	278	7%	1.1	
		SBR	25	26	4%	0.2	
		Total	1,062	1,080	2%	0.6	
		EBL	87	85	-2%	0.2	
		EBT	283	285	1%	0.1	
		EBR	47	50	6%	0.4	
		WBL	41	38	-7%	0.5	
		WBT	190	193	2%	0.2	
		WBR	29	33	14%	0.7	
		NBL	6	6	0%	0.0	
		NBT	299	287	-4%	0.7	
		NBR	35	34	-3%	0.2	
		SBL	48	44	-8%	0.6	
		SBT	593	582	-2%	0.5	
		SBR	97	91	-6%	0.6	
Total	1,755	1,728	-2%	0.6			
12	Lincoln Ave at Eighth St	EBL	4	3	-25%	0.5	
		EBT	279	342	23%	3.6	
		EBR	18	20	11%	0.5	
		WBL	17	15	-12%	0.5	
		WBT	168	172	2%	0.3	
		WBR	176	182	3%	0.4	
		NBL	28	30	7%	0.4	
		NBT	352	370	5%	0.9	
		NBR	30	29	-3%	0.2	
		SBL	736	727	-1%	0.3	
		SBT	442	456	3%	0.7	
		SBR	16	15	-6%	0.3	
		Total	2,266	2,361	4%	2.0	
		13	Lincoln Ave at Sherman St	EBL	24	21	-13%
EBT	666			676	2%	0.4	
EBR	109			112	3%	0.3	
WBL	10			10	0%	0.0	
WBT	323			325	1%	0.1	
WBR	28			24	-14%	0.8	
NBL	26			22	-15%	0.8	
NBT	128			132	3%	0.4	
NBR	16			16	0%	0.0	
SBL	166			169	2%	0.2	

Int #	Intersection	Movement	Peak Hour	Calibration Results		
			Volume	SimTraffic	% Volume Difference	GEH Value
			Input	Avg		
		SBT	277	272	-2%	0.3
		SBR	26	27	4%	0.2
		Total	1,799	1,806	0%	0.2
		Grand Tot	18,496	18,862	2%	2.7
			Percent cases with GEH statistic < 5			99%
			FHWA Calibration Criteria (>= 85%)			Met
			Difference in Sum of all flows			2%
			FHWA Calibration Criteria (Diff <= 5%)			Met

Lanes, Volumes, Timings

Central Avenue Safety Improvement

1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)

05/22/2020



Lane Group	EBL2	EBT	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL2	SBL
Lane Configurations		↕		↕	↕			↕	↕			↕
Traffic Volume (vph)	12	0	53	18	165	3	1	273	5	35	4	72
Future Volume (vph)	12	0	53	18	165	3	1	273	5	35	4	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)			0		0		100		0			0
Storage Lanes			0		1		1		1			1
Taper Length (ft)			25				100					25
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
Ped Bike Factor				1.00	0.97			1.00	0.96			0.99
Fr _t					0.850				0.850			
Fl _t Protected		0.950		0.964								0.950
Satd. Flow (prot)	0	1444	0	1761	1553	0	0	1845	1568	0	0	1736
Fl _t Permitted		0.234		0.765				0.999				0.153
Satd. Flow (perm)	0	356	0	1391	1512	0	0	1843	1505	0	0	278
Right Turn on Red							Yes			Yes		
Satd. Flow (RTOR)					126				126			
Link Speed (mph)		25		25				25				
Link Distance (ft)		1144		887				1060				
Travel Time (s)		31.2		24.2				28.9				
Confl. Peds. (#/hr)			3				4			19		19
Confl. Bikes (#/hr)					1	1				10		
Peak Hour Factor	0.50	0.50	0.66	0.66	0.66	0.66	0.79	0.79	0.79	0.79	0.65	0.65
Heavy Vehicles (%)	25%	25%	4%	4%	4%	4%	3%	3%	3%	3%	4%	4%
Adj. Flow (vph)	24	0	80	27	250	5	1	346	6	44	6	111
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	24	0	107	255	0	0	347	50	0	0	117
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Left	Left	Right	Right	Left	Left	Right	Right	Left	Left
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	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		15		9	9	15		9	9	15	15
Number of Detectors	1	2	1	2	1		1	2	1		1	1
Detector Template	Left	Thru	Left	Thru	Right		Left	Thru	Right		Left	Left
Leading Detector (ft)	20	100	20	100	20		20	100	20		20	20
Trailing Detector (ft)	0	0	0	0	0		0	0	0		0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0	0		0	0
Detector 1 Size(ft)	20	6	20	6	20		20	6	20		20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94		94				94				
Detector 2 Size(ft)		6		6				6				
Detector 2 Type		Cl+Ex		Cl+Ex				Cl+Ex				
Detector 2 Channel												



Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	210	47
Future Volume (vph)	210	47
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		0
Storage Lanes		0
Taper Length (ft)		
Lane Util. Factor	1.00	1.00
Ped Bike Factor	0.99	
Fr _t	0.973	
Flt Protected		
Satd. Flow (prot)	1768	0
Flt Permitted		
Satd. Flow (perm)	1768	0
Right Turn on Red		Yes
Satd. Flow (RTOR)	11	
Link Speed (mph)	25	
Link Distance (ft)	774	
Travel Time (s)	21.1	
Confl. Peds. (#/hr)		4
Confl. Bikes (#/hr)		1
Peak Hour Factor	0.65	0.65
Heavy Vehicles (%)	4%	4%
Adj. Flow (vph)	323	72
Shared Lane Traffic (%)		
Lane Group Flow (vph)	395	0
Enter Blocked Intersection	No	No
Lane Alignment	Left	Right
Median Width(ft)	12	
Link Offset(ft)	24	
Crosswalk Width(ft)	16	
Two way Left Turn Lane		
Headway Factor	1.00	1.00
Turning Speed (mph)		9
Number of Detectors	2	
Detector Template	Thru	
Leading Detector (ft)	100	
Trailing Detector (ft)	0	
Detector 1 Position(ft)	0	
Detector 1 Size(ft)	6	
Detector 1 Type	Cl+Ex	
Detector 1 Channel		
Detector 1 Extend (s)	0.0	
Detector 1 Queue (s)	0.0	
Detector 1 Delay (s)	0.0	
Detector 2 Position(ft)	94	
Detector 2 Size(ft)	6	
Detector 2 Type	Cl+Ex	
Detector 2 Channel		



Lane Group	EBL2	EBT	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL2	SBL
Detector 2 Extend (s)		0.0		0.0				0.0				
Turn Type	Perm	NA	Perm	NA	Perm		Perm	NA	Perm		Perm	Perm
Protected Phases		2		1				4				
Permitted Phases	2		1		1		4		4		3	3
Detector Phase	2	2	1	1	1		4	4	4		3	3
Switch Phase												
Minimum Initial (s)	6.0	6.0	10.0	10.0	10.0		9.0	9.0	9.0		13.0	13.0
Minimum Split (s)	24.0	24.0	14.6	14.6	14.6		29.0	29.0	29.0		28.0	28.0
Total Split (s)	21.7	21.7	15.6	15.6	15.6		28.7	28.7	28.7		31.0	31.0
Total Split (%)	22.4%	22.4%	16.1%	16.1%	16.1%		29.6%	29.6%	29.6%		32.0%	32.0%
Maximum Green (s)	17.1	17.1	11.0	11.0	11.0		24.1	24.1	24.1		26.0	26.0
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6		3.6	3.6	3.6		4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0			0.0
Total Lost Time (s)		4.6		4.6	4.6			4.6	4.6			5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag		Lag	Lag	Lag		Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes
Vehicle Extension (s)	1.5	1.5	2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0
Recall Mode	C-Max	C-Max	None	None	None		Max	Max	Max		None	None
Walk Time (s)	7.0	7.0					7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	16.0	16.0					21.0	21.0	21.0		20.0	20.0
Pedestrian Calls (#/hr)	3	3					19	19	19		4	4
Act Effct Green (s)		17.1		10.8	10.8			24.1	24.1			26.2
Actuated g/C Ratio		0.18		0.11	0.11			0.25	0.25			0.27
v/c Ratio		0.39		0.69	0.91			0.76	0.11			1.56
Control Delay		55.1		65.6	58.1			46.0	0.5			339.8
Queue Delay		0.0		0.0	0.0			0.0	0.0			0.0
Total Delay		55.1		65.6	58.1			46.0	0.5			339.8
LOS		E		E	E			D	A			F
Approach Delay		55.1		60.3				40.3				
Approach LOS		E		E				D				

Intersection Summary

Area Type: Other
 Cycle Length: 97
 Actuated Cycle Length: 97
 Offset: 4 (4%), Referenced to phase 2:EBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.56
 Intersection Signal Delay: 75.4
 Intersection Capacity Utilization 83.6%
 Analysis Period (min) 15
 Intersection LOS: E
 ICU Level of Service E

Splits and Phases: 1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)





Lane Group	SBT	SBR
Detector 2 Extend (s)	0.0	
Turn Type	NA	
Protected Phases	3	
Permitted Phases		
Detector Phase	3	
Switch Phase		
Minimum Initial (s)	13.0	
Minimum Split (s)	28.0	
Total Split (s)	31.0	
Total Split (%)	32.0%	
Maximum Green (s)	26.0	
Yellow Time (s)	4.0	
All-Red Time (s)	1.0	
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	5.0	
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	2.0	
Recall Mode	None	
Walk Time (s)	7.0	
Flash Dont Walk (s)	20.0	
Pedestrian Calls (#/hr)	4	
Act Effct Green (s)	26.2	
Actuated g/C Ratio	0.27	
v/c Ratio	0.81	
Control Delay	47.4	
Queue Delay	0.0	
Total Delay	47.4	
LOS	D	
Approach Delay	114.2	
Approach LOS	F	
Intersection Summary		

Lanes, Volumes, Timings
2: 3rd St & Central Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	208	21	104	276	85	14	15	85	50	18	19
Future Volume (vph)	13	208	21	104	276	85	14	15	85	50	18	19
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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr _t		0.988			0.975			0.899			0.970	
Fl _t Protected		0.997			0.989			0.994			0.972	
Satd. Flow (prot)	0	1782	0	0	1814	0	0	1698	0	0	1791	0
Fl _t Permitted		0.997			0.989			0.994			0.972	
Satd. Flow (perm)	0	1782	0	0	1814	0	0	1698	0	0	1791	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		782			216			641			365	
Travel Time (s)		21.3			5.9			17.5			10.0	
Confl. Peds. (#/hr)	60		25	25		60	88					88
Confl. Bikes (#/hr)			1			8						
Peak Hour Factor	0.67	0.67	0.67	0.83	0.83	0.83	0.50	0.50	0.50	0.87	0.87	0.87
Heavy Vehicles (%)	5%	5%	5%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	19	310	31	125	333	102	28	30	170	57	21	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	360	0	0	560	0	0	228	0	0	100	0
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)		0			0			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
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	62.8%						ICU Level of Service B					
Analysis Period (min)	15											

Lanes, Volumes, Timings
3: Ballena Blvd/4th St & Central Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	311	9	42	410	25	33	16	73	74	11	30
Future Volume (vph)	35	311	9	42	410	25	33	16	73	74	11	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0	95		0	0		0	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	60			90			25			25		
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
Ped Bike Factor	0.99	1.00		0.99	1.00			1.00	0.97		0.98	
Fr _t		0.996			0.991				0.850		0.965	
Fl _t Protected	0.950			0.950				0.967			0.969	
Satd. Flow (prot)	1770	3521	0	1787	3533	0	0	1784	1568	0	1767	0
Fl _t Permitted	0.950			0.950				0.799			0.769	
Satd. Flow (perm)	1757	3521	0	1761	3533	0	0	1467	1521	0	1387	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			15				103		25	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		501			1066			474			334	
Travel Time (s)		13.7			29.1			12.9			9.1	
Confl. Peds. (#/hr)	9		57	57		9	14		27	27		14
Confl. Bikes (#/hr)			1			11						
Peak Hour Factor	0.58	0.58	0.58	0.76	0.76	0.76	0.80	0.80	0.80	0.72	0.72	0.72
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	3%	3%	3%	0%	0%	0%
Adj. Flow (vph)	60	536	16	55	539	33	41	20	91	103	15	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	552	0	55	572	0	0	61	91	0	160	0
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			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	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
3: Ballena Blvd/4th St & Central Ave

Central Avenue Safety Improvement

05/22/2020

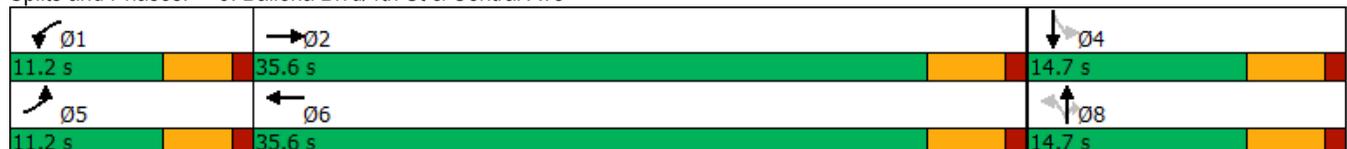


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		
Detector Phase	5	2		1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	5.0	6.0		5.0	6.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	9.5	35.0		9.5	19.0		28.0	28.0	28.0	30.0	30.0	
Total Split (s)	11.2	35.6		11.2	35.6		14.7	14.7	14.7	14.7	14.7	
Total Split (%)	18.2%	57.9%		18.2%	57.9%		23.9%	23.9%	23.9%	23.9%	23.9%	
Maximum Green (s)	7.0	31.0		7.0	31.0		10.1	10.1	10.1	10.1	10.1	
Yellow Time (s)	3.2	3.6		3.2	3.6		3.6	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	4.2	4.6		4.2	4.6			4.6	4.6		4.6	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	1.6	2.2		1.6	2.2		2.2	2.2	2.2	2.2	2.2	
Recall Mode	None	None		None	None		None	None	None	None	None	
Walk Time (s)		8.0			8.0		8.0	8.0	8.0	8.0	8.0	
Flash Dont Walk (s)		26.0			10.0		19.0	19.0	19.0	21.0	21.0	
Pedestrian Calls (#/hr)		57			9		27	27	27	14	14	
Act Effct Green (s)	9.8	28.2		9.8	28.2			17.4	17.4		17.4	
Actuated g/C Ratio	0.19	0.54		0.19	0.54			0.33	0.33		0.33	
v/c Ratio	0.18	0.29		0.17	0.30			0.13	0.16		0.34	
Control Delay	33.9	12.2		33.8	12.1			19.8	4.4		19.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	33.9	12.2		33.8	12.1			19.8	4.4		19.3	
LOS	C	B		C	B			B	A		B	
Approach Delay		14.4			14.0			10.6			19.3	
Approach LOS		B			B			B			B	

Intersection Summary

Area Type:	Other
Cycle Length:	61.5
Actuated Cycle Length:	52.5
Natural Cycle:	75
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.34
Intersection Signal Delay:	14.4
Intersection LOS:	B
Intersection Capacity Utilization:	66.5%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 3: Ballena Blvd/4th St & Central Ave



Lanes, Volumes, Timings
4: Central Ave & 5th St



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (vph)	131	442	509	48	61	75
Future Volume (vph)	131	442	509	48	61	75
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						
Fr t			0.987		0.925	
Fl t Protected		0.989			0.978	
Satd. Flow (prot)	0	3535	3493	0	1719	0
Fl t Permitted		0.989			0.978	
Satd. Flow (perm)	0	3535	3493	0	1719	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		1066	1602		412	
Travel Time (s)		29.1	43.7		11.2	
Confl. Peds. (#/hr)	47			47		102
Confl. Bikes (#/hr)				10		
Peak Hour Factor	0.80	0.80	0.82	0.82	0.76	0.76
Heavy Vehicles (%)	1%	1%	2%	2%	0%	0%
Adj. Flow (vph)	164	553	621	59	80	99
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	717	680	0	179	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
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	55.2%			ICU Level of Service B		
Analysis Period (min)	15					

Lanes, Volumes, Timings
5: Central Ave & Webster St

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	407	5	14	597	266	22	42	44	307	27	58
Future Volume (vph)	73	407	5	14	597	266	22	42	44	307	27	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor		1.00			0.96			0.96		0.95	0.95	
Fr _t		0.998			0.954			0.945			0.955	
Fl _t Protected		0.993			0.999			0.990		0.950	0.973	
Satd. Flow (prot)	0	3503	0	0	3255	0	0	1693	0	1681	1609	0
Fl _t Permitted		0.524			0.924			0.990		0.950	0.973	
Satd. Flow (perm)	0	1849	0	0	3010	0	0	1678	0	1602	1567	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			56			28			20	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1602			1180			338			695	
Travel Time (s)		43.7			32.2			9.2			19.0	
Confl. Peds. (#/hr)	50		31	31		50	40		37	37		40
Confl. Bikes (#/hr)			6			28			5			2
Peak Hour Factor	0.76	0.76	0.76	0.85	0.85	0.85	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	96	536	7	16	702	313	25	48	50	349	31	66
Shared Lane Traffic (%)										35%		
Lane Group Flow (vph)	0	639	0	0	1031	0	0	123	0	227	219	0
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)		0			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	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
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	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		4			8		2	2		6	6	
Permitted Phases	4			8								

Lanes, Volumes, Timings
5: Central Ave & Webster St

Central Avenue Safety Improvement

05/22/2020

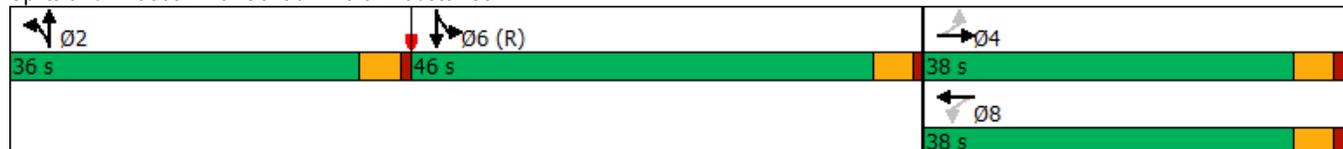


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.2	22.2		22.2	22.2		25.0	25.0		25.0	25.0	
Total Split (s)	38.0	38.0		38.0	38.0		36.0	36.0		46.0	46.0	
Total Split (%)	31.7%	31.7%		31.7%	31.7%		30.0%	30.0%		38.3%	38.3%	
Maximum Green (s)	33.2	33.2		33.2	33.2		31.4	31.4		41.4	41.4	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.2	1.2		1.2	1.2		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		4.8			4.8			4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.4	2.4		2.4	2.4		2.5	2.5		2.5	2.5	
Recall Mode	None	None		None	None		None	None		C-Max	C-Max	
Walk Time (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	31	31		50	50		37	37		40	40	
Act Effct Green (s)		33.2			33.2			17.5		55.3	55.3	
Actuated g/C Ratio		0.28			0.28			0.15		0.46	0.46	
v/c Ratio		1.55dl			1.18			0.45		0.29	0.29	
Control Delay		164.5			130.1			39.2		22.6	20.5	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		164.5			130.1			39.2		22.6	20.5	
LOS		F			F			D		C	C	
Approach Delay		164.5			130.1			39.3			21.6	
Approach LOS		F			F			D			C	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 79 (66%), Referenced to phase 6:SBTL, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.25
 Intersection Signal Delay: 113.3 Intersection LOS: F
 Intersection Capacity Utilization 74.6% ICU Level of Service D
 Analysis Period (min) 15
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 5: Central Ave & Webster St



Lanes, Volumes, Timings
6: 8th St & Central Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	286	383	16	530	147	316	309	8	50	167	22
Future Volume (vph)	5	286	383	16	530	147	316	309	8	50	167	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		90	0		0	85		0	0		0
Storage Lanes	0		1	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00	0.92		0.97		0.99	1.00			0.99	
Fr _t			0.850		0.968			0.996			0.987	
Fl _t Protected		0.999			0.999		0.950				0.990	
Satd. Flow (prot)	0	3536	1583	0	3322	0	1770	1854	0	0	1814	0
Fl _t Permitted		0.897			0.942		0.950				0.854	
Satd. Flow (perm)	0	3174	1458	0	3131	0	1746	1854	0	0	1562	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			435		35			2			6	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1180			656			751			703	
Travel Time (s)		32.2			17.9			20.5			19.2	
Confl. Peds. (#/hr)	22		14	14		22	19		16	16		19
Confl. Bikes (#/hr)			10			42			7			3
Peak Hour Factor	0.88	0.88	0.88	0.84	0.84	0.84	0.91	0.91	0.91	0.79	0.79	0.79
Adj. Flow (vph)	6	325	435	19	631	175	347	340	9	63	211	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	331	435	0	825	0	347	349	0	0	302	0
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)		0			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	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
6: 8th St & Central Ave

Central Avenue Safety Improvement

05/22/2020

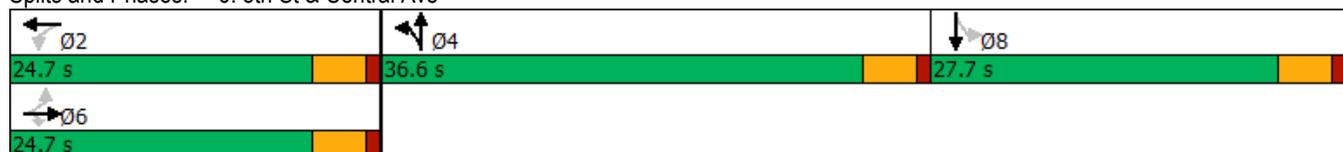


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	Perm	NA		Split	NA		Perm	NA	
Protected Phases		6			2		4	4			8	
Permitted Phases	6		6	2						8		
Detector Phase	6	6	6	2	2		4	4		8	8	
Switch Phase												
Minimum Initial (s)	17.0	17.0	17.0	17.0	17.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	21.6	21.6	21.6	21.6	21.6		28.0	28.0		26.0	26.0	
Total Split (s)	24.7	24.7	24.7	24.7	24.7		36.6	36.6		27.7	27.7	
Total Split (%)	27.8%	27.8%	27.8%	27.8%	27.8%		41.1%	41.1%		31.1%	31.1%	
Maximum Green (s)	20.1	20.1	20.1	20.1	20.1		32.0	32.0		23.1	23.1	
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0			0.0	
Total Lost Time (s)		4.6	4.6		4.6		4.6	4.6			4.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Recall Mode	Min	Min	Min	Min	Min		Min	Min		Min	Min	
Walk Time (s)	0.0	0.0	0.0	7.0	7.0		9.0	9.0		4.0	4.0	
Flash Dont Walk (s)	14.0	14.0	14.0	11.0	11.0		18.0	18.0		21.0	21.0	
Pedestrian Calls (#/hr)	14	14	14	22	22		16	16		19	19	
Act Effect Green (s)		20.2	20.2		20.2		22.4	22.4			21.3	
Actuated g/C Ratio		0.26	0.26		0.26		0.29	0.29			0.27	
v/c Ratio		0.40	0.62		0.98		0.68	0.65			0.70	
Control Delay		26.5	7.4		57.1		32.3	30.7			35.2	
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	
Total Delay		26.5	7.4		57.1		32.3	30.7			35.2	
LOS		C	A		E		C	C			D	
Approach Delay		15.7			57.1			31.5			35.2	
Approach LOS		B			E			C			D	

Intersection Summary

Area Type: Other
 Cycle Length: 89
 Actuated Cycle Length: 77.7
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 35.4
 Intersection LOS: D
 Intersection Capacity Utilization 81.3%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 6: 8th St & Central Ave



Lanes, Volumes, Timings
7: Sherman St & Encinal Ave & Central Ave

Central Avenue Safety Improvement

05/22/2020

Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Traffic Volume (vph)	4	149	281	7	1	162	46	75	91	2	5	18
Future Volume (vph)	4	149	281	7	1	162	46	75	91	2	5	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0		0		0	0		0		
Storage Lanes	1		2		0		0	0		0		
Taper Length (ft)	60				25			25				
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00	0.92			0.98			0.99			
Fr t			0.850			0.970			0.994			
Flt Protected		0.999							0.979			
Satd. Flow (prot)	0	1861	2787	0	0	1780	0	0	1802	0	0	0
Flt Permitted		0.992				0.999			0.807			
Satd. Flow (perm)	0	1847	2576	0	0	1778	0	0	1485	0	0	0
Right Turn on Red				Yes			Yes				Yes	
Satd. Flow (RTOR)			25			19			2			
Link Speed (mph)		25				25			25			
Link Distance (ft)		342				729			517			
Travel Time (s)		9.3				19.9			14.1			
Confl. Peds. (#/hr)	14			11	11		14			24	17	24
Confl. Bikes (#/hr)				3			14			7	7	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.90	0.90	0.90	0.71	0.71	0.71	0.71	0.77
Adj. Flow (vph)	4	159	299	7	1	180	51	106	128	3	7	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	163	306	0	0	232	0	0	244	0	0	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right	Right	Left	Left	Right	Left	Left	Right	Right	Left
Median Width(ft)		0				0			0			
Link Offset(ft)		0				0			12			
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	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	9	15		9	15		9	9	15
Number of Detectors	1	2	1		1	2		1	2			1
Detector Template	Left	Thru	Right		Left	Thru		Left	Thru			Left
Leading Detector (ft)	20	100	20		20	100		20	100			20
Trailing Detector (ft)	0	0	0		0	0		0	0			0
Detector 1 Position(ft)	0	0	0		0	0		0	0			0
Detector 1 Size(ft)	20	6	20		20	6		20	6			20
Detector 1 Type	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
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
Detector 2 Position(ft)		94				94			94			
Detector 2 Size(ft)		6				6			6			
Detector 2 Type		Cl+Ex				Cl+Ex			Cl+Ex			
Detector 2 Channel												
Detector 2 Extend (s)		0.0				0.0			0.0			

Lanes, Volumes, Timings
7: Sherman St & Encinal Ave & Central Ave

Central Avenue Safety Improvement

05/22/2020



Lane Group	SBL	SBT	SBR	NWL2	NWL	NWR	NWR2
Lane Configurations		↕			↕		
Traffic Volume (vph)	51	35	11	1	395	60	1
Future Volume (vph)	51	35	11	1	395	60	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0		0	0	
Storage Lanes	0		0		2	0	
Taper Length (ft)	25				25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	0.95	0.95
Ped Bike Factor		1.00			0.97		
Fr _t		0.987			0.980		
Fl _t Protected		0.971			0.958		
Satd. Flow (prot)	0	1782	0	0	3383	0	0
Fl _t Permitted		0.644			0.955		
Satd. Flow (perm)	0	1182	0	0	3267	0	0
Right Turn on Red			Yes				Yes
Satd. Flow (RTOR)		7			101		
Link Speed (mph)		25			25		
Link Distance (ft)		722			680		
Travel Time (s)		19.7			18.5		
Confl. Peds. (#/hr)	17			11			
Confl. Bikes (#/hr)			5			1	1
Peak Hour Factor	0.77	0.77	0.77	0.85	0.85	0.85	0.85
Adj. Flow (vph)	66	45	14	1	465	71	1
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	148	0	0	538	0	0
Enter Blocked Intersection	No						
Lane Alignment	Left	Left	Right	Left	Left	Right	Right
Median Width(ft)		0			24		
Link Offset(ft)		-12			0		
Crosswalk Width(ft)		16			16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15	15	9	9
Number of Detectors	1	2		1	1		
Detector Template	Left	Thru		Left	Left		
Leading Detector (ft)	20	100		20	20		
Trailing Detector (ft)	0	0		0	0		
Detector 1 Position(ft)	0	0		0	0		
Detector 1 Size(ft)	20	6		20	20		
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+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		
Detector 2 Position(ft)		94					
Detector 2 Size(ft)		6					
Detector 2 Type		CI+Ex					
Detector 2 Channel							
Detector 2 Extend (s)		0.0					

Lanes, Volumes, Timings
7: Sherman St & Encinal Ave & Central Ave

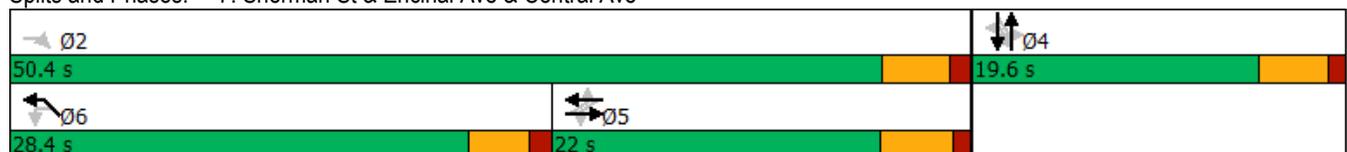


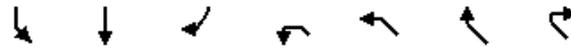
Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Turn Type	Perm	NA	custom		Perm	NA		Perm	NA			Perm
Protected Phases		5				5			4			
Permitted Phases	5		2		5			4				4
Detector Phase	5	5	2		5	5		4	4			4
Switch Phase												
Minimum Initial (s)	11.0	11.0	4.0		11.0	11.0		4.0	4.0			4.0
Minimum Split (s)	15.9	15.9	8.8		15.9	15.9		8.6	8.6			8.6
Total Split (s)	22.0	22.0	50.4		22.0	22.0		19.6	19.6			19.6
Total Split (%)	31.4%	31.4%	72.0%		31.4%	31.4%		28.0%	28.0%			28.0%
Maximum Green (s)	17.1	17.1	45.6		17.1	17.1		15.0	15.0			15.0
Yellow Time (s)	3.9	3.9	3.6		3.9	3.9		3.6	3.6			3.6
All-Red Time (s)	1.0	1.0	1.2		1.0	1.0		1.0	1.0			1.0
Lost Time Adjust (s)		0.0	0.0			0.0			0.0			
Total Lost Time (s)		4.9	4.8			4.9			4.6			
Lead/Lag	Lag	Lag			Lag	Lag						
Lead-Lag Optimize?	Yes	Yes			Yes	Yes						
Vehicle Extension (s)	0.2	0.2	3.0		0.2	0.2		3.0	3.0			3.0
Recall Mode	Max	Max	Max		Max	Max		Max	Max			Max
Walk Time (s)			0.0					0.0	0.0			0.0
Flash Dont Walk (s)			7.0					7.0	7.0			7.0
Pedestrian Calls (#/hr)			11					24	24			24
Act Effct Green (s)		17.1	45.6			17.1			15.0			
Actuated g/C Ratio		0.24	0.65			0.24			0.21			
v/c Ratio		0.36	0.18			0.52			0.76			
Control Delay		24.7	4.7			25.8			43.8			
Queue Delay		0.0	0.0			0.0			0.0			
Total Delay		24.7	4.7			25.8			43.8			
LOS		C	A			C			D			
Approach Delay		11.7				25.8			43.8			
Approach LOS		B				C			D			

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 21.8
 Intersection LOS: C
 Intersection Capacity Utilization 47.6%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 7: Sherman St & Encinal Ave & Central Ave





Lane Group	SBL	SBT	SBR	NWL2	NWL	NWR	NWR2
Turn Type	Perm	NA		Perm	Prot		
Protected Phases		4			6		
Permitted Phases	4			6			
Detector Phase	4	4		6	6		
Switch Phase							
Minimum Initial (s)	4.0	4.0		4.0	4.0		
Minimum Split (s)	8.6	8.6		8.4	8.4		
Total Split (s)	19.6	19.6		28.4	28.4		
Total Split (%)	28.0%	28.0%		40.6%	40.6%		
Maximum Green (s)	15.0	15.0		24.0	24.0		
Yellow Time (s)	3.6	3.6		3.2	3.2		
All-Red Time (s)	1.0	1.0		1.2	1.2		
Lost Time Adjust (s)		0.0			0.0		
Total Lost Time (s)		4.6			4.4		
Lead/Lag				Lead	Lead		
Lead-Lag Optimize?				Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		
Recall Mode	Max	Max		Max	Max		
Walk Time (s)	0.0	0.0		0.0	0.0		
Flash Dont Walk (s)	7.0	7.0		7.0	7.0		
Pedestrian Calls (#/hr)	24	24		7	7		
Act Effect Green (s)		15.0			24.0		
Actuated g/C Ratio		0.21			0.34		
v/c Ratio		0.57			0.45		
Control Delay		33.5			15.8		
Queue Delay		0.0			0.0		
Total Delay		33.5			15.8		
LOS		C			B		
Approach Delay		33.5			15.8		
Approach LOS		C			B		
Intersection Summary							

Lanes, Volumes, Timings
8: Webster St & Santa Clara Ave

Central Avenue Safety Improvement

05/22/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	80	22	16	94	100	5	306	18	45	300	18
Future Volume (vph)	19	80	22	16	94	100	5	306	18	45	300	18
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	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor		0.99			0.97			1.00				0.99
Fr _t		0.975			0.936			0.992				0.992
Fl _t Protected		0.992			0.996			0.999				0.994
Satd. Flow (prot)	0	1759	0	0	1614	0	0	3495	0	0	3482	0
Fl _t Permitted		0.940			0.972			0.949				0.874
Satd. Flow (perm)	0	1661	0	0	1574	0	0	3320	0	0	3053	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			86			10				12
Link Speed (mph)		25			25			25				25
Link Distance (ft)		745			1178			695				689
Travel Time (s)		20.3			32.1			19.0				18.8
Confl. Peds. (#/hr)	45		13	13		45	24		42	42		24
Confl. Bikes (#/hr)			2			42			2			3
Peak Hour Factor	0.69	0.69	0.69	0.89	0.89	0.89	0.89	0.89	0.89	0.79	0.79	0.79
Heavy Vehicles (%)	4%	4%	4%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	28	116	32	18	106	112	6	344	20	57	380	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	176	0	0	236	0	0	370	0	0	460	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		0			0			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	2		1	2		1	2		1	2	
Detector Template	Left	Thru										
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
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	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			6		5		2

Lanes, Volumes, Timings
8: Webster St & Santa Clara Ave

Central Avenue Safety Improvement

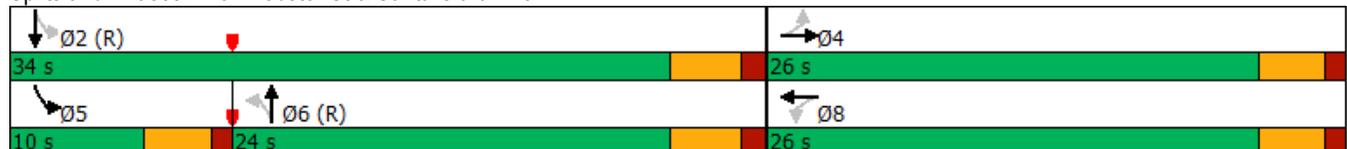
05/22/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			6			2		
Detector Phase	4	4		8	8		6	6		5	2	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		5.0	5.0		4.0	5.0	
Minimum Split (s)	23.0	23.0		23.0	23.0		31.0	31.0		9.5	31.0	
Total Split (s)	26.0	26.0		26.0	26.0		24.0	24.0		10.0	34.0	
Total Split (%)	43.3%	43.3%		43.3%	43.3%		40.0%	40.0%		16.7%	56.7%	
Maximum Green (s)	22.0	22.0		22.0	22.0		19.6	19.6		6.0	29.6	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.2	3.2		3.0	3.2	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.2	1.2		1.0	1.2	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.0			4.0			4.4			4.4	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.0	1.5	
Recall Mode	None	None		None	None		C-Max	C-Max		None	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		23.0	23.0			23.0	
Pedestrian Calls (#/hr)	13	13		45	45		42	42			24	
Act Effect Green (s)		15.7			15.7			35.9			35.9	
Actuated g/C Ratio		0.26			0.26			0.60			0.60	
v/c Ratio		0.39			0.50			0.19			0.25	
Control Delay		16.4			13.6			11.4			6.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		16.4			13.6			11.4			6.4	
LOS		B			B			B			A	
Approach Delay		16.4			13.6			11.4			6.4	
Approach LOS		B			B			B			A	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 16 (27%), Referenced to phase 2:SBTL and 6:NBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.50
 Intersection Signal Delay: 10.7 Intersection LOS: B
 Intersection Capacity Utilization 69.0% ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 8: Webster St & Santa Clara Ave



Lanes, Volumes, Timings
9: 8th St & Santa Clara Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	153	14	6	192	62	6	442	37	37	189	18
Future Volume (vph)	26	153	14	6	192	62	6	442	37	37	189	18
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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.98			0.99			0.98	
Fr _t		0.990			0.968			0.990			0.990	
Fl _t Protected		0.993			0.999			0.999			0.992	
Satd. Flow (prot)	0	1784	0	0	1693	0	0	1824	0	0	1795	0
Fl _t Permitted		0.922			0.993			0.997			0.895	
Satd. Flow (perm)	0	1653	0	0	1681	0	0	1819	0	0	1609	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			29			8			7	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1178			660			703			684	
Travel Time (s)		32.1			18.0			19.2			18.7	
Confl. Peds. (#/hr)	26		53	53		26	59		64	64		59
Confl. Bikes (#/hr)			7				57		1			1
Peak Hour Factor	0.73	0.73	0.73	0.69	0.69	0.69	0.94	0.94	0.94	0.86	0.86	0.86
Heavy Vehicles (%)	4%	4%	4%	6%	6%	6%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	36	210	19	9	278	90	6	470	39	43	220	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	265	0	0	377	0	0	515	0	0	284	0
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)		0			0			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
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	29.0	29.0		29.0	29.0		20.0	20.0		20.0	20.0	
Total Split (s)	34.2	34.2		34.2	34.2		34.6	34.6		34.6	34.6	
Total Split (%)	49.7%	49.7%		49.7%	49.7%		50.3%	50.3%		50.3%	50.3%	
Maximum Green (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	3.2	3.2		3.2	3.2		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.2			4.2			4.6			4.6	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	18.0	18.0		18.0	18.0		4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	53	53		26	26		64	64		59	59	
Act Effect Green (s)		30.0			30.0			30.0			30.0	
Actuated g/C Ratio		0.44			0.44			0.44			0.44	

Lanes, Volumes, Timings
9: 8th St & Santa Clara Ave

Central Avenue Safety Improvement

05/22/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.37			0.50			0.65			0.40	
Control Delay		14.5			15.7			19.6			15.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		14.5			15.7			19.6			15.1	
LOS		B			B			B			B	
Approach Delay		14.5			15.7			19.6			15.1	
Approach LOS		B			B			B			B	

Intersection Summary

Area Type:	Other
Cycle Length:	68.8
Actuated Cycle Length:	68.8
Offset:	0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle:	55
Control Type:	Pretimed
Maximum v/c Ratio:	0.65
Intersection Signal Delay:	16.8
Intersection Capacity Utilization	66.1%
Analysis Period (min)	15
Intersection LOS:	B
ICU Level of Service	C

Splits and Phases: 9: 8th St & Santa Clara Ave

	34.2 s		34.6 s
	34.2 s		34.6 s

Lanes, Volumes, Timings
10: Sherman St & Santa Clara Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	197	20	7	209	47	27	308	11	27	113	14
Future Volume (vph)	28	197	20	7	209	47	27	308	11	27	113	14
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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr t		0.989			0.976			0.996			0.988	
Fl t Protected		0.994			0.999			0.996			0.991	
Satd. Flow (prot)	0	1813	0	0	1764	0	0	1866	0	0	1806	0
Fl t Permitted		0.994			0.999			0.996			0.991	
Satd. Flow (perm)	0	1813	0	0	1764	0	0	1866	0	0	1806	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		526			571			722			667	
Travel Time (s)		14.3			15.6			19.7			18.2	
Confl. Peds. (#/hr)	13		5	5		13	4		10	10		4
Confl. Bikes (#/hr)			4			23			2			
Peak Hour Factor	0.86	0.86	0.86	0.78	0.78	0.78	0.88	0.88	0.88	0.86	0.86	0.86
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	1%	1%	1%	3%	3%	3%
Adj. Flow (vph)	33	229	23	9	268	60	31	350	13	31	131	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	285	0	0	337	0	0	394	0	0	178	0
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)		0			0			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
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	52.9%					ICU Level of Service A						
Analysis Period (min)	15											

Lanes, Volumes, Timings
11: Webster St & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	290	66	20	424	26	47	359	20	26	298	78
Future Volume (vph)	170	290	66	20	424	26	47	359	20	26	298	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	165		0	140		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	80			40			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.99	1.00		1.00	1.00			1.00			0.99	
Fr _t		0.972			0.991			0.993			0.971	
Fl _t Protected	0.950			0.950				0.995			0.997	
Satd. Flow (prot)	1752	3394	0	1787	3536	0	0	3490	0	0	3408	0
Fl _t Permitted	0.370			0.438				0.871			0.913	
Satd. Flow (perm)	677	3394	0	821	3536	0	0	3052	0	0	3118	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		58			13			10			62	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		742			1168			689			384	
Travel Time (s)		20.2			31.9			18.8			10.5	
Confl. Peds. (#/hr)	27		10	10		27	21		38	38		21
Peak Hour Factor	0.77	0.77	0.77	0.81	0.81	0.81	0.92	0.92	0.92	0.84	0.84	0.84
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	221	377	86	25	523	32	51	390	22	31	355	93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	221	463	0	25	555	0	0	463	0	0	479	0
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			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	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
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	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
11: Webster St & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020

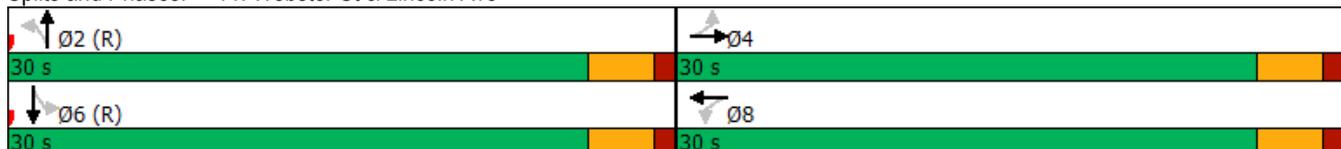


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA										
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		27.0	27.0		24.0	24.0		25.0	25.0	
Total Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	26.0	26.0		26.0	26.0		26.0	26.0		26.0	26.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		10.0	10.0		7.0	7.0		8.0	8.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	10	10		27	27		38	38		21	21	
Act Effect Green (s)	21.1	21.1		21.1	21.1			30.9			30.9	
Actuated g/C Ratio	0.35	0.35		0.35	0.35			0.52			0.52	
v/c Ratio	0.93	0.38		0.09	0.44			0.29			0.29	
Control Delay	63.2	12.5		11.3	14.9			9.9			9.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	63.2	12.5		11.3	14.9			9.9			9.0	
LOS	E	B		B	B			A			A	
Approach Delay		28.9			14.7			9.9			9.0	
Approach LOS		C			B			A			A	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 37 (62%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 16.8
 Intersection Capacity Utilization 79.9%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 11: Webster St & Lincoln Ave



Lanes, Volumes, Timings
12: 8th St/Constitution Way & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	257	23	19	366	239	24	516	22	201	192	10
Future Volume (vph)	11	257	23	19	366	239	24	516	22	201	192	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		60	200		0
Storage Lanes	0		0	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.97	1.00	1.00
Ped Bike Factor		1.00			0.99			1.00		0.97	1.00	
Fr _t		0.988			0.943			0.994		0.992		
Fl _t Protected		0.998			0.998			0.998		0.950		
Satd. Flow (prot)	0	3449	0	0	3346	0	0	3504	0	3400	1827	0
Fl _t Permitted		0.919			0.935			0.998		0.950		
Satd. Flow (perm)	0	3176	0	0	3134	0	0	3503	0	3310	1827	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			138			5			3	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1168			670			684			583	
Travel Time (s)		31.9			18.3			18.7			15.9	
Confl. Peds. (#/hr)			5	5			14		36	36		14
Confl. Bikes (#/hr)						2			1			1
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.94	0.94	0.94	0.79	0.79	0.79
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	14	334	30	24	458	299	26	549	23	254	243	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	378	0	0	781	0	0	598	0	254	256	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru										
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
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	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
12: 8th St/Constitution Way & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		4			8		2	2		6	6	
Permitted Phases	4			8								
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	38.0	38.0		12.6	12.6		27.0	27.0		27.0	27.0	
Total Split (s)	22.6	22.6		22.6	22.6		29.6	29.6		35.6	35.6	
Total Split (%)	25.7%	25.7%		25.7%	25.7%		33.7%	33.7%		40.5%	40.5%	
Maximum Green (s)	18.0	18.0		18.0	18.0		25.0	25.0		31.0	31.0	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		4.6			4.6			4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.5	1.5		1.5	1.5	
Recall Mode	None	None										
Walk Time (s)	10.0	10.0					10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	27.0	27.0					16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	5	5					36	36		14	14	
Act Effct Green (s)		21.9			21.9			17.1		14.3	14.3	
Actuated g/C Ratio		0.32			0.32			0.25		0.21	0.21	
v/c Ratio		0.37			0.71			0.68		0.36	0.66	
Control Delay		20.6			22.5			28.2		25.9	35.2	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		20.6			22.5			28.2		25.9	35.2	
LOS		C			C			C		C	D	
Approach Delay		20.6			22.5			28.2			30.6	
Approach LOS		C			C			C			C	

Intersection Summary

Area Type:	Other
Cycle Length:	87.8
Actuated Cycle Length:	68
Natural Cycle:	95
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.71
Intersection Signal Delay:	25.5
Intersection LOS:	C
Intersection Capacity Utilization:	78.6%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 12: 8th St/Constitution Way & Lincoln Ave

Ø2	Ø6	Ø4
29.6 s	35.6 s	22.6 s
		Ø8
		22.6 s

Lanes, Volumes, Timings
13: Sherman St & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	402	44	10	487	67	66	303	15	47	108	16
Future Volume (vph)	20	402	44	10	487	67	66	303	15	47	108	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	60		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	80			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00			1.00			1.00			1.00	
Fr _t		0.985			0.982			0.995			0.988	
Fl _t Protected	0.950				0.999			0.991			0.986	
Satd. Flow (prot)	1805	3547	0	0	3525	0	0	1835	0	0	1812	0
Fl _t Permitted	0.311				0.945			0.913			0.763	
Satd. Flow (perm)	588	3547	0	0	3335	0	0	1690	0	0	1401	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32			41			4			10	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		546			554			667			570	
Travel Time (s)		14.9			15.1			18.2			15.5	
Confl. Peds. (#/hr)	12		4	4		12	5		6	6		5
Confl. Bikes (#/hr)			1			1			6			3
Peak Hour Factor	0.84	0.84	0.84	0.72	0.72	0.72	0.85	0.85	0.85	0.75	0.75	0.75
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	24	479	52	14	676	93	78	356	18	63	144	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	531	0	0	783	0	0	452	0	0	228	0
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			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
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	19.0	19.0		19.0	19.0		28.0	28.0		28.0	28.0	
Total Split (s)	32.2	32.2		32.2	32.2		21.6	21.6		21.6	21.6	
Total Split (%)	59.9%	59.9%		59.9%	59.9%		40.1%	40.1%		40.1%	40.1%	
Maximum Green (s)	28.0	28.0		28.0	28.0		17.0	17.0		17.0	17.0	
Yellow Time (s)	3.2	3.2		3.2	3.2		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0			0.0	
Total Lost Time (s)	4.2	4.2			4.2			4.6			4.6	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		20.0	20.0		20.0	20.0	

Lanes, Volumes, Timings
13: Sherman St & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)	4	4		12	12		6	6		5	5	
Act Effect Green (s)	28.0	28.0			28.0			17.0			17.0	
Actuated g/C Ratio	0.52	0.52			0.52			0.32			0.32	
v/c Ratio	0.08	0.29			0.45			0.84			0.51	
Control Delay	7.3	7.3			8.6			34.8			19.1	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	7.3	7.3			8.6			34.8			19.1	
LOS	A	A			A			C			B	
Approach Delay		7.3			8.6			34.8			19.1	
Approach LOS		A			A			C			B	

Intersection Summary

Area Type:	Other
Cycle Length:	53.8
Actuated Cycle Length:	53.8
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	50
Control Type:	Pretimed
Maximum v/c Ratio:	0.84
Intersection Signal Delay:	15.3
Intersection LOS:	B
Intersection Capacity Utilization	54.4%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 13: Sherman St & Lincoln Ave

Ø2 (R) 32.2 s	Ø4 21.6 s
Ø6 (R) 32.2 s	Ø8 21.6 s

Lanes, Volumes, Timings

Central Avenue Safety Improvement

1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)

05/22/2020



Lane Group	EBL2	EBT	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL2	SBL
Lane Configurations		↕		↕	↕			↕	↕			↕
Traffic Volume (vph)	44	16	5	9	73	6	2	172	0	22	2	116
Future Volume (vph)	44	16	5	9	73	6	2	172	0	22	2	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)			0		0		100		0			0
Storage Lanes			0		1		1		1			1
Taper Length (ft)			25				100					25
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
Ped Bike Factor				1.00				1.00	0.98			1.00
Fr _t					0.850				0.850			
Fl _t Protected		0.965		0.984				0.999				0.950
Satd. Flow (prot)	0	1834	0	1833	1583	0	0	1879	1599	0	0	1805
Fl _t Permitted		0.214		0.887				0.995				0.134
Satd. Flow (perm)	0	407	0	1647	1583	0	0	1872	1575	0	0	254
Right Turn on Red							Yes			Yes		
Satd. Flow (RTOR)					126				758			
Link Speed (mph)		25		25				25				
Link Distance (ft)		1144		887				1060				
Travel Time (s)		31.2		24.2				28.9				
Confl. Peds. (#/hr)			5				11			3		3
Confl. Bikes (#/hr)												
Peak Hour Factor	0.83	0.83	0.78	0.78	0.78	0.78	0.73	0.73	0.73	0.73	0.78	0.78
Heavy Vehicles (%)	0%	0%	2%	2%	2%	2%	1%	1%	1%	1%	0%	0%
Adj. Flow (vph)	53	19	6	12	94	8	3	236	0	30	3	149
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	72	0	18	102	0	0	239	30	0	0	152
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Left	Left	Right	Right	Left	Left	Right	Right	Left	Left
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	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		15		9	9	15		9	9	15	15
Number of Detectors	1	2	1	2	1		1	2	1		1	1
Detector Template	Left	Thru	Left	Thru	Right		Left	Thru	Right		Left	Left
Leading Detector (ft)	20	100	20	100	20		20	100	20		20	20
Trailing Detector (ft)	0	0	0	0	0		0	0	0		0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0	0		0	0
Detector 1 Size(ft)	20	6	20	6	20		20	6	20		20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94		94				94				
Detector 2 Size(ft)		6		6				6				
Detector 2 Type		Cl+Ex		Cl+Ex				Cl+Ex				
Detector 2 Channel												



Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	286	18
Future Volume (vph)	286	18
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		0
Storage Lanes		0
Taper Length (ft)		
Lane Util. Factor	1.00	1.00
Ped Bike Factor	1.00	
Fr _t	0.991	
Flt Protected		
Satd. Flow (prot)	1878	0
Flt Permitted		
Satd. Flow (perm)	1878	0
Right Turn on Red		Yes
Satd. Flow (RTOR)	3	
Link Speed (mph)	25	
Link Distance (ft)	774	
Travel Time (s)	21.1	
Confl. Peds. (#/hr)		11
Confl. Bikes (#/hr)		4
Peak Hour Factor	0.78	0.78
Heavy Vehicles (%)	0%	0%
Adj. Flow (vph)	367	23
Shared Lane Traffic (%)		
Lane Group Flow (vph)	390	0
Enter Blocked Intersection	No	No
Lane Alignment	Left	Right
Median Width(ft)	12	
Link Offset(ft)	24	
Crosswalk Width(ft)	16	
Two way Left Turn Lane		
Headway Factor	1.00	1.00
Turning Speed (mph)		9
Number of Detectors	2	
Detector Template	Thru	
Leading Detector (ft)	100	
Trailing Detector (ft)	0	
Detector 1 Position(ft)	0	
Detector 1 Size(ft)	6	
Detector 1 Type	Cl+Ex	
Detector 1 Channel		
Detector 1 Extend (s)	0.0	
Detector 1 Queue (s)	0.0	
Detector 1 Delay (s)	0.0	
Detector 2 Position(ft)	94	
Detector 2 Size(ft)	6	
Detector 2 Type	Cl+Ex	
Detector 2 Channel		

Lanes, Volumes, Timings

Central Avenue Safety Improvement

1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)

05/22/2020



Lane Group	EBL2	EBT	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL2	SBL
Detector 2 Extend (s)		0.0		0.0				0.0				
Turn Type	Perm	NA	Perm	NA	Perm		Perm	NA	Perm		Perm	Perm
Protected Phases		2		1				4				
Permitted Phases	2		1		1		4		4		3	3
Detector Phase	2	2	1	1	1		4	4	4		3	3
Switch Phase												
Minimum Initial (s)	6.0	6.0	10.0	10.0	10.0		9.0	9.0	9.0		13.0	13.0
Minimum Split (s)	24.0	24.0	14.6	14.6	14.6		29.0	29.0	29.0		28.0	28.0
Total Split (s)	21.7	21.7	15.6	15.6	15.6		28.7	28.7	28.7		31.0	31.0
Total Split (%)	22.4%	22.4%	16.1%	16.1%	16.1%		29.6%	29.6%	29.6%		32.0%	32.0%
Maximum Green (s)	17.1	17.1	11.0	11.0	11.0		24.1	24.1	24.1		26.0	26.0
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6		3.6	3.6	3.6		4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0			0.0
Total Lost Time (s)		4.6		4.6	4.6			4.6	4.6			5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag		Lag	Lag	Lag		Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes
Vehicle Extension (s)	1.5	1.5	2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0
Recall Mode	C-Max	C-Max	None	None	None		Max	Max	Max		None	None
Walk Time (s)	7.0	7.0					7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	16.0	16.0					21.0	21.0	21.0		20.0	20.0
Pedestrian Calls (#/hr)	5	5					3	3	3		11	11
Act Effct Green (s)		17.1		10.0	10.0			24.1	24.1			29.9
Actuated g/C Ratio		0.18		0.10	0.10			0.25	0.25			0.31
v/c Ratio		1.01		0.11	0.37			0.51	0.03			1.95
Control Delay		154.9		41.2	8.8			36.0	0.0			498.9
Queue Delay		0.0		0.0	0.0			0.0	0.0			0.0
Total Delay		154.9		41.2	8.8			36.0	0.0			498.9
LOS		F		D	A			D	A			F
Approach Delay		154.9		13.6				32.0				
Approach LOS		F		B				C				

Intersection Summary

Area Type: Other
 Cycle Length: 97
 Actuated Cycle Length: 97
 Offset: 4 (4%), Referenced to phase 2:EBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.95
 Intersection Signal Delay: 111.4 Intersection LOS: F
 Intersection Capacity Utilization 84.6% ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)





Lane Group	SBT	SBR
Detector 2 Extend (s)	0.0	
Turn Type	NA	
Protected Phases	3	
Permitted Phases		
Detector Phase	3	
Switch Phase		
Minimum Initial (s)	13.0	
Minimum Split (s)	28.0	
Total Split (s)	31.0	
Total Split (%)	32.0%	
Maximum Green (s)	26.0	
Yellow Time (s)	4.0	
All-Red Time (s)	1.0	
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	5.0	
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	2.0	
Recall Mode	None	
Walk Time (s)	7.0	
Flash Dont Walk (s)	20.0	
Pedestrian Calls (#/hr)	11	
Act Effct Green (s)	29.9	
Actuated g/C Ratio	0.31	
v/c Ratio	0.67	
Control Delay	37.3	
Queue Delay	0.0	
Total Delay	37.3	
LOS	D	
Approach Delay	166.7	
Approach LOS	F	
Intersection Summary		

Lanes, Volumes, Timings
2: 3rd St & Central Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	311	12	24	172	49	8	17	22	74	15	9
Future Volume (vph)	8	311	12	24	172	49	8	17	22	74	15	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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr t		0.995			0.973			0.938			0.988	
Fl t Protected		0.999			0.995			0.991			0.964	
Satd. Flow (prot)	0	1870	0	0	1839	0	0	1766	0	0	1810	0
Fl t Permitted		0.999			0.995			0.991			0.964	
Satd. Flow (perm)	0	1870	0	0	1839	0	0	1766	0	0	1810	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		782			216			641			365	
Travel Time (s)		21.3			5.9			17.5			10.0	
Confl. Peds. (#/hr)	17		23	23		17	23					23
Confl. Bikes (#/hr)			12									1
Peak Hour Factor	0.77	0.77	0.77	0.82	0.82	0.82	0.59	0.59	0.59	0.68	0.68	0.68
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	10	404	16	29	210	60	14	29	37	109	22	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	430	0	0	299	0	0	80	0	0	144	0
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)		0			0			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
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	44.3%					ICU Level of Service A						
Analysis Period (min)	15											

Lanes, Volumes, Timings
3: Ballena Blvd/4th St & Central Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	333	57	85	237	21	19	11	90	17	16	3
Future Volume (vph)	1	333	57	85	237	21	19	11	90	17	16	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0	95		0	0		0	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	60			90			25			25		
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
Ped Bike Factor	0.99	1.00		0.99	1.00			0.99	0.98		1.00	
Fr _t		0.978			0.988				0.850		0.989	
Fl _t Protected	0.950			0.950				0.970			0.977	
Satd. Flow (prot)	1787	3479	0	1805	3556	0	0	1843	1615	0	1832	0
Fl _t Permitted	0.950			0.950				0.780			0.830	
Satd. Flow (perm)	1769	3479	0	1790	3556	0	0	1473	1584	0	1553	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		46			22				103			4
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		501			1066			474			334	
Travel Time (s)		13.7			29.1			12.9			9.1	
Confl. Peds. (#/hr)	9		30	30		9	16		7	7		16
Confl. Bikes (#/hr)			12						2			1
Peak Hour Factor	0.84	0.84	0.84	0.81	0.81	0.81	0.88	0.88	0.88	0.75	0.75	0.75
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	396	68	105	293	26	22	13	102	23	21	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	464	0	105	319	0	0	35	102	0	48	0
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			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	2		1	2		1	2	1	1		2
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left		Thru
Leading Detector (ft)	20	100		20	100		20	100	20	20		100
Trailing Detector (ft)	0	0		0	0		0	0	0	0		0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0		0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20		6
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
3: Ballena Blvd/4th St & Central Ave

Central Avenue Safety Improvement

05/22/2020

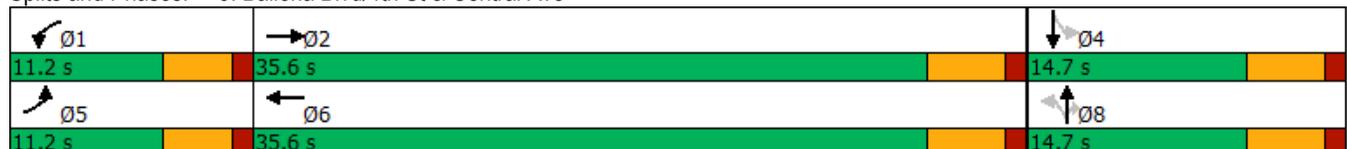


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		
Detector Phase	5	2		1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	5.0	6.0		5.0	6.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	9.5	35.0		9.5	19.0		28.0	28.0	28.0	30.0	30.0	
Total Split (s)	11.2	35.6		11.2	35.6		14.7	14.7	14.7	14.7	14.7	
Total Split (%)	18.2%	57.9%		18.2%	57.9%		23.9%	23.9%	23.9%	23.9%	23.9%	
Maximum Green (s)	7.0	31.0		7.0	31.0		10.1	10.1	10.1	10.1	10.1	
Yellow Time (s)	3.2	3.6		3.2	3.6		3.6	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	4.2	4.6		4.2	4.6			4.6	4.6		4.6	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	1.6	2.2		1.6	2.2		2.2	2.2	2.2	2.2	2.2	
Recall Mode	None	None		None	None		None	None	None	None	None	
Walk Time (s)		8.0			8.0		8.0	8.0	8.0	8.0	8.0	
Flash Dont Walk (s)		26.0			10.0		19.0	19.0	19.0	21.0	21.0	
Pedestrian Calls (#/hr)		30			9		7	7	7	16	16	
Act Effect Green (s)	9.7	22.7		10.5	26.7			14.0	14.0		14.0	
Actuated g/C Ratio	0.24	0.56		0.26	0.66			0.35	0.35		0.35	
v/c Ratio	0.00	0.23		0.22	0.13			0.07	0.17		0.09	
Control Delay	32.0	8.8		28.2	6.0			19.2	5.9		17.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	32.0	8.8		28.2	6.0			19.2	5.9		17.9	
LOS	C	A		C	A			B	A		B	
Approach Delay		8.8			11.5			9.3			17.9	
Approach LOS		A			B			A			B	

Intersection Summary

Area Type:	Other
Cycle Length:	61.5
Actuated Cycle Length:	40.3
Natural Cycle:	75
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.23
Intersection Signal Delay:	10.4
Intersection LOS:	B
Intersection Capacity Utilization:	56.2%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 3: Ballena Blvd/4th St & Central Ave



Lanes, Volumes, Timings
4: Central Ave & 5th St



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (vph)	43	414	373	60	46	42
Future Volume (vph)	43	414	373	60	46	42
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						
Fr t			0.979		0.935	
Fl t Protected		0.995			0.975	
Satd. Flow (prot)	0	3556	3534	0	1715	0
Fl t Permitted		0.995			0.975	
Satd. Flow (perm)	0	3556	3534	0	1715	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		1066	1602		412	
Travel Time (s)		29.1	43.7		11.2	
Confl. Peds. (#/hr)	13			13		49
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.89	0.89	0.97	0.97	0.74	0.74
Heavy Vehicles (%)	1%	1%	0%	0%	1%	1%
Adj. Flow (vph)	48	465	385	62	62	57
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	513	447	0	119	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
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	47.5%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings
5: Central Ave & Webster St

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	474	4	17	401	205	18	39	31	559	30	86
Future Volume (vph)	61	474	4	17	401	205	18	39	31	559	30	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor		1.00			0.96			0.97		0.95	0.94	
Fr _t		0.999			0.951			0.952			0.962	
Fl _t Protected		0.994			0.999			0.990		0.950	0.968	
Satd. Flow (prot)	0	3511	0	0	3220	0	0	1714	0	1681	1605	0
Fl _t Permitted		0.552			0.817			0.990		0.950	0.968	
Satd. Flow (perm)	0	1944	0	0	2631	0	0	1695	0	1604	1557	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			65			22			17	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1602			1180			338			695	
Travel Time (s)		43.7			32.2			9.2			19.0	
Confl. Peds. (#/hr)	67		32	32		67	59		36	36		59
Confl. Bikes (#/hr)			10			6			3			6
Peak Hour Factor	0.83	0.83	0.83	0.90	0.90	0.90	0.74	0.74	0.74	0.94	0.94	0.94
Adj. Flow (vph)	73	571	5	19	446	228	24	53	42	595	32	91
Shared Lane Traffic (%)										39%		
Lane Group Flow (vph)	0	649	0	0	693	0	0	119	0	363	355	0
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)		0			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	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
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	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		4			8		2	2		6	6	
Permitted Phases	4			8								

Lanes, Volumes, Timings
5: Central Ave & Webster St

Central Avenue Safety Improvement

05/22/2020

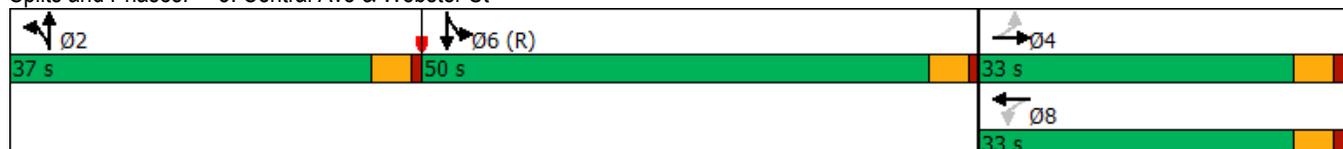


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.2	22.2		22.2	22.2		25.0	25.0		25.0	25.0	
Total Split (s)	33.0	33.0		33.0	33.0		37.0	37.0		50.0	50.0	
Total Split (%)	27.5%	27.5%		27.5%	27.5%		30.8%	30.8%		41.7%	41.7%	
Maximum Green (s)	28.2	28.2		28.2	28.2		32.4	32.4		45.4	45.4	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.2	1.2		1.2	1.2		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		4.8			4.8			4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.4	2.4		2.4	2.4		2.5	2.5		2.5	2.5	
Recall Mode	Min	Min		Min	Min		Min	Min		C-Max	C-Max	
Walk Time (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	32	32		67	67		37	37		61	61	
Act Effct Green (s)		28.2			28.2			17.6		60.2	60.2	
Actuated g/C Ratio		0.24			0.24			0.15		0.50	0.50	
v/c Ratio		1.42			1.04			0.44		0.43	0.44	
Control Delay		236.7			85.7			41.0		26.8	25.9	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		236.7			85.7			41.0		26.8	25.9	
LOS		F			F			D		C	C	
Approach Delay		236.7			85.7			41.0			26.3	
Approach LOS		F			F			D			C	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 72 (60%), Referenced to phase 6:SBTL, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.42
 Intersection Signal Delay: 108.7 Intersection LOS: F
 Intersection Capacity Utilization 74.3% ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 5: Central Ave & Webster St



Lanes, Volumes, Timings
6: 8th St & Central Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	425	694	26	363	92	276	260	14	48	322	10
Future Volume (vph)	14	425	694	26	363	92	276	260	14	48	322	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		100	0		0	85		0	0		0
Storage Lanes	0		1	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00	0.91		0.99		0.98	1.00			1.00	
Fr _t			0.850		0.971			0.993			0.997	
Fl _t Protected		0.998			0.997		0.950				0.994	
Satd. Flow (prot)	0	3532	1583	0	3380	0	1770	1848	0	0	1843	0
Fl _t Permitted		0.928			0.881		0.950				0.916	
Satd. Flow (perm)	0	3283	1434	0	2984	0	1726	1848	0	0	1698	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			689		30			3			1	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1180			656			751			703	
Travel Time (s)		32.2			17.9			20.5			19.2	
Confl. Peds. (#/hr)	19		18	18		19	40		4	4		40
Confl. Bikes (#/hr)			12			3			11			5
Peak Hour Factor	0.78	0.78	0.78	0.91	0.91	0.91	0.85	0.85	0.85	0.96	0.96	0.96
Adj. Flow (vph)	18	545	890	29	399	101	325	306	16	50	335	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	563	890	0	529	0	325	322	0	0	395	0
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)		0			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	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
6: 8th St & Central Ave

Central Avenue Safety Improvement

05/22/2020

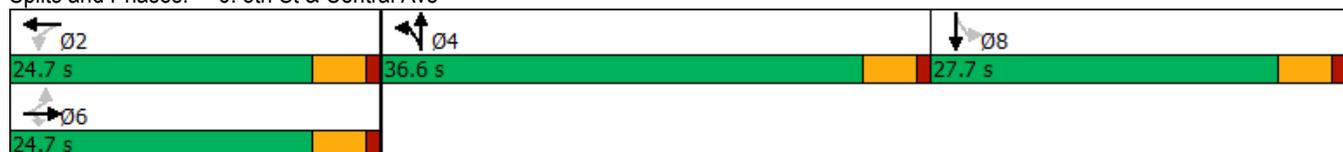


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	Perm	NA		Split	NA		Perm	NA	
Protected Phases		6			2		4	4			8	
Permitted Phases	6		6	2						8		
Detector Phase	6	6	6	2	2		4	4		8	8	
Switch Phase												
Minimum Initial (s)	17.0	17.0	17.0	17.0	17.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	21.6	21.6	21.6	21.6	21.6		28.0	28.0		26.0	26.0	
Total Split (s)	24.7	24.7	24.7	24.7	24.7		36.6	36.6		27.7	27.7	
Total Split (%)	27.8%	27.8%	27.8%	27.8%	27.8%		41.1%	41.1%		31.1%	31.1%	
Maximum Green (s)	20.1	20.1	20.1	20.1	20.1		32.0	32.0		23.1	23.1	
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0			0.0	
Total Lost Time (s)		4.6	4.6		4.6		4.6	4.6			4.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Recall Mode	Min	Min	Min	Min	Min		Min	Min		Min	Min	
Walk Time (s)	0.0	0.0	0.0	7.0	7.0		9.0	9.0		4.0	4.0	
Flash Dont Walk (s)	14.0	14.0	14.0	11.0	11.0		18.0	18.0		21.0	21.0	
Pedestrian Calls (#/hr)	20	20	20	21	21		4	4		40	40	
Act Effect Green (s)		20.2	20.2		20.2		21.8	21.8			23.0	
Actuated g/C Ratio		0.26	0.26		0.26		0.28	0.28			0.29	
v/c Ratio		0.67	1.01		0.67		0.66	0.63			0.80	
Control Delay		31.7	43.1		30.6		33.0	31.1			39.9	
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	
Total Delay		31.7	43.1		30.6		33.0	31.1			39.9	
LOS		C	D		C		C	C			D	
Approach Delay		38.7			30.6			32.1			39.9	
Approach LOS		D			C			C			D	

Intersection Summary

Area Type: Other
 Cycle Length: 89
 Actuated Cycle Length: 78.8
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.01
 Intersection Signal Delay: 36.0
 Intersection Capacity Utilization 91.5%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service F

Splits and Phases: 6: 8th St & Central Ave



Lanes, Volumes, Timings
7: Sherman St & Encinal Ave & Central Ave

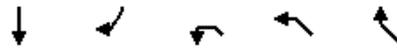
Central Avenue Safety Improvement

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Lane Group	EBL	EBT	EBR	EBR2	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	SBL
Lane Configurations		↕	↗↘		↕			↕				
Traffic Volume (vph)	7	132	376	13	197	24	27	25	5	4	24	121
Future Volume (vph)	7	132	376	13	197	24	27	25	5	4	24	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0			0	0		0			0
Storage Lanes	1		2			0	0		0			0
Taper Length (ft)	60						25					25
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00	0.94		0.99			0.99				
Fr _t			0.850		0.985			0.979				
Fl _t Protected		0.998						0.978				
Satd. Flow (prot)	0	1859	2787	0	1825	0	0	1763	0	0	0	0
Fl _t Permitted		0.981						0.828				
Satd. Flow (perm)	0	1826	2620	0	1825	0	0	1493	0	0	0	0
Right Turn on Red				Yes		Yes				Yes		
Satd. Flow (RTOR)			25		8			5				
Link Speed (mph)		25			25			25				
Link Distance (ft)		342			729			517				
Travel Time (s)		9.3			19.9			14.1				
Confl. Peds. (#/hr)	14			8		14			11	8	11	8
Confl. Bikes (#/hr)				1		2			4	4		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.85	0.85	0.85	0.85	0.85	0.85	0.90	0.90
Adj. Flow (vph)	7	140	400	14	232	28	32	29	6	5	27	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	147	414	0	260	0	0	72	0	0	0	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right	Right	Left	Right	Left	Left	Right	Right	Left	Left
Median Width(ft)		0			0			0				
Link Offset(ft)		0			0			12				
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	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	9		9	15		9	9	15	15
Number of Detectors	1	2	1		2		1	2			1	1
Detector Template	Left	Thru	Right		Thru		Left	Thru			Left	Left
Leading Detector (ft)	20	100	20		100		20	100			20	20
Trailing Detector (ft)	0	0	0		0		0	0			0	0
Detector 1 Position(ft)	0	0	0		0		0	0			0	0
Detector 1 Size(ft)	20	6	20		6		20	6			20	20
Detector 1 Type	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
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
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				

Lanes, Volumes, Timings
7: Sherman St & Encinal Ave & Central Ave



Lane Group	SBT	SBR	NWL2	NWL	NWR
Lane Configurations	↕			↔	
Traffic Volume (vph)	76	9	2	319	37
Future Volume (vph)	76	9	2	319	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Storage Length (ft)		0		0	0
Storage Lanes		0		2	0
Taper Length (ft)				25	
Lane Util. Factor	1.00	1.00	0.95	0.97	0.95
Ped Bike Factor	0.97			0.98	
Fr _t	0.995			0.985	
Fl _t Protected	0.969			0.957	
Satd. Flow (prot)	1795	0	0	3399	0
Fl _t Permitted	0.793			0.953	
Satd. Flow (perm)	1422	0	0	3317	0
Right Turn on Red		Yes			
Satd. Flow (RTOR)	3				
Link Speed (mph)	25			25	
Link Distance (ft)	722			680	
Travel Time (s)	19.7			18.5	
Confl. Peds. (#/hr)			8		
Confl. Bikes (#/hr)		4			1
Peak Hour Factor	0.90	0.90	0.92	0.92	0.92
Adj. Flow (vph)	84	10	2	347	40
Shared Lane Traffic (%)					
Lane Group Flow (vph)	255	0	0	389	0
Enter Blocked Intersection	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right
Median Width(ft)	0			24	
Link Offset(ft)	-12			0	
Crosswalk Width(ft)	16			16	
Two way Left Turn Lane					
Headway Factor	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15	15	9
Number of Detectors	2		1	1	
Detector Template	Thru		Left	Left	
Leading Detector (ft)	100		20	20	
Trailing Detector (ft)	0		0	0	
Detector 1 Position(ft)	0		0	0	
Detector 1 Size(ft)	6		20	20	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel					
Detector 1 Extend (s)	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	
Detector 2 Position(ft)	94				
Detector 2 Size(ft)	6				
Detector 2 Type	Cl+Ex				
Detector 2 Channel					
Detector 2 Extend (s)	0.0				

Lanes, Volumes, Timings
7: Sherman St & Encinal Ave & Central Ave

Central Avenue Safety Improvement

05/22/2020

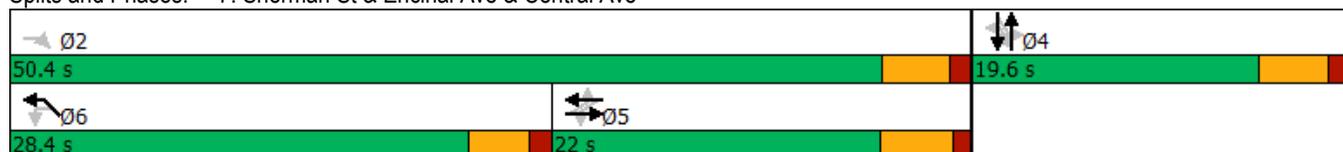


Lane Group	EBL	EBT	EBR	EBR2	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	SBL
Turn Type	Perm	NA	custom		NA		Perm	NA			Perm	Perm
Protected Phases		5			5			4				
Permitted Phases	5		2				4				4	4
Detector Phase	5	5	2		5		4	4			4	4
Switch Phase												
Minimum Initial (s)	11.0	11.0	4.0		11.0		4.0	4.0			4.0	4.0
Minimum Split (s)	15.9	15.9	8.8		15.9		8.6	8.6			8.6	8.6
Total Split (s)	22.0	22.0	50.4		22.0		19.6	19.6			19.6	19.6
Total Split (%)	31.4%	31.4%	72.0%		31.4%		28.0%	28.0%			28.0%	28.0%
Maximum Green (s)	17.1	17.1	45.6		17.1		15.0	15.0			15.0	15.0
Yellow Time (s)	3.9	3.9	3.6		3.9		3.6	3.6			3.6	3.6
All-Red Time (s)	1.0	1.0	1.2		1.0		1.0	1.0			1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0			0.0				
Total Lost Time (s)		4.9	4.8		4.9			4.6				
Lead/Lag	Lag	Lag			Lag							
Lead-Lag Optimize?	Yes	Yes			Yes							
Vehicle Extension (s)	0.2	0.2	3.0		0.2		3.0	3.0			3.0	3.0
Recall Mode	Max	Max	Max		Max		Max	Max			Max	Max
Walk Time (s)			0.0				0.0	0.0			0.0	0.0
Flash Dont Walk (s)			7.0				7.0	7.0			7.0	7.0
Pedestrian Calls (#/hr)			9				12	12			12	12
Act Effct Green (s)		17.1	45.6		17.1			15.0				
Actuated g/C Ratio		0.24	0.65		0.24			0.21				
v/c Ratio		0.33	0.24		0.58			0.22				
Control Delay		24.3	5.1		28.5			23.6				
Queue Delay		0.0	0.0		0.0			0.0				
Total Delay		24.3	5.1		28.5			23.6				
LOS		C	A		C			C				
Approach Delay		10.1			28.5			23.6				
Approach LOS		B			C			C				

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 22.7
 Intersection Capacity Utilization 56.3%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service B

Splits and Phases: 7: Sherman St & Encinal Ave & Central Ave



Lanes, Volumes, Timings
7: Sherman St & Encinal Ave & Central Ave

Central Avenue Safety Improvement

05/22/2020



Lane Group	SBT	SBR	NWL2	NWL	NWR
Turn Type	NA		Perm	Prot	
Protected Phases	4			6	
Permitted Phases			6		
Detector Phase	4		6	6	
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	
Minimum Split (s)	8.6		8.4	8.4	
Total Split (s)	19.6		28.4	28.4	
Total Split (%)	28.0%		40.6%	40.6%	
Maximum Green (s)	15.0		24.0	24.0	
Yellow Time (s)	3.6		3.2	3.2	
All-Red Time (s)	1.0		1.2	1.2	
Lost Time Adjust (s)	0.0			0.0	
Total Lost Time (s)	4.6			4.4	
Lead/Lag			Lead	Lead	
Lead-Lag Optimize?			Yes	Yes	
Vehicle Extension (s)	3.0		3.0	3.0	
Recall Mode	Max		Max	Max	
Walk Time (s)	0.0		0.0	0.0	
Flash Dont Walk (s)	7.0		7.0	7.0	
Pedestrian Calls (#/hr)	12		7	7	
Act Effct Green (s)	15.0			24.0	
Actuated g/C Ratio	0.21			0.34	
v/c Ratio	0.83			0.34	
Control Delay	51.1			18.2	
Queue Delay	0.0			0.0	
Total Delay	51.1			18.2	
LOS	D			B	
Approach Delay	51.1			18.2	
Approach LOS	D			B	

Intersection Summary

Lanes, Volumes, Timings
8: Webster St & Santa Clara Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	55	13	25	67	62	9	255	27	70	552	38
Future Volume (vph)	18	55	13	25	67	62	9	255	27	70	552	38
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	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor		0.99			0.98			0.99			0.99	
Fr _t		0.979			0.946			0.986			0.991	
Fl _t Protected		0.990			0.992			0.999			0.995	
Satd. Flow (prot)	0	1741	0	0	1665	0	0	3456	0	0	3473	0
Fl _t Permitted		0.924			0.945			0.937			0.880	
Satd. Flow (perm)	0	1616	0	0	1579	0	0	3239	0	0	3059	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			64			19			15	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		745			1178			695			689	
Travel Time (s)		20.3			32.1			19.0			18.8	
Confl. Peds. (#/hr)	43		40	40		43	60		70	70		60
Confl. Bikes (#/hr)			9			3			5			3
Peak Hour Factor	0.77	0.77	0.77	0.88	0.88	0.88	0.87	0.87	0.87	0.96	0.96	0.96
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	23	71	17	28	76	70	10	293	31	73	575	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	111	0	0	174	0	0	334	0	0	688	0
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)		0			0			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	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
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	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			6		5	2	

Lanes, Volumes, Timings
8: Webster St & Santa Clara Ave

Central Avenue Safety Improvement

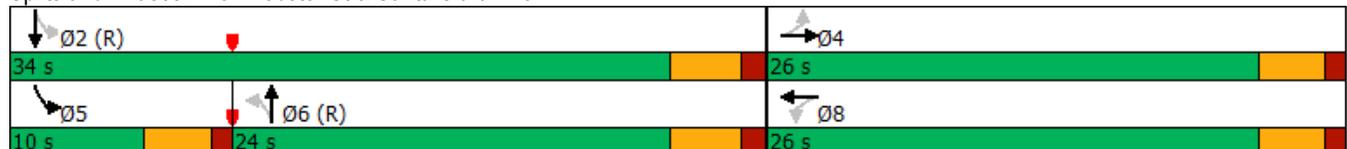
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			6			2		
Detector Phase	4	4		8	8		6	6		5	2	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		5.0	5.0		4.0	5.0	
Minimum Split (s)	23.0	23.0		23.0	23.0		31.0	31.0		9.5	31.0	
Total Split (s)	26.0	26.0		26.0	26.0		24.0	24.0		10.0	34.0	
Total Split (%)	43.3%	43.3%		43.3%	43.3%		40.0%	40.0%		16.7%	56.7%	
Maximum Green (s)	22.0	22.0		22.0	22.0		19.6	19.6		6.0	29.6	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.2	3.2		3.0	3.2	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.2	1.2		1.0	1.2	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.0			4.0			4.4			4.4	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	1.8	1.8		1.8	1.8		2.0	2.0		0.2	2.0	
Recall Mode	None	None		None	None		C-Max	C-Max		None	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		23.0	23.0			23.0	
Pedestrian Calls (#/hr)	40	40		43	43		71	71			60	
Act Effect Green (s)		15.3			15.3			36.3			36.3	
Actuated g/C Ratio		0.26			0.26			0.60			0.60	
v/c Ratio		0.26			0.39			0.17			0.37	
Control Delay		14.1			12.2			9.7			5.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		14.1			12.2			9.7			5.1	
LOS		B			B			A			A	
Approach Delay		14.1			12.2			9.7			5.1	
Approach LOS		B			B			A			A	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 55 (92%), Referenced to phase 2:SBTL and 6:NBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.39
 Intersection Signal Delay: 8.0 Intersection LOS: A
 Intersection Capacity Utilization 77.6% ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 8: Webster St & Santa Clara Ave



Lanes, Volumes, Timings
9: 8th St & Santa Clara Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	157	9	7	127	66	8	321	27	48	386	18
Future Volume (vph)	22	157	9	7	127	66	8	321	27	48	386	18
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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.98			0.99			0.99	
Flt		0.993			0.956			0.990			0.995	
Flt Protected		0.994			0.998			0.999			0.995	
Satd. Flow (prot)	0	1779	0	0	1693	0	0	1868	0	0	1855	0
Flt Permitted		0.956			0.991			0.988			0.924	
Satd. Flow (perm)	0	1706	0	0	1679	0	0	1846	0	0	1718	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			36			6			3	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1178			660			703			684	
Travel Time (s)		32.1			18.0			19.2			18.7	
Confl. Peds. (#/hr)	23		33	33		23	37		26	26		37
Confl. Bikes (#/hr)			14			3			3			1
Peak Hour Factor	0.92	0.92	0.92	0.93	0.93	0.93	0.86	0.86	0.86	0.84	0.84	0.84
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	0%	0%	0%	1%	1%	1%
Adj. Flow (vph)	24	171	10	8	137	71	9	373	31	57	460	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	205	0	0	216	0	0	413	0	0	538	0
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)		0			0			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
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	29.0	29.0		29.0	29.0		20.0	20.0		20.0	20.0	
Total Split (s)	44.2	44.2		44.2	44.2		44.6	44.6		44.6	44.6	
Total Split (%)	49.8%	49.8%		49.8%	49.8%		50.2%	50.2%		50.2%	50.2%	
Maximum Green (s)	40.0	40.0		40.0	40.0		40.0	40.0		40.0	40.0	
Yellow Time (s)	3.2	3.2		3.2	3.2		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.2			4.2			4.6			4.6	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	18.0	18.0		18.0	18.0		4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	33	33		23	23		26	26		37	37	
Act Effct Green (s)		40.0			40.0			40.0			40.0	
Actuated g/C Ratio		0.45			0.45			0.45			0.45	

Lanes, Volumes, Timings
9: 8th St & Santa Clara Ave

Central Avenue Safety Improvement

05/22/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.27			0.28			0.50			0.69	
Control Delay		16.1			13.8			19.5			25.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		16.1			13.8			19.5			25.2	
LOS		B			B			B			C	
Approach Delay		16.1			13.8			19.5			25.2	
Approach LOS		B			B			B			C	

Intersection Summary

Area Type:	Other
Cycle Length:	88.8
Actuated Cycle Length:	88.8
Offset:	0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle:	60
Control Type:	Pretimed
Maximum v/c Ratio:	0.69
Intersection Signal Delay:	20.3
Intersection Capacity Utilization	77.3%
Analysis Period (min)	15
Intersection LOS:	C
ICU Level of Service	D

Splits and Phases: 9: 8th St & Santa Clara Ave

	44.2 s		44.6 s
	44.2 s		44.6 s

Lanes, Volumes, Timings
10: Sherman St & Santa Clara Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	254	31	7	212	33	16	114	5	92	260	25
Future Volume (vph)	13	254	31	7	212	33	16	114	5	92	260	25
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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr t		0.986			0.982			0.995			0.991	
Fl t Protected		0.998			0.999			0.994			0.988	
Satd. Flow (prot)	0	1815	0	0	1810	0	0	1879	0	0	1860	0
Fl t Permitted		0.998			0.999			0.994			0.988	
Satd. Flow (perm)	0	1815	0	0	1810	0	0	1879	0	0	1860	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		526			571			722			667	
Travel Time (s)		14.3			15.6			19.7			18.2	
Confl. Peds. (#/hr)	13		23	23		13	1		19	19		1
Confl. Bikes (#/hr)			8			6			2			
Peak Hour Factor	0.84	0.84	0.84	0.90	0.90	0.90	0.91	0.91	0.91	0.98	0.98	0.98
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	15	302	37	8	236	37	18	125	5	94	265	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	354	0	0	281	0	0	148	0	0	385	0
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)		0			0			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
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	55.1%						ICU Level of Service B					
Analysis Period (min)	15											

Lanes, Volumes, Timings
11: Webster St & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	283	47	41	190	29	6	299	35	48	593	97
Future Volume (vph)	87	283	47	41	190	29	6	299	35	48	593	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	165		0	140		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	80			40			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.99	1.00		0.99	1.00			1.00				0.99
Fr't		0.979			0.980			0.985				0.980
Flt Protected	0.950			0.950				0.999				0.997
Satd. Flow (prot)	1787	3482	0	1805	3525	0	0	3466	0	0	3435	0
Flt Permitted	0.596			0.505				0.946				0.911
Satd. Flow (perm)	1109	3482	0	947	3525	0	0	3282	0	0	3134	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		39			33			26				35
Link Speed (mph)		25			25			25				25
Link Distance (ft)		742			1168			689				384
Travel Time (s)		20.2			31.9			18.8				10.5
Confl. Peds. (#/hr)	23		28	28		23	53		45	45		53
Confl. Bikes (#/hr)			2									1
Peak Hour Factor	0.94	0.94	0.94	0.87	0.87	0.87	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	93	301	50	47	218	33	6	318	37	51	631	103
Shared Lane Traffic (%)												
Lane Group Flow (vph)	93	351	0	47	251	0	0	361	0	0	785	0
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			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	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
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	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
11: Webster St & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020

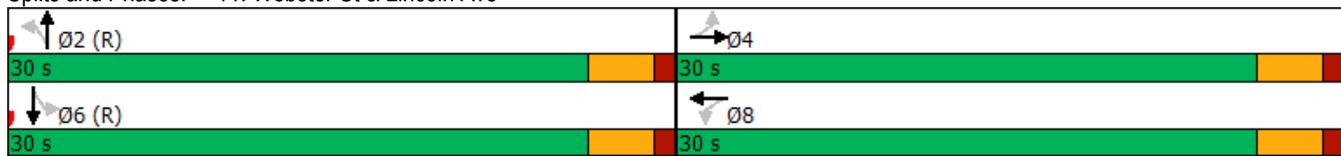


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA										
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		27.0	27.0		24.0	24.0		25.0	25.0	
Total Split (s)	30.0	30.0		30.0	30.0		30.0	30.0		30.0	30.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	26.0	26.0		26.0	26.0		26.0	26.0		26.0	26.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		10.0	10.0		7.0	7.0		8.0	8.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	28	28		23	23		46	46		53	53	
Act Effct Green (s)	15.7	15.7		15.7	15.7			36.3			36.3	
Actuated g/C Ratio	0.26	0.26		0.26	0.26			0.60			0.60	
v/c Ratio	0.32	0.37		0.19	0.27			0.18			0.41	
Control Delay	17.8	15.6		15.3	14.0			14.8			8.8	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	17.8	15.6		15.3	14.0			14.8			8.8	
LOS	B	B		B	B			B			A	
Approach Delay		16.1			14.2			14.8			8.8	
Approach LOS		B			B			B			A	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 37 (62%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.41
 Intersection Signal Delay: 12.5
 Intersection Capacity Utilization 73.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 11: Webster St & Lincoln Ave



Lanes, Volumes, Timings
12: 8th St/Constitution Way & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔	↔	
Traffic Volume (vph)	4	279	18	17	168	176	28	352	30	736	442	16
Future Volume (vph)	4	279	18	17	168	176	28	352	30	736	442	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		60	200		0
Storage Lanes	0		0	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.97	1.00	1.00
Ped Bike Factor		1.00			1.00			1.00		0.99	1.00	
Fr _t		0.991			0.927			0.989			0.995	
Fl _t Protected		0.999			0.998			0.997		0.950		
Satd. Flow (prot)	0	3530	0	0	3340	0	0	3552	0	3467	1871	0
Fl _t Permitted		0.949			0.926			0.997		0.950		
Satd. Flow (perm)	0	3353	0	0	3097	0	0	3551	0	3419	1871	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			187			9				2
Link Speed (mph)		25			25			25				25
Link Distance (ft)		1168			670			684				583
Travel Time (s)		31.9			18.3			18.7				15.9
Confl. Peds. (#/hr)			14	14			6		15	15		6
Confl. Bikes (#/hr)			1						3			
Peak Hour Factor	0.90	0.90	0.90	0.94	0.94	0.94	0.83	0.83	0.83	0.89	0.89	0.89
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Adj. Flow (vph)	4	310	20	18	179	187	34	424	36	827	497	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	334	0	0	384	0	0	494	0	827	515	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru										
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
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	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
12: 8th St/Constitution Way & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		4			8		2	2		6	6	
Permitted Phases	4			8								
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	38.0	38.0		12.6	12.6		27.0	27.0		27.0	27.0	
Total Split (s)	24.6	24.6		24.6	24.6		34.6	34.6		36.6	36.6	
Total Split (%)	25.7%	25.7%		25.7%	25.7%		36.1%	36.1%		38.2%	38.2%	
Maximum Green (s)	20.0	20.0		20.0	20.0		30.0	30.0		32.0	32.0	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		4.6			4.6			4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.5	1.5		1.5	1.5	
Recall Mode	None	None										
Walk Time (s)	10.0	10.0					10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	27.0	27.0					16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	14	14					15	15		6	6	
Act Effct Green (s)		13.9			13.9			16.4		25.7	25.7	
Actuated g/C Ratio		0.19			0.19			0.23		0.36	0.36	
v/c Ratio		0.51			0.51			0.60		0.66	0.76	
Control Delay		29.1			16.2			28.9		24.7	32.0	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		29.1			16.2			28.9		24.7	32.0	
LOS		C			B			C		C	C	
Approach Delay		29.1			16.2			28.9			27.5	
Approach LOS		C			B			C			C	

Intersection Summary

Area Type:	Other
Cycle Length:	95.8
Actuated Cycle Length:	71.3
Natural Cycle:	95
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.76
Intersection Signal Delay:	26.3
Intersection LOS:	C
Intersection Capacity Utilization:	75.1%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 12: 8th St/Constitution Way & Lincoln Ave

Ø2	Ø6	Ø4
34.6 s	36.6 s	24.6 s
		Ø8
		24.6 s

Lanes, Volumes, Timings
13: Sherman St & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	666	109	10	323	28	26	128	16	166	277	26
Future Volume (vph)	24	666	109	10	323	28	26	128	16	166	277	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	60		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	80			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00			1.00			1.00			1.00	
Fr _t		0.979			0.988			0.987			0.993	
Fl _t Protected	0.950				0.999			0.992			0.983	
Satd. Flow (prot)	1805	3517	0	0	3519	0	0	1857	0	0	1852	0
Fl _t Permitted	0.499				0.933			0.889			0.806	
Satd. Flow (perm)	942	3517	0	0	3286	0	0	1663	0	0	1517	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		51			24			10			6	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		546			554			667			570	
Travel Time (s)		14.9			15.1			18.2			15.5	
Confl. Peds. (#/hr)	8		10	10		8	22		8	8		22
Confl. Bikes (#/hr)									2			3
Peak Hour Factor	0.95	0.95	0.95	0.83	0.83	0.83	0.82	0.82	0.82	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	25	701	115	12	389	34	32	156	20	193	322	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	816	0	0	435	0	0	208	0	0	545	0
Enter Blocked Intersection	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
Turn Type	Perm	NA										
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	19.0	19.0		19.0	19.0		28.0	28.0		28.0	28.0	
Total Split (s)	32.2	32.2		32.2	32.2		21.6	21.6		21.6	21.6	
Total Split (%)	59.9%	59.9%		59.9%	59.9%		40.1%	40.1%		40.1%	40.1%	
Maximum Green (s)	28.0	28.0		28.0	28.0		17.0	17.0		17.0	17.0	
Yellow Time (s)	3.2	3.2		3.2	3.2		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0			0.0	
Total Lost Time (s)	4.2	4.2			4.2			4.6			4.6	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		20.0	20.0		20.0	20.0	

Lanes, Volumes, Timings
13: Sherman St & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)	10	10		8	8		8	8		22	22	
Act Effect Green (s)	28.0	28.0			28.0			17.0			17.0	
Actuated g/C Ratio	0.52	0.52			0.52			0.32			0.32	
v/c Ratio	0.05	0.44			0.25			0.39			1.13	
Control Delay	6.8	8.4			7.2			16.3			104.0	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	6.8	8.4			7.2			16.3			104.0	
LOS	A	A			A			B			F	
Approach Delay		8.3			7.2			16.3			104.0	
Approach LOS		A			A			B			F	

Intersection Summary

Area Type:	Other
Cycle Length:	53.8
Actuated Cycle Length:	53.8
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	50
Control Type:	Pretimed
Maximum v/c Ratio:	1.13
Intersection Signal Delay:	34.6
Intersection Capacity Utilization	79.6%
Analysis Period (min)	15
Intersection LOS:	C
ICU Level of Service	D

Splits and Phases: 13: Sherman St & Lincoln Ave

Ø2 (R) 32.2 s	Ø4 21.6 s
Ø6 (R) 32.2 s	Ø8 21.6 s

Lanes, Volumes, Timings

Central Avenue Safety Improvement

1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)

05/22/2020



Lane Group	EBL2	EBT	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL2	SBL
Lane Configurations												
Traffic Volume (vph)	25	4	53	24	165	3	1	358	7	35	4	72
Future Volume (vph)	25	4	53	24	165	3	1	358	7	35	4	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)			0		0		100		0			0
Storage Lanes			0		1		1		1			1
Taper Length (ft)			25				100					25
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
Ped Bike Factor				1.00	0.97			1.00	0.96			0.99
Fr _t					0.850				0.850			
Fl _t Protected		0.959		0.967								0.950
Satd. Flow (prot)	0	1458	0	1767	1553	0	0	1845	1568	0	0	1736
Fl _t Permitted		0.188		0.758				0.999				0.167
Satd. Flow (perm)	0	286	0	1379	1511	0	0	1843	1505	0	0	303
Right Turn on Red							Yes			Yes		
Satd. Flow (RTOR)					126				126			
Link Speed (mph)		25		25				25				
Link Distance (ft)		1144		887				1060				
Travel Time (s)		31.2		24.2				28.9				
Confl. Peds. (#/hr)			3				4			19		19
Confl. Bikes (#/hr)					1	1				10		
Peak Hour Factor	0.50	0.50	0.66	0.66	0.66	0.66	0.79	0.79	0.79	0.79	0.65	0.65
Heavy Vehicles (%)	25%	25%	4%	4%	4%	4%	3%	3%	3%	3%	4%	4%
Adj. Flow (vph)	50	8	80	36	250	5	1	453	9	44	6	111
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	58	0	116	255	0	0	454	53	0	0	117
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Left	Left	Right	Right	Left	Left	Right	Right	Left	Left
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	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		15		9	9	15		9	9	15	15
Number of Detectors	1	2	1	2	1		1	2	1		1	1
Detector Template	Left	Thru	Left	Thru	Right		Left	Thru	Right		Left	Left
Leading Detector (ft)	20	100	20	100	20		20	100	20		20	20
Trailing Detector (ft)	0	0	0	0	0		0	0	0		0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0	0		0	0
Detector 1 Size(ft)	20	6	20	6	20		20	6	20		20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94		94				94				
Detector 2 Size(ft)		6		6				6				
Detector 2 Type		Cl+Ex		Cl+Ex				Cl+Ex				
Detector 2 Channel												



Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	315	143
Future Volume (vph)	315	143
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		0
Storage Lanes		0
Taper Length (ft)		
Lane Util. Factor	1.00	1.00
Ped Bike Factor	0.99	
Fr _t	0.953	
Flt Protected		
Satd. Flow (prot)	1726	0
Flt Permitted		
Satd. Flow (perm)	1726	0
Right Turn on Red		Yes
Satd. Flow (RTOR)	22	
Link Speed (mph)	25	
Link Distance (ft)	774	
Travel Time (s)	21.1	
Confl. Peds. (#/hr)		4
Confl. Bikes (#/hr)		1
Peak Hour Factor	0.65	0.65
Heavy Vehicles (%)	4%	4%
Adj. Flow (vph)	485	220
Shared Lane Traffic (%)		
Lane Group Flow (vph)	705	0
Enter Blocked Intersection	No	No
Lane Alignment	Left	Right
Median Width(ft)	12	
Link Offset(ft)	24	
Crosswalk Width(ft)	16	
Two way Left Turn Lane		
Headway Factor	1.00	1.00
Turning Speed (mph)		9
Number of Detectors	2	
Detector Template	Thru	
Leading Detector (ft)	100	
Trailing Detector (ft)	0	
Detector 1 Position(ft)	0	
Detector 1 Size(ft)	6	
Detector 1 Type	Cl+Ex	
Detector 1 Channel		
Detector 1 Extend (s)	0.0	
Detector 1 Queue (s)	0.0	
Detector 1 Delay (s)	0.0	
Detector 2 Position(ft)	94	
Detector 2 Size(ft)	6	
Detector 2 Type	Cl+Ex	
Detector 2 Channel		

Lanes, Volumes, Timings

Central Avenue Safety Improvement

1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)

05/22/2020



Lane Group	EBL2	EBT	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL2	SBL
Detector 2 Extend (s)		0.0		0.0				0.0				
Turn Type	Perm	NA	Perm	NA	Perm		Perm	NA	Perm		Perm	Perm
Protected Phases		2		1				4				
Permitted Phases	2		1		1		4		4		3	3
Detector Phase	2	2	1	1	1		4	4	4		3	3
Switch Phase												
Minimum Initial (s)	6.0	6.0	10.0	10.0	10.0		9.0	9.0	9.0		13.0	13.0
Minimum Split (s)	24.0	24.0	14.6	14.6	14.6		29.0	29.0	29.0		28.0	28.0
Total Split (s)	24.4	24.4	14.6	14.6	14.6		29.0	29.0	29.0		29.0	29.0
Total Split (%)	25.2%	25.2%	15.1%	15.1%	15.1%		29.9%	29.9%	29.9%		29.9%	29.9%
Maximum Green (s)	19.8	19.8	10.0	10.0	10.0		24.4	24.4	24.4		24.0	24.0
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6		3.6	3.6	3.6		4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0			0.0
Total Lost Time (s)		4.6		4.6	4.6			4.6	4.6			5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag		Lag	Lag	Lag		Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes
Vehicle Extension (s)	1.5	1.5	2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0
Recall Mode	C-Max	C-Max	None	None	None		Max	Max	Max		None	None
Walk Time (s)	7.0	7.0					7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	16.0	16.0					21.0	21.0	21.0		20.0	20.0
Pedestrian Calls (#/hr)	3	3					19	19	19		4	4
Act Effct Green (s)		19.8		10.0	10.0			24.4	24.4			24.0
Actuated g/C Ratio		0.20		0.10	0.10			0.25	0.25			0.25
v/c Ratio		1.00		0.82	0.95			0.98	0.11			1.58
Control Delay		162.4		83.2	67.6			74.9	0.5			345.5
Queue Delay		0.0		0.0	0.0			0.0	0.0			0.0
Total Delay		162.4		83.2	67.6			74.9	0.5			345.5
LOS		F		F	E			E	A			F
Approach Delay		162.4		72.5				67.1				
Approach LOS		F		E				E				

Intersection Summary

Area Type: Other
 Cycle Length: 97
 Actuated Cycle Length: 97
 Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.59
 Intersection Signal Delay: 185.1 Intersection LOS: F
 Intersection Capacity Utilization 94.0% ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)





Lane Group	SBT	SBR
Detector 2 Extend (s)	0.0	
Turn Type	NA	
Protected Phases	3	
Permitted Phases		
Detector Phase	3	
Switch Phase		
Minimum Initial (s)	13.0	
Minimum Split (s)	28.0	
Total Split (s)	29.0	
Total Split (%)	29.9%	
Maximum Green (s)	24.0	
Yellow Time (s)	4.0	
All-Red Time (s)	1.0	
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	5.0	
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	2.0	
Recall Mode	None	
Walk Time (s)	7.0	
Flash Dont Walk (s)	20.0	
Pedestrian Calls (#/hr)	4	
Act Effct Green (s)	24.0	
Actuated g/C Ratio	0.25	
v/c Ratio	1.59	
Control Delay	304.4	
Queue Delay	0.0	
Total Delay	304.4	
LOS	F	
Approach Delay	310.2	
Approach LOS	F	
Intersection Summary		

Lanes, Volumes, Timings
2: 3rd St & Central Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	311	21	193	370	85	14	16	101	50	22	19
Future Volume (vph)	13	311	21	193	370	85	14	16	101	50	22	19
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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr _t		0.992			0.982			0.896			0.971	
Fl _t Protected		0.998			0.985			0.995			0.973	
Satd. Flow (prot)	0	1791	0	0	1820	0	0	1694	0	0	1795	0
Fl _t Permitted		0.998			0.985			0.995			0.973	
Satd. Flow (perm)	0	1791	0	0	1820	0	0	1694	0	0	1795	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		782			216			641			365	
Travel Time (s)		21.3			5.9			17.5			10.0	
Confl. Peds. (#/hr)	60		25	25		60	88					88
Confl. Bikes (#/hr)			1			8						
Peak Hour Factor	0.67	0.67	0.67	0.83	0.83	0.83	0.50	0.50	0.50	0.87	0.87	0.87
Heavy Vehicles (%)	5%	5%	5%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	19	464	31	233	446	102	28	32	202	57	25	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	514	0	0	781	0	0	262	0	0	104	0
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)		0			0			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
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	77.7%						ICU Level of Service D					
Analysis Period (min)	15											

Lanes, Volumes, Timings
3: Ballena Blvd/4th St & Central Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	427	9	49	605	25	33	16	83	75	11	30
Future Volume (vph)	35	427	9	49	605	25	33	16	83	75	11	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0	95		0	0		0	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	60			90			25			25		
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
Ped Bike Factor	1.00	1.00		0.99	1.00			1.00	0.97		0.98	
Fr _t		0.997			0.994				0.850		0.965	
Fl _t Protected	0.950			0.950				0.967			0.969	
Satd. Flow (prot)	1770	3525	0	1787	3547	0	0	1784	1568	0	1767	0
Fl _t Permitted	0.950			0.950				0.799			0.768	
Satd. Flow (perm)	1761	3525	0	1768	3547	0	0	1467	1521	0	1385	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			9				104		25	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		501			1066			474			334	
Travel Time (s)		13.7			29.1			12.9			9.1	
Confl. Peds. (#/hr)	9		57	57		9	14		27	27		14
Confl. Bikes (#/hr)			1			11						
Peak Hour Factor	0.58	0.58	0.58	0.76	0.76	0.76	0.80	0.80	0.80	0.72	0.72	0.72
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	3%	3%	3%	0%	0%	0%
Adj. Flow (vph)	60	736	16	64	796	33	41	20	104	104	15	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	752	0	64	829	0	0	61	104	0	161	0
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			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	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
3: Ballena Blvd/4th St & Central Ave

Central Avenue Safety Improvement

05/22/2020

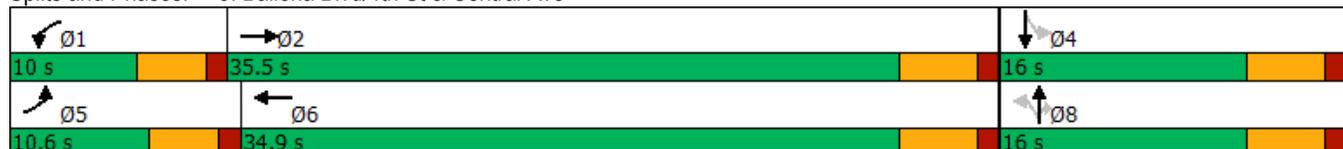


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		
Detector Phase	5	2		1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	5.0	6.0		5.0	6.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	9.5	35.0		9.5	19.0		14.7	14.7	14.7	14.7	14.7	
Total Split (s)	10.6	35.5		10.0	34.9		16.0	16.0	16.0	16.0	16.0	
Total Split (%)	17.2%	57.7%		16.3%	56.7%		26.0%	26.0%	26.0%	26.0%	26.0%	
Maximum Green (s)	6.4	30.9		5.8	30.3		11.4	11.4	11.4	11.4	11.4	
Yellow Time (s)	3.2	3.6		3.2	3.6		3.6	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	4.2	4.6		4.2	4.6			4.6	4.6		4.6	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	1.6	2.2		1.6	2.2		2.2	2.2	2.2	2.2	2.2	
Recall Mode	None	None		None	None		None	None	None	None	None	
Walk Time (s)		8.0			8.0		8.0	8.0	8.0	8.0	8.0	
Flash Dont Walk (s)		26.0			10.0		19.0	19.0	19.0	21.0	21.0	
Pedestrian Calls (#/hr)		57			9		27	27	27	14	14	
Act Effct Green (s)	9.2	29.7		9.0	29.4			17.1	17.1		17.1	
Actuated g/C Ratio	0.17	0.56		0.17	0.55			0.32	0.32		0.32	
v/c Ratio	0.20	0.38		0.21	0.42			0.13	0.19		0.35	
Control Delay	34.3	12.7		35.2	13.3			19.4	5.3		19.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	34.3	12.7		35.2	13.3			19.4	5.3		19.3	
LOS	C	B		D	B			B	A		B	
Approach Delay		14.3			14.9			10.5			19.3	
Approach LOS		B			B			B			B	

Intersection Summary

Area Type:	Other
Cycle Length:	61.5
Actuated Cycle Length:	53.1
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.42
Intersection Signal Delay:	14.6
Intersection LOS:	B
Intersection Capacity Utilization:	67.2%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 3: Ballena Blvd/4th St & Central Ave



Lanes, Volumes, Timings
4: Central Ave & 5th St



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (vph)	131	587	724	48	61	75
Future Volume (vph)	131	587	724	48	61	75
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						
Fr t			0.991		0.925	
Fl t Protected		0.991			0.978	
Satd. Flow (prot)	0	3542	3507	0	1719	0
Fl t Permitted		0.991			0.978	
Satd. Flow (perm)	0	3542	3507	0	1719	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		1066	1602		412	
Travel Time (s)		29.1	43.7		11.2	
Confl. Peds. (#/hr)	47			47		102
Confl. Bikes (#/hr)				10		
Peak Hour Factor	0.80	0.80	0.82	0.82	0.76	0.76
Heavy Vehicles (%)	1%	1%	2%	2%	0%	0%
Adj. Flow (vph)	164	734	883	59	80	99
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	898	942	0	179	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
Sign Control		Stop	Stop		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	65.1%			ICU Level of Service C		
Analysis Period (min)	15					

Lanes, Volumes, Timings
5: Central Ave & Webster St

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	541	5	18	792	271	22	42	60	310	27	72
Future Volume (vph)	81	541	5	18	792	271	22	42	60	310	27	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor		1.00			0.97			0.96		0.95	0.95	
Fr't		0.999			0.962			0.935			0.946	
Fl't Protected		0.994			0.999			0.991		0.950	0.975	
Satd. Flow (prot)	0	3511	0	0	3311	0	0	1666	0	1681	1590	0
Fl't Permitted		0.521			0.930			0.991		0.950	0.975	
Satd. Flow (perm)	0	1840	0	0	3081	0	0	1653	0	1604	1553	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			57			34			21	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1602			1180			338			695	
Travel Time (s)		43.7			32.2			9.2			19.0	
Confl. Peds. (#/hr)	50		31	31		50	40		37	37		40
Confl. Bikes (#/hr)			6			28			5			2
Peak Hour Factor	0.76	0.76	0.76	0.85	0.85	0.85	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	107	712	7	21	932	319	25	48	68	352	31	82
Shared Lane Traffic (%)										33%		
Lane Group Flow (vph)	0	826	0	0	1272	0	0	141	0	236	229	0
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)		0			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	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
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	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		4			8		2	2		6	6	
Permitted Phases	4			8								

Lanes, Volumes, Timings
5: Central Ave & Webster St

Central Avenue Safety Improvement

05/22/2020

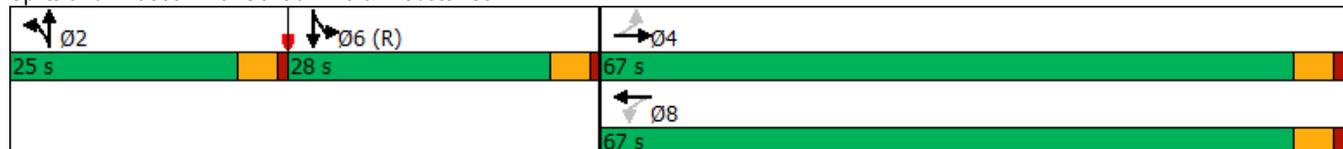


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.2	22.2		22.2	22.2		25.0	25.0		25.0	25.0	
Total Split (s)	67.0	67.0		67.0	67.0		25.0	25.0		28.0	28.0	
Total Split (%)	55.8%	55.8%		55.8%	55.8%		20.8%	20.8%		23.3%	23.3%	
Maximum Green (s)	62.2	62.2		62.2	62.2		20.4	20.4		23.4	23.4	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.2	1.2		1.2	1.2		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.8			4.8			4.6			4.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.4	2.4		2.4	2.4		2.5	2.5		2.5	2.5	
Recall Mode	None	None		None	None		None	None		C-Max	C-Max	
Walk Time (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	31	31		50	50		37	37		40	40	
Act Effct Green (s)		58.2			58.2			15.9			31.9	31.9
Actuated g/C Ratio		0.48			0.48			0.13			0.27	0.27
v/c Ratio		1.20dl			0.83			0.56			0.53	0.52
Control Delay		45.5			30.8			44.4			34.6	30.8
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay		45.5			30.8			44.4			34.6	30.8
LOS		D			C			D			C	C
Approach Delay		45.5			30.8			44.4				32.8
Approach LOS		D			C			D				C

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 17 (14%), Referenced to phase 6:SBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 36.4
 Intersection LOS: D
 Intersection Capacity Utilization 81.4%
 ICU Level of Service D
 Analysis Period (min) 15
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 5: Central Ave & Webster St



Lanes, Volumes, Timings
6: 8th St & Central Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	350	468	16	643	147	407	309	8	50	225	23
Future Volume (vph)	5	350	468	16	643	147	407	309	8	50	225	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		90	0		0	85		0	0		0
Storage Lanes	0		1	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.93		0.98		0.99	1.00			1.00	
Fr _t			0.850		0.973		0.996				0.990	
Fl _t Protected		0.999			0.999		0.950				0.992	
Satd. Flow (prot)	0	3536	1583	0	3367	0	1770	1854	0	0	1825	0
Fl _t Permitted		0.924			0.942		0.950				0.877	
Satd. Flow (perm)	0	3270	1466	0	3174	0	1748	1854	0	0	1610	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			532		33			1			4	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1180			656			751			703	
Travel Time (s)		32.2			17.9			20.5			19.2	
Confl. Peds. (#/hr)	22		14	14		22	19		16	16		19
Confl. Bikes (#/hr)			10			42			7			3
Peak Hour Factor	0.88	0.88	0.88	0.84	0.84	0.84	0.91	0.91	0.91	0.79	0.79	0.79
Adj. Flow (vph)	6	398	532	19	765	175	447	340	9	63	285	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	404	532	0	959	0	447	349	0	0	377	0
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)		0			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	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
6: 8th St & Central Ave

Central Avenue Safety Improvement

05/22/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	Perm	NA		Split	NA		Perm	NA	
Protected Phases		6			2		4	4			8	
Permitted Phases	6		6	2						8		
Detector Phase	6	6	6	2	2		4	4		8	8	
Switch Phase												
Minimum Initial (s)	17.0	17.0	17.0	17.0	17.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	21.6	21.6	21.6	21.6	21.6		28.0	28.0		26.0	26.0	
Total Split (s)	35.0	35.0	35.0	35.0	35.0		28.0	28.0		26.0	26.0	
Total Split (%)	39.3%	39.3%	39.3%	39.3%	39.3%		31.5%	31.5%		29.2%	29.2%	
Maximum Green (s)	30.4	30.4	30.4	30.4	30.4		23.4	23.4		21.4	21.4	
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0			0.0	
Total Lost Time (s)		4.6	4.6		4.6		4.6	4.6			4.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Recall Mode	Min	Min	Min	Min	Min		Min	Min		Min	Min	
Walk Time (s)	0.0	0.0	0.0	7.0	7.0		9.0	9.0		4.0	4.0	
Flash Dont Walk (s)	14.0	14.0	14.0	11.0	11.0		18.0	18.0		21.0	21.0	
Pedestrian Calls (#/hr)	14	14	14	22	22		16	16		19	19	
Act Effect Green (s)		27.9	27.9		27.9		23.5	23.5			22.6	
Actuated g/C Ratio		0.32	0.32		0.32		0.27	0.27			0.26	
v/c Ratio		0.39	0.64		0.93		0.95	0.70			0.91	
Control Delay		25.0	6.4		44.8		63.7	38.5			59.5	
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	
Total Delay		25.0	6.4		44.8		63.7	38.5			59.5	
LOS		C	A		D		E	D			E	
Approach Delay		14.4			44.8			52.7			59.5	
Approach LOS		B			D			D			E	

Intersection Summary

Area Type: Other

Cycle Length: 89

Actuated Cycle Length: 87.9

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 39.4

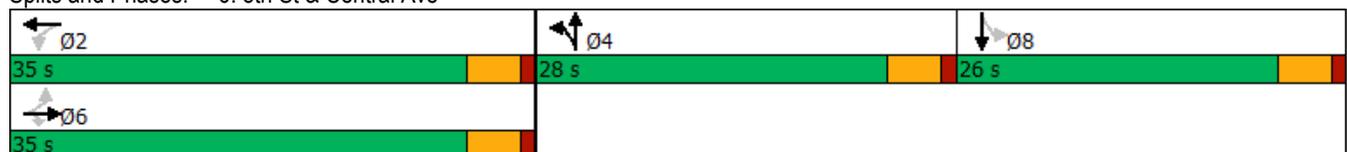
Intersection LOS: D

Intersection Capacity Utilization 87.2%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 6: 8th St & Central Ave



Lanes, Volumes, Timings
7: Sherman St & Encinal Ave & Central Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Traffic Volume (vph)	4	168	318	7	1	182	46	75	95	10	24	32
Future Volume (vph)	4	168	318	7	1	182	46	75	95	10	24	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0		0		0	0		0		
Storage Lanes	1		2		0		0	0		0		
Taper Length (ft)	60				25			25				
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00	0.92			0.98			0.98			
Fr _t			0.850			0.973			0.977			
Fl _t Protected		0.999							0.982			
Satd. Flow (prot)	0	1861	2787	0	0	1785	0	0	1745	0	0	0
Fl _t Permitted		0.992				0.999			0.818			
Satd. Flow (perm)	0	1847	2576	0	0	1783	0	0	1454	0	0	0
Right Turn on Red				Yes			Yes				Yes	
Satd. Flow (RTOR)			25			16			10			
Link Speed (mph)		25				25			25			
Link Distance (ft)		342				729			517			
Travel Time (s)		9.3				19.9			14.1			
Confl. Peds. (#/hr)	14			11	11		14			24	17	24
Confl. Bikes (#/hr)				3			14			7	7	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.90	0.90	0.90	0.71	0.71	0.71	0.71	0.77
Adj. Flow (vph)	4	179	338	7	1	202	51	106	134	14	34	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	183	345	0	0	254	0	0	288	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No						
Lane Alignment	Left	Left	Right	Right	Left	Left	Right	Left	Left	Right	Right	Left
Median Width(ft)		0				0			0			
Link Offset(ft)		0				0			12			
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	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	9	15		9	15		9	9	15
Number of Detectors	1	2	1		1	2		1	2			1
Detector Template	Left	Thru	Right		Left	Thru		Left	Thru			Left
Leading Detector (ft)	20	100	20		20	100		20	100			20
Trailing Detector (ft)	0	0	0		0	0		0	0			0
Detector 1 Position(ft)	0	0	0		0	0		0	0			0
Detector 1 Size(ft)	20	6	20		20	6		20	6			20
Detector 1 Type	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
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
Detector 2 Position(ft)		94				94			94			
Detector 2 Size(ft)		6				6			6			
Detector 2 Type		Cl+Ex				Cl+Ex			Cl+Ex			
Detector 2 Channel												
Detector 2 Extend (s)		0.0				0.0			0.0			

Lanes, Volumes, Timings
7: Sherman St & Encinal Ave & Central Ave

Central Avenue Safety Improvement

05/22/2020



Lane Group	SBL	SBT	SBR	NWL2	NWL	NWR	NWR2
Lane Configurations		↕			↕		
Traffic Volume (vph)	90	39	11	1	443	60	1
Future Volume (vph)	90	39	11	1	443	60	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0		0	0	
Storage Lanes	0		0		2	0	
Taper Length (ft)	25				25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	0.95	0.95
Ped Bike Factor		1.00			0.97		
Fr _t		0.992			0.982		
Fl _t Protected		0.966			0.958		
Satd. Flow (prot)	0	1783	0	0	3390	0	0
Fl _t Permitted		0.586			0.955		
Satd. Flow (perm)	0	1082	0	0	3279	0	0
Right Turn on Red			Yes				Yes
Satd. Flow (RTOR)		5			101		
Link Speed (mph)		25			25		
Link Distance (ft)		722			680		
Travel Time (s)		19.7			18.5		
Confl. Peds. (#/hr)	17			11			
Confl. Bikes (#/hr)			5			1	1
Peak Hour Factor	0.77	0.77	0.77	0.85	0.85	0.85	0.85
Adj. Flow (vph)	117	51	14	1	521	71	1
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	224	0	0	594	0	0
Enter Blocked Intersection	No						
Lane Alignment	Left	Left	Right	Left	Left	Right	Right
Median Width(ft)		0			24		
Link Offset(ft)		-12			0		
Crosswalk Width(ft)		16			16		
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15	15	9	9
Number of Detectors	1	2		1	1		
Detector Template	Left	Thru		Left	Left		
Leading Detector (ft)	20	100		20	20		
Trailing Detector (ft)	0	0		0	0		
Detector 1 Position(ft)	0	0		0	0		
Detector 1 Size(ft)	20	6		20	20		
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+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		
Detector 2 Position(ft)		94					
Detector 2 Size(ft)		6					
Detector 2 Type		CI+Ex					
Detector 2 Channel							
Detector 2 Extend (s)		0.0					

Lanes, Volumes, Timings
7: Sherman St & Encinal Ave & Central Ave

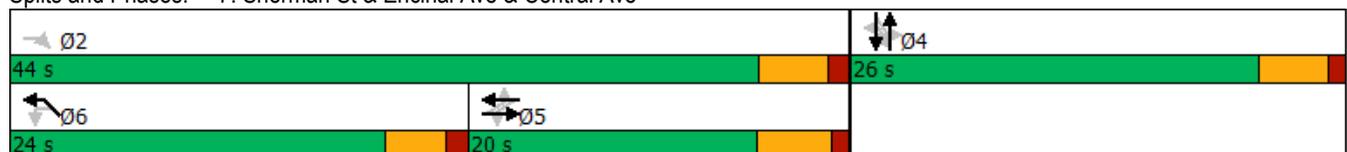


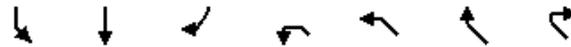
Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2
Turn Type	Perm	NA	custom		Perm	NA		Perm	NA			Perm
Protected Phases		5				5			4			
Permitted Phases	5		2		5			4				4
Detector Phase	5	5	2		5	5		4	4			4
Switch Phase												
Minimum Initial (s)	11.0	11.0	4.0		11.0	11.0		4.0	4.0			4.0
Minimum Split (s)	15.9	15.9	8.8		15.9	15.9		8.6	8.6			8.6
Total Split (s)	20.0	20.0	44.0		20.0	20.0		26.0	26.0			26.0
Total Split (%)	28.6%	28.6%	62.9%		28.6%	28.6%		37.1%	37.1%			37.1%
Maximum Green (s)	15.1	15.1	39.2		15.1	15.1		21.4	21.4			21.4
Yellow Time (s)	3.9	3.9	3.6		3.9	3.9		3.6	3.6			3.6
All-Red Time (s)	1.0	1.0	1.2		1.0	1.0		1.0	1.0			1.0
Lost Time Adjust (s)		0.0	0.0			0.0			0.0			
Total Lost Time (s)		4.9	4.8			4.9			4.6			
Lead/Lag	Lag	Lag			Lag	Lag						
Lead-Lag Optimize?	Yes	Yes			Yes	Yes						
Vehicle Extension (s)	0.2	0.2	3.0		0.2	0.2		3.0	3.0			3.0
Recall Mode	Max	Max	Max		Max	Max		Max	Max			Max
Walk Time (s)			0.0					0.0	0.0			0.0
Flash Dont Walk (s)			7.0					7.0	7.0			7.0
Pedestrian Calls (#/hr)			11					24	24			24
Act Effct Green (s)		15.1	39.2			15.1			21.4			
Actuated g/C Ratio		0.22	0.56			0.22			0.31			
v/c Ratio		0.46	0.24			0.64			0.64			
Control Delay		28.3	7.7			31.8			27.8			
Queue Delay		0.0	0.0			0.0			0.0			
Total Delay		28.3	7.7			31.8			27.8			
LOS		C	A			C			C			
Approach Delay		14.9				31.8			27.8			
Approach LOS		B				C			C			

Intersection Summary

Area Type:	Other
Cycle Length:	70
Actuated Cycle Length:	70
Natural Cycle:	50
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.67
Intersection Signal Delay:	23.1
Intersection LOS:	C
Intersection Capacity Utilization:	56.9%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 7: Sherman St & Encinal Ave & Central Ave





Lane Group	SBL	SBT	SBR	NWL2	NWL	NWR	NWR2
Turn Type	Perm	NA		Perm	Prot		
Protected Phases		4			6		
Permitted Phases	4			6			
Detector Phase	4	4		6	6		
Switch Phase							
Minimum Initial (s)	4.0	4.0		4.0	4.0		
Minimum Split (s)	8.6	8.6		8.4	8.4		
Total Split (s)	26.0	26.0		24.0	24.0		
Total Split (%)	37.1%	37.1%		34.3%	34.3%		
Maximum Green (s)	21.4	21.4		19.6	19.6		
Yellow Time (s)	3.6	3.6		3.2	3.2		
All-Red Time (s)	1.0	1.0		1.2	1.2		
Lost Time Adjust (s)		0.0			0.0		
Total Lost Time (s)		4.6			4.4		
Lead/Lag				Lead	Lead		
Lead-Lag Optimize?				Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		
Recall Mode	Max	Max		Max	Max		
Walk Time (s)	0.0	0.0		0.0	0.0		
Flash Dont Walk (s)	7.0	7.0		7.0	7.0		
Pedestrian Calls (#/hr)	24	24		7	7		
Act Effect Green (s)		21.4			19.6		
Actuated g/C Ratio		0.31			0.28		
v/c Ratio		0.67			0.60		
Control Delay		32.8			20.9		
Queue Delay		0.0			0.0		
Total Delay		32.8			20.9		
LOS		C			C		
Approach Delay		32.8			20.9		
Approach LOS		C			C		
Intersection Summary							

Lanes, Volumes, Timings
8: Webster St & Santa Clara Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	80	22	16	94	100	5	315	18	45	309	19
Future Volume (vph)	23	80	22	16	94	100	5	315	18	45	309	19
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	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor		0.99			0.96			1.00				0.99
Fr _t		0.976			0.936			0.992				0.992
Fl _t Protected		0.991			0.996			0.999				0.994
Satd. Flow (prot)	0	1760	0	0	1612	0	0	3496	0	0	3482	0
Fl _t Permitted		0.927			0.971			0.950				0.874
Satd. Flow (perm)	0	1639	0	0	1571	0	0	3324	0	0	3053	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			81			11				14
Link Speed (mph)		25			25			25				25
Link Distance (ft)		745			1178			695				689
Travel Time (s)		20.3			32.1			19.0				18.8
Confl. Peds. (#/hr)	45		13	13		45	24		42	42		24
Confl. Bikes (#/hr)			2			42			2			3
Peak Hour Factor	0.69	0.69	0.69	0.89	0.89	0.89	0.89	0.89	0.89	0.79	0.79	0.79
Heavy Vehicles (%)	4%	4%	4%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	33	116	32	18	106	112	6	354	20	57	391	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	181	0	0	236	0	0	380	0	0	472	0
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)		0			0			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	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
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	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			6		5		2

Lanes, Volumes, Timings
8: Webster St & Santa Clara Ave

Central Avenue Safety Improvement

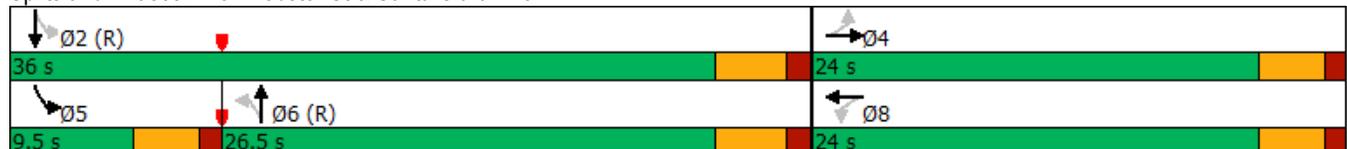
05/22/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			6			2		
Detector Phase	4	4		8	8		6	6		5	2	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		5.0	5.0		4.0	5.0	
Minimum Split (s)	23.0	23.0		23.0	23.0		24.0	24.0		9.5	31.0	
Total Split (s)	24.0	24.0		24.0	24.0		26.5	26.5		9.5	36.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		44.2%	44.2%		15.8%	60.0%	
Maximum Green (s)	20.0	20.0		20.0	20.0		22.1	22.1		5.5	31.6	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.2	3.2		3.0	3.2	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.2	1.2		1.0	1.2	
Lost Time Adjust (s)	0.0			0.0			0.0			0.0		
Total Lost Time (s)	4.0			4.0			4.4			4.4		
Lead/Lag							Lag	Lag	Lead			
Lead-Lag Optimize?							Yes	Yes	Yes			
Vehicle Extension (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.0	1.5	
Recall Mode	None	None		None	None		C-Max	C-Max		None	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		23.0	23.0			23.0	
Pedestrian Calls (#/hr)	13	13		45	45		42	42			24	
Act Effect Green (s)	14.6			14.6			37.0			37.0		
Actuated g/C Ratio	0.24			0.24			0.62			0.62		
v/c Ratio	0.44			0.53			0.19			0.25		
Control Delay	18.7			15.7			4.8			7.9		
Queue Delay	0.0			0.0			0.0			0.0		
Total Delay	18.7			15.7			4.8			7.9		
LOS	B			B			A			A		
Approach Delay	18.7			15.7			4.8			7.9		
Approach LOS	B			B			A			A		

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 18 (30%), Referenced to phase 2:SBTL and 6:NBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.53
 Intersection Signal Delay: 10.0 Intersection LOS: A
 Intersection Capacity Utilization 69.3% ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 8: Webster St & Santa Clara Ave



Lanes, Volumes, Timings
9: 8th St & Santa Clara Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	153	14	6	192	62	6	442	37	38	237	18
Future Volume (vph)	26	153	14	6	192	62	6	442	37	38	237	18
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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.98			0.99			0.99	
Fr _t		0.990			0.968			0.990			0.992	
Fl _t Protected		0.993			0.999			0.999			0.994	
Satd. Flow (prot)	0	1784	0	0	1692	0	0	1824	0	0	1805	0
Fl _t Permitted		0.921			0.992			0.996			0.902	
Satd. Flow (perm)	0	1651	0	0	1678	0	0	1817	0	0	1629	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			28			8			6	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1178			660			703			684	
Travel Time (s)		32.1			18.0			19.2			18.7	
Confl. Peds. (#/hr)	26		53	53		26	59		64	64		59
Confl. Bikes (#/hr)			7				57		1			1
Peak Hour Factor	0.73	0.73	0.73	0.69	0.69	0.69	0.94	0.94	0.94	0.86	0.86	0.86
Heavy Vehicles (%)	4%	4%	4%	6%	6%	6%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	36	210	19	9	278	90	6	470	39	44	276	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	265	0	0	377	0	0	515	0	0	341	0
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)		0			0			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
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	29.0	29.0		29.0	29.0		20.0	20.0		20.0	20.0	
Total Split (s)	32.8	32.8		32.8	32.8		36.0	36.0		36.0	36.0	
Total Split (%)	47.7%	47.7%		47.7%	47.7%		52.3%	52.3%		52.3%	52.3%	
Maximum Green (s)	28.6	28.6		28.6	28.6		31.4	31.4		31.4	31.4	
Yellow Time (s)	3.2	3.2		3.2	3.2		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.2			4.2			4.6			4.6	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	18.0	18.0		18.0	18.0		4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	53	53		26	26		64	64		59	59	
Act Effect Green (s)		28.6			28.6			31.4			31.4	
Actuated g/C Ratio		0.42			0.42			0.46			0.46	

Lanes, Volumes, Timings
9: 8th St & Santa Clara Ave

Central Avenue Safety Improvement

05/22/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.38			0.53			0.62			0.46	
Control Delay		15.7			17.2			17.9			15.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		15.7			17.2			17.9			15.1	
LOS		B			B			B			B	
Approach Delay		15.7			17.2			17.9			15.1	
Approach LOS		B			B			B			B	

Intersection Summary

Area Type:	Other
Cycle Length:	68.8
Actuated Cycle Length:	68.8
Offset:	0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle:	55
Control Type:	Pretimed
Maximum v/c Ratio:	0.62
Intersection Signal Delay:	16.7
Intersection LOS:	B
Intersection Capacity Utilization	68.9%
ICU Level of Service	C
Analysis Period (min)	15

Splits and Phases: 9: 8th St & Santa Clara Ave

	32.8 s		36 s
	32.8 s		36 s

Lanes, Volumes, Timings
10: Sherman St & Santa Clara Ave

Central Avenue Safety Improvement
05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	197	20	7	209	47	27	308	11	27	169	20
Future Volume (vph)	32	197	20	7	209	47	27	308	11	27	169	20
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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr t		0.989			0.976			0.996			0.988	
Fl t Protected		0.994			0.999			0.996			0.994	
Satd. Flow (prot)	0	1813	0	0	1764	0	0	1866	0	0	1812	0
Fl t Permitted		0.994			0.999			0.996			0.994	
Satd. Flow (perm)	0	1813	0	0	1764	0	0	1866	0	0	1812	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		526			571			722			667	
Travel Time (s)		14.3			15.6			19.7			18.2	
Confl. Peds. (#/hr)	13		5	5		13	4		10	10		4
Confl. Bikes (#/hr)			4			23			2			
Peak Hour Factor	0.86	0.86	0.86	0.78	0.78	0.78	0.88	0.88	0.88	0.86	0.86	0.86
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	1%	1%	1%	3%	3%	3%
Adj. Flow (vph)	37	229	23	9	268	60	31	350	13	31	197	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	289	0	0	337	0	0	394	0	0	251	0
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)		0			0			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
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	56.3%					ICU Level of Service B						
Analysis Period (min)	15											

Lanes, Volumes, Timings
11: Webster St & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	176	333	66	26	493	169	47	374	28	212	304	83
Future Volume (vph)	176	333	66	26	493	169	47	374	28	212	304	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	165		0	140		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	80			40			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.99	1.00		1.00	0.99			1.00			0.99	
Fr _t		0.975			0.962			0.991			0.979	
Fl _t Protected	0.950			0.950				0.995			0.983	
Satd. Flow (prot)	1752	3406	0	1787	3412	0	0	3481	0	0	3393	0
Fl _t Permitted	0.270			0.433				0.838			0.655	
Satd. Flow (perm)	495	3406	0	812	3412	0	0	2930	0	0	2249	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		55			113			13			34	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		742			1168			689			384	
Travel Time (s)		20.2			31.9			18.8			10.5	
Confl. Peds. (#/hr)	27		10	10		27	21		38	38		21
Peak Hour Factor	0.77	0.77	0.77	0.81	0.81	0.81	0.92	0.92	0.92	0.84	0.84	0.84
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	229	432	86	32	609	209	51	407	30	252	362	99
Shared Lane Traffic (%)												
Lane Group Flow (vph)	229	518	0	32	818	0	0	488	0	0	713	0
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			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	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
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	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
11: Webster St & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020

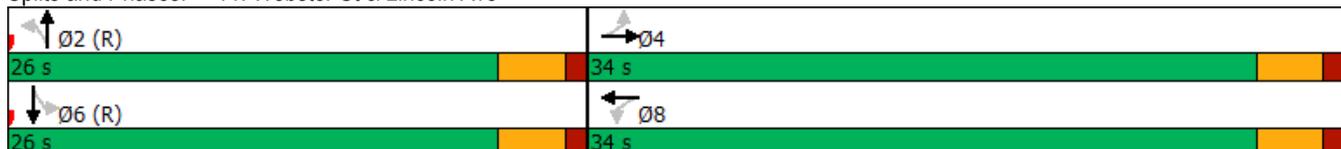


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA										
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		27.0	27.0		24.0	24.0		25.0	25.0	
Total Split (s)	34.0	34.0		34.0	34.0		26.0	26.0		26.0	26.0	
Total Split (%)	56.7%	56.7%		56.7%	56.7%		43.3%	43.3%		43.3%	43.3%	
Maximum Green (s)	30.0	30.0		30.0	30.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		10.0	10.0		7.0	7.0		8.0	8.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	10	10		27	27		38	38		21	21	
Act Effect Green (s)	28.1	28.1		28.1	28.1			23.9			23.9	
Actuated g/C Ratio	0.47	0.47		0.47	0.47			0.40			0.40	
v/c Ratio	0.99	0.32		0.08	0.49			0.42			0.78	
Control Delay	77.8	9.0		8.6	10.1			12.3			24.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	77.8	9.0		8.6	10.1			12.3			24.0	
LOS	E	A		A	B			B			C	
Approach Delay		30.1			10.1			12.3			24.0	
Approach LOS		C			B			B			C	

Intersection Summary

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	32 (53%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	55
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.99
Intersection Signal Delay:	19.3
Intersection LOS:	B
Intersection Capacity Utilization:	83.1%
ICU Level of Service:	E
Analysis Period (min):	15

Splits and Phases: 11: Webster St & Lincoln Ave



Lanes, Volumes, Timings
12: 8th St/Constitution Way & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	375	99	19	515	239	99	516	22	201	192	11
Future Volume (vph)	27	375	99	19	515	239	99	516	22	201	192	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		60	200		0
Storage Lanes	0		0	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.97	1.00	1.00
Ped Bike Factor		0.99			1.00			1.00		0.98	1.00	
Fr _t		0.970			0.954			0.995			0.992	
Fl _t Protected		0.997			0.999			0.992		0.950		
Satd. Flow (prot)	0	3372	0	0	3392	0	0	3488	0	3400	1827	0
Fl _t Permitted		0.766			0.928			0.992		0.950		
Satd. Flow (perm)	0	2591	0	0	3151	0	0	3482	0	3319	1827	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			87			4			3	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1168			670			684			583	
Travel Time (s)		31.9			18.3			18.7			15.9	
Confl. Peds. (#/hr)			5	5			14		36	36		14
Confl. Bikes (#/hr)						2			1			1
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.94	0.94	0.94	0.79	0.79	0.79
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	35	487	129	24	644	299	105	549	23	254	243	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	651	0	0	967	0	0	677	0	254	257	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru										
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
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	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
12: 8th St/Constitution Way & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020

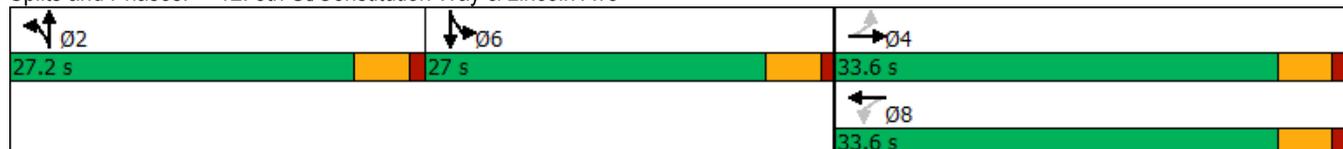


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		4			8		2	2		6	6	
Permitted Phases	4			8								
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.6	22.6		12.6	12.6		27.0	27.0		27.0	27.0	
Total Split (s)	33.6	33.6		33.6	33.6		27.2	27.2		27.0	27.0	
Total Split (%)	38.3%	38.3%		38.3%	38.3%		31.0%	31.0%		30.8%	30.8%	
Maximum Green (s)	29.0	29.0		29.0	29.0		22.6	22.6		22.4	22.4	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		4.6			4.6			4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.5	1.5		1.5	1.5	
Recall Mode	None	None										
Walk Time (s)	10.0	10.0					10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	27.0	27.0					16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	5	5					36	36		14	14	
Act Effct Green (s)		26.3			26.3			20.5		15.4	15.4	
Actuated g/C Ratio		0.34			0.34			0.27		0.20	0.20	
v/c Ratio		0.72			0.85			0.73		0.37	0.70	
Control Delay		27.5			31.4			32.3		30.1	41.3	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		27.5			31.4			32.3		30.1	41.3	
LOS		C			C			C		C	D	
Approach Delay		27.5			31.4			32.3			35.7	
Approach LOS		C			C			C			D	

Intersection Summary

Area Type:	Other
Cycle Length:	87.8
Actuated Cycle Length:	77
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.85
Intersection Signal Delay:	31.5
Intersection LOS:	C
Intersection Capacity Utilization:	83.1%
ICU Level of Service:	E
Analysis Period (min):	15

Splits and Phases: 12: 8th St/Constitution Way & Lincoln Ave



Lanes, Volumes, Timings
13: Sherman St & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	472	54	10	545	67	66	306	15	47	161	40
Future Volume (vph)	35	472	54	10	545	67	66	306	15	47	161	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	60		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	80			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00			1.00			1.00			1.00	
Fr _t		0.985			0.984			0.995			0.978	
Fl _t Protected	0.950				0.999			0.992			0.991	
Satd. Flow (prot)	1805	3546	0	0	3534	0	0	1837	0	0	1801	0
Fl _t Permitted	0.226				0.943			0.888			0.873	
Satd. Flow (perm)	428	3546	0	0	3336	0	0	1644	0	0	1586	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			29			5			23	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		546			554			667			570	
Travel Time (s)		14.9			15.1			18.2			15.5	
Confl. Peds. (#/hr)	12		4	4		12	5		6	6		5
Confl. Bikes (#/hr)			1			1			6			3
Peak Hour Factor	0.84	0.84	0.84	0.72	0.72	0.72	0.85	0.85	0.85	0.75	0.75	0.75
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	42	562	64	14	757	93	78	360	18	63	215	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	626	0	0	864	0	0	456	0	0	331	0
Enter Blocked Intersection	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
Turn Type	Perm	NA										
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	19.0	19.0		19.0	19.0		21.6	21.6		21.6	21.6	
Total Split (s)	25.8	25.8		25.8	25.8		28.0	28.0		28.0	28.0	
Total Split (%)	48.0%	48.0%		48.0%	48.0%		52.0%	52.0%		52.0%	52.0%	
Maximum Green (s)	21.6	21.6		21.6	21.6		23.4	23.4		23.4	23.4	
Yellow Time (s)	3.2	3.2		3.2	3.2		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0			0.0	
Total Lost Time (s)	4.2	4.2			4.2			4.6			4.6	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		20.0	20.0		20.0	20.0	

Lanes, Volumes, Timings
13: Sherman St & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)	4	4		12	12		6	6		5	5	
Act Effect Green (s)	21.6	21.6			21.6			23.4			23.4	
Actuated g/C Ratio	0.40	0.40			0.40			0.43			0.43	
v/c Ratio	0.25	0.44			0.64			0.64			0.47	
Control Delay	15.3	12.3			15.1			16.7			12.8	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	15.3	12.3			15.1			16.7			12.8	
LOS	B	B			B			B			B	
Approach Delay		12.5			15.1			16.7			12.8	
Approach LOS		B			B			B			B	

Intersection Summary

Area Type:	Other
Cycle Length:	53.8
Actuated Cycle Length:	53.8
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	45
Control Type:	Pretimed
Maximum v/c Ratio:	0.64
Intersection Signal Delay:	14.3
Intersection LOS:	B
Intersection Capacity Utilization:	63.3%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 13: Sherman St & Lincoln Ave

Ø2 (R) 25.8 s	Ø4 28 s
Ø6 (R) 25.8 s	Ø8 28 s

Lanes, Volumes, Timings

Central Avenue Safety Improvement

1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)

05/22/2020



Lane Group	EBL2	EBT	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL2	SBL
Lane Configurations												
Traffic Volume (vph)	135	25	5	15	73	6	2	330	0	22	2	116
Future Volume (vph)	135	25	5	15	73	6	2	330	0	22	2	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)			0		0		100		0			0
Storage Lanes			0		1		1		1			1
Taper Length (ft)			25				100					25
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
Ped Bike Factor				1.00				1.00	0.98			1.00
Fr t					0.850				0.850			
Flt Protected		0.959		0.988								0.950
Satd. Flow (prot)	0	1822	0	1840	1583	0	0	1881	1599	0	0	1805
Flt Permitted		0.185		0.885				0.996				0.154
Satd. Flow (perm)	0	352	0	1645	1583	0	0	1874	1575	0	0	292
Right Turn on Red							Yes			Yes		
Satd. Flow (RTOR)					126				743			
Link Speed (mph)		25		25				25				
Link Distance (ft)		1144		887				1060				
Travel Time (s)		31.2		24.2				28.9				
Confl. Peds. (#/hr)			5				11			3		3
Confl. Bikes (#/hr)												
Peak Hour Factor	0.83	0.83	0.78	0.78	0.78	0.78	0.73	0.73	0.73	0.73	0.78	0.78
Heavy Vehicles (%)	0%	0%	2%	2%	2%	2%	1%	1%	1%	1%	0%	0%
Adj. Flow (vph)	163	30	6	19	94	8	3	452	0	30	3	149
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	193	0	25	102	0	0	455	30	0	0	152
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Left	Left	Right	Right	Left	Left	Right	Right	Left	Left
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	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		15		9	9	15		9	9	15	15
Number of Detectors	1	2	1	2	1		1	2	1		1	1
Detector Template	Left	Thru	Left	Thru	Right		Left	Thru	Right		Left	Left
Leading Detector (ft)	20	100	20	100	20		20	100	20		20	20
Trailing Detector (ft)	0	0	0	0	0		0	0	0		0	0
Detector 1 Position(ft)	0	0	0	0	0		0	0	0		0	0
Detector 1 Size(ft)	20	6	20	6	20		20	6	20		20	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0
Detector 2 Position(ft)		94		94				94				
Detector 2 Size(ft)		6		6				6				
Detector 2 Type		Cl+Ex		Cl+Ex				Cl+Ex				
Detector 2 Channel												



Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	426	66
Future Volume (vph)	426	66
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		0
Storage Lanes		0
Taper Length (ft)		
Lane Util. Factor	1.00	1.00
Ped Bike Factor	0.99	
Fr _t	0.980	
Flt Protected		
Satd. Flow (prot)	1851	0
Flt Permitted		
Satd. Flow (perm)	1851	0
Right Turn on Red		Yes
Satd. Flow (RTOR)	8	
Link Speed (mph)	25	
Link Distance (ft)	774	
Travel Time (s)	21.1	
Confl. Peds. (#/hr)		11
Confl. Bikes (#/hr)		4
Peak Hour Factor	0.78	0.78
Heavy Vehicles (%)	0%	0%
Adj. Flow (vph)	546	85
Shared Lane Traffic (%)		
Lane Group Flow (vph)	631	0
Enter Blocked Intersection	No	No
Lane Alignment	Left	Right
Median Width(ft)	12	
Link Offset(ft)	24	
Crosswalk Width(ft)	16	
Two way Left Turn Lane		
Headway Factor	1.00	1.00
Turning Speed (mph)		9
Number of Detectors	2	
Detector Template	Thru	
Leading Detector (ft)	100	
Trailing Detector (ft)	0	
Detector 1 Position(ft)	0	
Detector 1 Size(ft)	6	
Detector 1 Type	Cl+Ex	
Detector 1 Channel		
Detector 1 Extend (s)	0.0	
Detector 1 Queue (s)	0.0	
Detector 1 Delay (s)	0.0	
Detector 2 Position(ft)	94	
Detector 2 Size(ft)	6	
Detector 2 Type	Cl+Ex	
Detector 2 Channel		

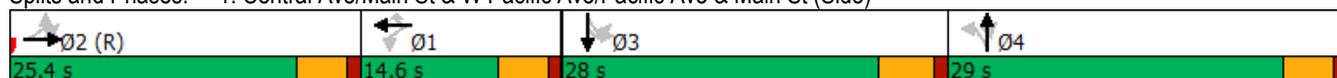


Lane Group	EBL2	EBT	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL2	SBL
Detector 2 Extend (s)		0.0		0.0				0.0				
Turn Type	Perm	NA	Perm	NA	Perm		Perm	NA	Perm		Perm	Perm
Protected Phases		2		1				4				
Permitted Phases	2		1		1		4		4		3	3
Detector Phase	2	2	1	1	1		4	4	4		3	3
Switch Phase												
Minimum Initial (s)	6.0	6.0	10.0	10.0	10.0		9.0	9.0	9.0		13.0	13.0
Minimum Split (s)	24.0	24.0	14.6	14.6	14.6		29.0	29.0	29.0		28.0	28.0
Total Split (s)	25.4	25.4	14.6	14.6	14.6		29.0	29.0	29.0		28.0	28.0
Total Split (%)	26.2%	26.2%	15.1%	15.1%	15.1%		29.9%	29.9%	29.9%		28.9%	28.9%
Maximum Green (s)	20.8	20.8	10.0	10.0	10.0		24.4	24.4	24.4		23.0	23.0
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6		3.6	3.6	3.6		4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)		0.0		0.0	0.0			0.0	0.0			0.0
Total Lost Time (s)		4.6		4.6	4.6			4.6	4.6			5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag		Lag	Lag	Lag		Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes
Vehicle Extension (s)	1.5	1.5	2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0
Recall Mode	C-Max	C-Max	None	None	None		Max	Max	Max		None	None
Walk Time (s)	7.0	7.0					7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	16.0	16.0					21.0	21.0	21.0		20.0	20.0
Pedestrian Calls (#/hr)	5	5					3	3	3		11	11
Act Effect Green (s)		20.8		10.0	10.0			24.4	24.4			25.9
Actuated g/C Ratio		0.21		0.10	0.10			0.25	0.25			0.27
v/c Ratio		2.57		0.15	0.37			0.97	0.03			1.95
Control Delay		765.3		42.0	8.8			71.2	0.0			497.3
Queue Delay		0.0		0.0	0.0			0.0	0.0			0.0
Total Delay		765.3		42.0	8.8			71.2	0.0			497.3
LOS		F		D	A			E	A			F
Approach Delay		765.3		15.3				66.8				
Approach LOS		F		B				E				

Intersection Summary

Area Type:	Other
Cycle Length:	97
Actuated Cycle Length:	97
Offset:	0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	2.57
Intersection Signal Delay:	228.1
Intersection LOS:	F
Intersection Capacity Utilization:	93.1%
ICU Level of Service:	F
Analysis Period (min):	15

Splits and Phases: 1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)





Lane Group	SBT	SBR
Detector 2 Extend (s)	0.0	
Turn Type	NA	
Protected Phases	3	
Permitted Phases		
Detector Phase	3	
Switch Phase		
Minimum Initial (s)	13.0	
Minimum Split (s)	28.0	
Total Split (s)	28.0	
Total Split (%)	28.9%	
Maximum Green (s)	23.0	
Yellow Time (s)	4.0	
All-Red Time (s)	1.0	
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	5.0	
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	2.0	
Recall Mode	None	
Walk Time (s)	7.0	
Flash Dont Walk (s)	20.0	
Pedestrian Calls (#/hr)	11	
Act Effct Green (s)	25.9	
Actuated g/C Ratio	0.27	
v/c Ratio	1.26	
Control Delay	165.8	
Queue Delay	0.0	
Total Delay	165.8	
LOS	F	
Approach Delay	230.1	
Approach LOS	F	
Intersection Summary		

Lanes, Volumes, Timings
2: 3rd St & Central Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	461	12	57	330	50	8	23	79	74	20	9
Future Volume (vph)	8	461	12	57	330	50	8	23	79	74	20	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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr t		0.997			0.985			0.903			0.988	
Fl t Protected		0.999			0.993			0.996			0.965	
Satd. Flow (prot)	0	1874	0	0	1858	0	0	1709	0	0	1811	0
Fl t Permitted		0.999			0.993			0.996			0.965	
Satd. Flow (perm)	0	1874	0	0	1858	0	0	1709	0	0	1811	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		782			216			641			365	
Travel Time (s)		21.3			5.9			17.5			10.0	
Confl. Peds. (#/hr)	17		23	23		17	23					23
Confl. Bikes (#/hr)			12									1
Peak Hour Factor	0.77	0.77	0.77	0.82	0.82	0.82	0.59	0.59	0.59	0.68	0.68	0.68
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	10	599	16	70	402	61	14	39	134	109	29	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	625	0	0	533	0	0	187	0	0	151	0
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)		0			0			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
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	72.2%						ICU Level of Service C					
Analysis Period (min)	15											

Lanes, Volumes, Timings
3: Ballena Blvd/4th St & Central Ave

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	608	57	118	423	27	21	11	95	18	16	3
Future Volume (vph)	1	608	57	118	423	27	21	11	95	18	16	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0	95		0	0		0	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	60			90			25			25		
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
Ped Bike Factor	0.99	1.00		0.99	1.00			0.99	0.98		1.00	
Fr _t		0.987			0.991				0.850		0.989	
Fl _t Protected	0.950			0.950				0.969			0.976	
Satd. Flow (prot)	1787	3518	0	1805	3570	0	0	1841	1615	0	1831	0
Fl _t Permitted	0.950			0.950				0.779			0.829	
Satd. Flow (perm)	1774	3518	0	1795	3570	0	0	1471	1584	0	1551	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			16				108			4
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		501			1066			474			334	
Travel Time (s)		13.7			29.1			12.9			9.1	
Confl. Peds. (#/hr)	9		30	30		9	16		7	7		16
Confl. Bikes (#/hr)			12						2			1
Peak Hour Factor	0.84	0.84	0.84	0.81	0.81	0.81	0.88	0.88	0.88	0.75	0.75	0.75
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	724	68	146	522	33	24	13	108	24	21	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	792	0	146	555	0	0	37	108	0	49	0
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			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	2		1	2		1	2	1	1		2
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20		100
Trailing Detector (ft)	0	0		0	0		0	0	0	0		0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0		0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20		6
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
3: Ballena Blvd/4th St & Central Ave

Central Avenue Safety Improvement

05/22/2020

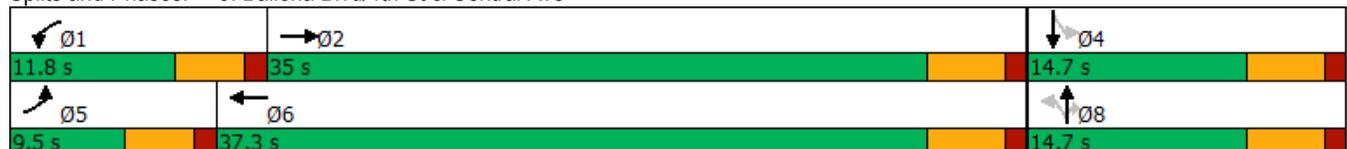


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8		8	4		
Detector Phase	5	2		1	6		8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	5.0	6.0		5.0	6.0		6.0	6.0	6.0	6.0	6.0	
Minimum Split (s)	9.5	35.0		9.5	19.0		14.7	14.7	14.7	14.7	14.7	
Total Split (s)	9.5	35.0		11.8	37.3		14.7	14.7	14.7	14.7	14.7	
Total Split (%)	15.4%	56.9%		19.2%	60.7%		23.9%	23.9%	23.9%	23.9%	23.9%	
Maximum Green (s)	5.3	30.4		7.6	32.7		10.1	10.1	10.1	10.1	10.1	
Yellow Time (s)	3.2	3.6		3.2	3.6		3.6	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	4.2	4.6		4.2	4.6			4.6	4.6		4.6	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	1.6	2.2		1.6	2.2		2.2	2.2	2.2	2.2	2.2	
Recall Mode	None	None		None	None		None	None	None	None	None	
Walk Time (s)		8.0			8.0		8.0	8.0	8.0	8.0	8.0	
Flash Dont Walk (s)		26.0			10.0		19.0	19.0	19.0	21.0	21.0	
Pedestrian Calls (#/hr)		30			9		7	7	7	16	16	
Act Effct Green (s)	7.8	25.1		9.5	32.5			12.2	12.2		12.2	
Actuated g/C Ratio	0.16	0.53		0.20	0.68			0.26	0.26		0.26	
v/c Ratio	0.00	0.43		0.41	0.23			0.10	0.22		0.12	
Control Delay	32.0	12.2		33.0	6.7			20.8	6.3		19.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	32.0	12.2		33.0	6.7			20.8	6.3		19.6	
LOS	C	B		C	A			C	A		B	
Approach Delay		12.2			12.2			10.0			19.6	
Approach LOS		B			B			B			B	

Intersection Summary

Area Type:	Other
Cycle Length:	61.5
Actuated Cycle Length:	47.7
Natural Cycle:	60
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.43
Intersection Signal Delay:	12.2
Intersection LOS:	B
Intersection Capacity Utilization:	59.2%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 3: Ballena Blvd/4th St & Central Ave



Lanes, Volumes, Timings
4: Central Ave & 5th St



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (vph)	43	710	634	60	46	42
Future Volume (vph)	43	710	634	60	46	42
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						
Frt			0.987		0.935	
Flt Protected		0.997			0.975	
Satd. Flow (prot)	0	3564	3563	0	1715	0
Flt Permitted		0.997			0.975	
Satd. Flow (perm)	0	3564	3563	0	1715	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		1066	1602		412	
Travel Time (s)		29.1	43.7		11.2	
Confl. Peds. (#/hr)	13			13		49
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.89	0.89	0.97	0.97	0.74	0.74
Heavy Vehicles (%)	1%	1%	0%	0%	1%	1%
Adj. Flow (vph)	48	798	654	62	62	57
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	846	716	0	119	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
Sign Control		Stop	Stop		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	62.5%
ICU Level of Service	B
Analysis Period (min)	15

Lanes, Volumes, Timings
5: Central Ave & Webster St

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	767	4	36	659	214	18	39	40	559	30	93
Future Volume (vph)	63	767	4	36	659	214	18	39	40	559	30	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Ped Bike Factor		1.00			0.97			0.96		0.95	0.94	
Fr't		0.999			0.965			0.944			0.958	
Flt Protected		0.996			0.998			0.991		0.950	0.969	
Satd. Flow (prot)	0	3519	0	0	3307	0	0	1693	0	1681	1596	0
Flt Permitted		0.651			0.795			0.991		0.950	0.969	
Satd. Flow (perm)	0	2300	0	0	2634	0	0	1677	0	1605	1550	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			45			25			15	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1602			1180			338			695	
Travel Time (s)		43.7			32.2			9.2			19.0	
Confl. Peds. (#/hr)	67		32	32		67	59		36	36		59
Confl. Bikes (#/hr)			10			6			3			6
Peak Hour Factor	0.83	0.83	0.83	0.90	0.90	0.90	0.74	0.74	0.74	0.94	0.94	0.94
Adj. Flow (vph)	76	924	5	40	732	238	24	53	54	595	32	99
Shared Lane Traffic (%)										38%		
Lane Group Flow (vph)	0	1005	0	0	1010	0	0	131	0	369	357	0
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)		0			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	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
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	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		4			8		2	2		6	6	
Permitted Phases	4			8								

Lanes, Volumes, Timings
5: Central Ave & Webster St

Central Avenue Safety Improvement

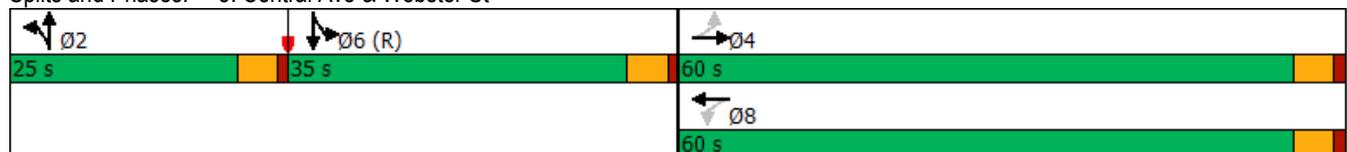
05/22/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.2	22.2		22.2	22.2		25.0	25.0		25.0	25.0	
Total Split (s)	60.0	60.0		60.0	60.0		25.0	25.0		35.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		20.8%	20.8%		29.2%	29.2%	
Maximum Green (s)	55.2	55.2		55.2	55.2		20.4	20.4		30.4	30.4	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.2	1.2		1.2	1.2		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.8			4.8			4.6			4.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.4	2.4		2.4	2.4		2.5	2.5		2.5	2.5	
Recall Mode	Min	Min		Min	Min		Min	Min		C-Max	C-Max	
Walk Time (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	32	32		67	67		37	37		61	61	
Act Effct Green (s)		54.3			54.3			15.6		36.1	36.1	
Actuated g/C Ratio		0.45			0.45			0.13		0.30	0.30	
v/c Ratio		0.97			0.83			0.54		0.73	0.73	
Control Delay		52.9			34.5			46.4		41.4	39.9	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		52.9			34.5			46.4		41.4	39.9	
LOS		D			C			D		D	D	
Approach Delay		52.9			34.5			46.4			40.6	
Approach LOS		D			C			D			D	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 72 (60%), Referenced to phase 6:SBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.97
 Intersection Signal Delay: 43.0
 Intersection Capacity Utilization 88.6%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service E

Splits and Phases: 5: Central Ave & Webster St



Lanes, Volumes, Timings
6: 8th St & Central Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	551	853	26	507	92	430	260	14	48	322	10
Future Volume (vph)	14	551	853	26	507	92	430	260	14	48	322	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		100	0		0	85		0	0		0
Storage Lanes	0		1	0		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00	0.91		0.99		0.98	1.00			1.00	
Fr _t			0.850		0.978			0.993			0.997	
Fl _t Protected		0.999			0.998		0.950				0.994	
Satd. Flow (prot)	0	3536	1583	0	3419	0	1770	1847	0	0	1843	0
Fl _t Permitted		0.929			0.878		0.950				0.913	
Satd. Flow (perm)	0	3287	1443	0	3007	0	1726	1847	0	0	1693	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			623		24			3			1	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1180			656			751			703	
Travel Time (s)		32.2			17.9			20.5			19.2	
Confl. Peds. (#/hr)	19		18	18		19	40		4	4		40
Confl. Bikes (#/hr)			12			3			11			5
Peak Hour Factor	0.78	0.78	0.78	0.91	0.91	0.91	0.85	0.85	0.85	0.96	0.96	0.96
Adj. Flow (vph)	18	706	1094	29	557	101	506	306	16	50	335	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	724	1094	0	687	0	506	322	0	0	395	0
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)		0			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	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
6: 8th St & Central Ave

Central Avenue Safety Improvement

05/22/2020

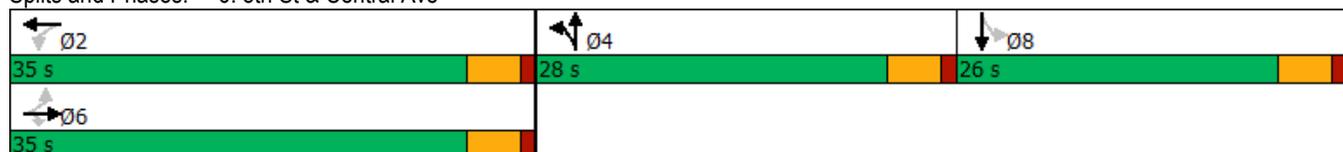


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	Perm	NA		Split	NA		Perm	NA	
Protected Phases		6			2		4	4			8	
Permitted Phases	6		6	2						8		
Detector Phase	6	6	6	2	2		4	4		8	8	
Switch Phase												
Minimum Initial (s)	17.0	17.0	17.0	17.0	17.0		20.0	20.0		20.0	20.0	
Minimum Split (s)	21.6	21.6	21.6	21.6	21.6		28.0	28.0		26.0	26.0	
Total Split (s)	35.0	35.0	35.0	35.0	35.0		28.0	28.0		26.0	26.0	
Total Split (%)	39.3%	39.3%	39.3%	39.3%	39.3%		31.5%	31.5%		29.2%	29.2%	
Maximum Green (s)	30.4	30.4	30.4	30.4	30.4		23.4	23.4		21.4	21.4	
Yellow Time (s)	3.6	3.6	3.6	3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0			0.0	
Total Lost Time (s)		4.6	4.6		4.6		4.6	4.6			4.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Recall Mode	Min	Min	Min	Min	Min		Min	Min		Min	Min	
Walk Time (s)	0.0	0.0	0.0	7.0	7.0		9.0	9.0		4.0	4.0	
Flash Dont Walk (s)	14.0	14.0	14.0	11.0	11.0		18.0	18.0		21.0	21.0	
Pedestrian Calls (#/hr)	20	20	20	21	21		4	4		40	40	
Act Effect Green (s)		30.4	30.4		30.4		24.1	24.1			23.5	
Actuated g/C Ratio		0.33	0.33		0.33		0.26	0.26			0.26	
v/c Ratio		0.67	1.22		0.68		1.09	0.66			0.91	
Control Delay		30.4	125.8		30.0		102.7	37.8			60.3	
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	
Total Delay		30.4	125.8		30.0		102.7	37.8			60.3	
LOS		C	F		C		F	D			E	
Approach Delay		87.8			30.0			77.4			60.3	
Approach LOS		F			C			E			E	

Intersection Summary

Area Type:	Other
Cycle Length:	89
Actuated Cycle Length:	91.9
Natural Cycle:	90
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.22
Intersection Signal Delay:	71.9
Intersection LOS:	E
Intersection Capacity Utilization:	104.7%
ICU Level of Service:	G
Analysis Period (min):	15

Splits and Phases: 6: 8th St & Central Ave



Lanes, Volumes, Timings
7: Sherman St & Encinal Ave & Central Ave

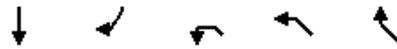
Central Avenue Safety Improvement

05/22/2020



Lane Group	EBL	EBT	EBR	EBR2	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	SBL
Lane Configurations		↕	↗↘		↕			↕				
Traffic Volume (vph)	7	160	456	14	252	28	33	30	6	5	24	121
Future Volume (vph)	7	160	456	14	252	28	33	30	6	5	24	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0			0	0		0			0
Storage Lanes	1		2			0	0		0			0
Taper Length (ft)	60						25					25
Lane Util. Factor	1.00	1.00	0.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00	0.94		0.99			0.99				
Fr _t			0.850		0.986			0.980				
Fl _t Protected		0.998						0.978				
Satd. Flow (prot)	0	1859	2787	0	1827	0	0	1766	0	0	0	0
Fl _t Permitted		0.982						0.822				
Satd. Flow (perm)	0	1828	2620	0	1827	0	0	1484	0	0	0	0
Right Turn on Red				Yes		Yes				Yes		
Satd. Flow (RTOR)			25		8			5				
Link Speed (mph)		25			25			25				
Link Distance (ft)		342			729			517				
Travel Time (s)		9.3			19.9			14.1				
Confl. Peds. (#/hr)	14			8		14			11	8	11	8
Confl. Bikes (#/hr)				1		2			4	4		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.85	0.85	0.85	0.85	0.85	0.85	0.90	0.90
Adj. Flow (vph)	7	170	485	15	296	33	39	35	7	6	27	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	177	500	0	329	0	0	87	0	0	0	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right	Right	Left	Right	Left	Left	Right	Right	Left	Left
Median Width(ft)		0			0			0				
Link Offset(ft)		0			0			12				
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	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	9		9	15		9	9	15	15
Number of Detectors	1	2	1		2		1	2			1	1
Detector Template	Left	Thru	Right		Thru		Left	Thru			Left	Left
Leading Detector (ft)	20	100	20		100		20	100			20	20
Trailing Detector (ft)	0	0	0		0		0	0			0	0
Detector 1 Position(ft)	0	0	0		0		0	0			0	0
Detector 1 Size(ft)	20	6	20		6		20	6			20	20
Detector 1 Type	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
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
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				

Lanes, Volumes, Timings
7: Sherman St & Encinal Ave & Central Ave



Lane Group	SBT	SBR	NWL2	NWL	NWR
Lane Configurations	↕			↙	↘
Traffic Volume (vph)	81	12	49	408	43
Future Volume (vph)	81	12	49	408	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Storage Length (ft)		0		0	0
Storage Lanes		0		2	0
Taper Length (ft)				25	
Lane Util. Factor	1.00	1.00	0.95	0.97	0.95
Ped Bike Factor	0.97			0.98	
Fr _t	0.993			0.987	
Fl _t Protected	0.970			0.956	
Satd. Flow (prot)	1793	0	0	3404	0
Fl _t Permitted	0.793			0.853	
Satd. Flow (perm)	1423	0	0	2983	0
Right Turn on Red		Yes			
Satd. Flow (RTOR)	4				
Link Speed (mph)	25			25	
Link Distance (ft)	722			680	
Travel Time (s)	19.7			18.5	
Confl. Peds. (#/hr)			8		
Confl. Bikes (#/hr)		4			1
Peak Hour Factor	0.90	0.90	0.92	0.92	0.92
Adj. Flow (vph)	90	13	53	443	47
Shared Lane Traffic (%)					
Lane Group Flow (vph)	264	0	0	543	0
Enter Blocked Intersection	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right
Median Width(ft)	0			24	
Link Offset(ft)	-12			0	
Crosswalk Width(ft)	16			16	
Two way Left Turn Lane					
Headway Factor	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15	15	9
Number of Detectors	2		1	1	
Detector Template	Thru		Left	Left	
Leading Detector (ft)	100		20	20	
Trailing Detector (ft)	0		0	0	
Detector 1 Position(ft)	0		0	0	
Detector 1 Size(ft)	6		20	20	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel					
Detector 1 Extend (s)	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	
Detector 2 Position(ft)	94				
Detector 2 Size(ft)	6				
Detector 2 Type	Cl+Ex				
Detector 2 Channel					
Detector 2 Extend (s)	0.0				

Lanes, Volumes, Timings
7: Sherman St & Encinal Ave & Central Ave

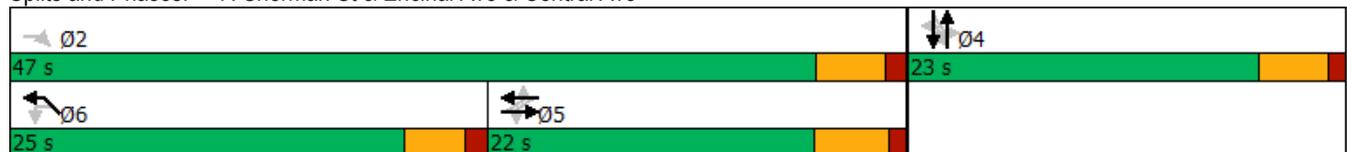


Lane Group	EBL	EBT	EBR	EBR2	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	SBL
Turn Type	Perm	NA	custom		NA		Perm	NA			Perm	Perm
Protected Phases		5			5			4				
Permitted Phases	5		2				4				4	4
Detector Phase	5	5	2		5		4	4			4	4
Switch Phase												
Minimum Initial (s)	11.0	11.0	4.0		11.0		4.0	4.0			4.0	4.0
Minimum Split (s)	15.9	15.9	8.8		15.9		8.6	8.6			8.6	8.6
Total Split (s)	22.0	22.0	47.0		22.0		23.0	23.0			23.0	23.0
Total Split (%)	31.4%	31.4%	67.1%		31.4%		32.9%	32.9%			32.9%	32.9%
Maximum Green (s)	17.1	17.1	42.2		17.1		18.4	18.4			18.4	18.4
Yellow Time (s)	3.9	3.9	3.6		3.9		3.6	3.6			3.6	3.6
All-Red Time (s)	1.0	1.0	1.2		1.0		1.0	1.0			1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0			0.0				
Total Lost Time (s)		4.9	4.8		4.9			4.6				
Lead/Lag	Lag	Lag			Lag							
Lead-Lag Optimize?	Yes	Yes			Yes							
Vehicle Extension (s)	0.2	0.2	3.0		0.2		3.0	3.0			3.0	3.0
Recall Mode	Max	Max	Max		Max		Max	Max			Max	Max
Walk Time (s)			0.0				0.0	0.0			0.0	0.0
Flash Dont Walk (s)			7.0				7.0	7.0			7.0	7.0
Pedestrian Calls (#/hr)			9				12	12			12	12
Act Effct Green (s)		17.1	42.2		17.1			18.4				
Actuated g/C Ratio		0.24	0.60		0.24			0.26				
v/c Ratio		0.40	0.31		0.73			0.22				
Control Delay		25.3	7.1		34.9			21.0				
Queue Delay		0.0	0.0		0.0			0.0				
Total Delay		25.3	7.1		34.9			21.0				
LOS		C	A		C			C				
Approach Delay		11.9			34.9			21.0				
Approach LOS		B			C			C				

Intersection Summary

Area Type:	Other
Cycle Length:	70
Actuated Cycle Length:	70
Natural Cycle:	55
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.73
Intersection Signal Delay:	23.2
Intersection LOS:	C
Intersection Capacity Utilization:	62.5%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 7: Sherman St & Encinal Ave & Central Ave





Lane Group	SBT	SBR	NWL2	NWL	NWR
Turn Type	NA		Perm	Prot	
Protected Phases	4			6	
Permitted Phases			6		
Detector Phase	4		6	6	
Switch Phase					
Minimum Initial (s)	4.0		4.0	4.0	
Minimum Split (s)	8.6		8.4	8.4	
Total Split (s)	23.0		25.0	25.0	
Total Split (%)	32.9%		35.7%	35.7%	
Maximum Green (s)	18.4		20.6	20.6	
Yellow Time (s)	3.6		3.2	3.2	
All-Red Time (s)	1.0		1.2	1.2	
Lost Time Adjust (s)	0.0			0.0	
Total Lost Time (s)	4.6			4.4	
Lead/Lag			Lead	Lead	
Lead-Lag Optimize?			Yes	Yes	
Vehicle Extension (s)	3.0		3.0	3.0	
Recall Mode	Max		Max	Max	
Walk Time (s)	0.0		0.0	0.0	
Flash Dont Walk (s)	7.0		7.0	7.0	
Pedestrian Calls (#/hr)	12		7	7	
Act Effct Green (s)	18.4			20.6	
Actuated g/C Ratio	0.26			0.29	
v/c Ratio	0.70			0.62	
Control Delay	35.0			25.0	
Queue Delay	0.0			0.0	
Total Delay	35.0			25.0	
LOS	D			C	
Approach Delay	35.0			25.0	
Approach LOS	D			C	
Intersection Summary					

Lanes, Volumes, Timings
8: Webster St & Santa Clara Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	55	13	25	67	62	9	255	27	70	552	43
Future Volume (vph)	18	55	13	25	67	62	9	255	27	70	552	43
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	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor		0.99			0.98			0.99				0.99
Fr _t		0.979			0.946			0.986				0.990
Fl _t Protected		0.990			0.992			0.999				0.995
Satd. Flow (prot)	0	1740	0	0	1665	0	0	3456	0	0	3468	0
Fl _t Permitted		0.922			0.944			0.937				0.881
Satd. Flow (perm)	0	1612	0	0	1578	0	0	3239	0	0	3057	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			61			20				18
Link Speed (mph)		25			25			25				25
Link Distance (ft)		745			1178			695				689
Travel Time (s)		20.3			32.1			19.0				18.8
Confl. Peds. (#/hr)	43		40	40		43	60		70	70		60
Confl. Bikes (#/hr)			9			3			5			3
Peak Hour Factor	0.77	0.77	0.77	0.88	0.88	0.88	0.87	0.87	0.87	0.96	0.96	0.96
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	23	71	17	28	76	70	10	293	31	73	575	45
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	111	0	0	174	0	0	334	0	0	693	0
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)		0			0			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	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
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	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			6		5	2	

Lanes, Volumes, Timings
8: Webster St & Santa Clara Ave

Central Avenue Safety Improvement

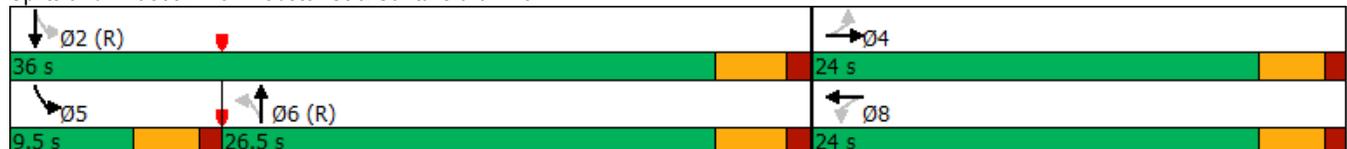
05/22/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4				8		6				2	
Detector Phase	4	4			8	8	6	6			5	2
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0	4.0	5.0	5.0			4.0	5.0
Minimum Split (s)	23.0	23.0			23.0	23.0	24.0	24.0			9.5	31.0
Total Split (s)	24.0	24.0			24.0	24.0	26.5	26.5			9.5	36.0
Total Split (%)	40.0%	40.0%			40.0%	40.0%	44.2%	44.2%			15.8%	60.0%
Maximum Green (s)	20.0	20.0			20.0	20.0	22.1	22.1			5.5	31.6
Yellow Time (s)	3.0	3.0			3.0	3.0	3.2	3.2			3.0	3.2
All-Red Time (s)	1.0	1.0			1.0	1.0	1.2	1.2			1.0	1.2
Lost Time Adjust (s)	0.0				0.0		0.0				0.0	
Total Lost Time (s)	4.0				4.0		4.4				4.4	
Lead/Lag							Lag	Lag	Lead			
Lead-Lag Optimize?							Yes	Yes	Yes			
Vehicle Extension (s)	1.8	1.8			1.8	1.8	2.0	2.0			0.2	2.0
Recall Mode	None	None			None	None	C-Max	C-Max			None	C-Max
Walk Time (s)	7.0	7.0			7.0	7.0	7.0	7.0			7.0	
Flash Dont Walk (s)	15.0	15.0			15.0	15.0	23.0	23.0			23.0	
Pedestrian Calls (#/hr)	40	40			43	43	71	71			60	
Act Effect Green (s)	14.2				14.2		37.4				37.4	
Actuated g/C Ratio	0.24				0.24		0.62				0.62	
v/c Ratio	0.28				0.42		0.16				0.36	
Control Delay	15.6				13.9		4.9				6.2	
Queue Delay	0.0				0.0		0.0				0.0	
Total Delay	15.6				13.9		4.9				6.2	
LOS	B				B		A				A	
Approach Delay	15.6				13.9		4.9				6.2	
Approach LOS	B				B		A				A	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 16 (27%), Referenced to phase 2:SBTL and 6:NBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.42
 Intersection Signal Delay: 7.7 Intersection LOS: A
 Intersection Capacity Utilization 77.6% ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 8: Webster St & Santa Clara Ave



Lanes, Volumes, Timings
9: 8th St & Santa Clara Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	157	9	7	127	67	8	321	27	48	386	18
Future Volume (vph)	22	157	9	7	127	67	8	321	27	48	386	18
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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.98			0.99			0.99	
Fr't		0.993			0.955			0.990			0.995	
Flt Protected		0.994			0.998			0.999			0.995	
Satd. Flow (prot)	0	1779	0	0	1691	0	0	1868	0	0	1855	0
Flt Permitted		0.953			0.990			0.989			0.922	
Satd. Flow (perm)	0	1701	0	0	1675	0	0	1848	0	0	1714	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			30			8			4	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1178			660			703			684	
Travel Time (s)		32.1			18.0			19.2			18.7	
Confl. Peds. (#/hr)	23		33	33		23	37		26	26		37
Confl. Bikes (#/hr)			14			3			3			1
Peak Hour Factor	0.92	0.92	0.92	0.93	0.93	0.93	0.86	0.86	0.86	0.84	0.84	0.84
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	0%	0%	0%	1%	1%	1%
Adj. Flow (vph)	24	171	10	8	137	72	9	373	31	57	460	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	205	0	0	217	0	0	413	0	0	538	0
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)		0			0			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
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	29.0	29.0		29.0	29.0		20.0	20.0		20.0	20.0	
Total Split (s)	33.8	33.8		33.8	33.8		55.0	55.0		55.0	55.0	
Total Split (%)	38.1%	38.1%		38.1%	38.1%		61.9%	61.9%		61.9%	61.9%	
Maximum Green (s)	29.6	29.6		29.6	29.6		50.4	50.4		50.4	50.4	
Yellow Time (s)	3.2	3.2		3.2	3.2		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.2			4.2			4.6			4.6	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	18.0	18.0		18.0	18.0		4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	33	33		23	23		26	26		37	37	
Act Effct Green (s)		29.6			29.6			50.4			50.4	
Actuated g/C Ratio		0.33			0.33			0.57			0.57	

Lanes, Volumes, Timings
9: 8th St & Santa Clara Ave

Central Avenue Safety Improvement

05/22/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.36			0.38			0.39			0.55	
Control Delay		24.4			21.6			11.8			14.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		24.4			21.6			11.8			14.7	
LOS		C			C			B			B	
Approach Delay		24.4			21.6			11.8			14.7	
Approach LOS		C			C			B			B	

Intersection Summary

Area Type:	Other
Cycle Length:	88.8
Actuated Cycle Length:	88.8
Offset:	0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle:	60
Control Type:	Pretimed
Maximum v/c Ratio:	0.55
Intersection Signal Delay:	16.4
Intersection LOS:	B
Intersection Capacity Utilization	77.3%
ICU Level of Service	D
Analysis Period (min)	15

Splits and Phases: 9: 8th St & Santa Clara Ave

	33.8 s		55 s
	33.8 s		55 s

Lanes, Volumes, Timings
10: Sherman St & Santa Clara Ave

Central Avenue Safety Improvement
05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	254	31	12	217	33	16	130	5	92	260	31
Future Volume (vph)	19	254	31	12	217	33	16	130	5	92	260	31
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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr t		0.986			0.983			0.996			0.989	
Fl t Protected		0.997			0.998			0.995			0.988	
Satd. Flow (prot)	0	1813	0	0	1810	0	0	1883	0	0	1857	0
Fl t Permitted		0.997			0.998			0.995			0.988	
Satd. Flow (perm)	0	1813	0	0	1810	0	0	1883	0	0	1857	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		526			571			722			667	
Travel Time (s)		14.3			15.6			19.7			18.2	
Confl. Peds. (#/hr)	13		23	23		13	1		19	19		1
Confl. Bikes (#/hr)			8			6			2			
Peak Hour Factor	0.84	0.84	0.84	0.90	0.90	0.90	0.91	0.91	0.91	0.98	0.98	0.98
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	23	302	37	13	241	37	18	143	5	94	265	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	362	0	0	291	0	0	166	0	0	391	0
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)		0			0			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
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	63.6%						ICU Level of Service B					
Analysis Period (min)	15											

Lanes, Volumes, Timings
11: Webster St & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	354	47	60	259	265	6	299	54	249	597	106
Future Volume (vph)	87	354	47	60	259	265	6	299	54	249	597	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	165		0	140		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	80			40			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.99	1.00		0.99	0.99			0.99			0.99	
Fr t		0.982			0.924			0.978			0.983	
Flt Protected	0.950			0.950				0.999			0.987	
Satd. Flow (prot)	1787	3496	0	1805	3289	0	0	3434	0	0	3414	0
Flt Permitted	0.276			0.429				0.943			0.739	
Satd. Flow (perm)	516	3496	0	806	3289	0	0	3241	0	0	2542	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28			305			46			31	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		742			1168			689			384	
Travel Time (s)		20.2			31.9			18.8			10.5	
Confl. Peds. (#/hr)	23		28	28		23	53		45	45		53
Confl. Bikes (#/hr)			2									1
Peak Hour Factor	0.94	0.94	0.94	0.87	0.87	0.87	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	93	377	50	69	298	305	6	318	57	265	635	113
Shared Lane Traffic (%)												
Lane Group Flow (vph)	93	427	0	69	603	0	0	381	0	0	1013	0
Enter Blocked Intersection	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	2		1	2		1	2		1	2	
Detector Template	Left	Thru										
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
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	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
11: Webster St & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA										
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		27.0	27.0		24.0	24.0		25.0	25.0	
Total Split (s)	27.0	27.0		27.0	27.0		33.0	33.0		33.0	33.0	
Total Split (%)	45.0%	45.0%		45.0%	45.0%		55.0%	55.0%		55.0%	55.0%	
Maximum Green (s)	23.0	23.0		23.0	23.0		29.0	29.0		29.0	29.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		10.0	10.0		7.0	7.0		8.0	8.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	28	28		23	23		46	46		53	53	
Act Effect Green (s)	15.7	15.7		15.7	15.7			36.3			36.3	
Actuated g/C Ratio	0.26	0.26		0.26	0.26			0.60			0.60	
v/c Ratio	0.69	0.46		0.33	0.55			0.19			0.65	
Control Delay	43.6	17.7		19.6	10.1			4.5			12.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	43.6	17.7		19.6	10.1			4.5			12.4	
LOS	D	B		B	B			A			B	
Approach Delay		22.3			11.0			4.5			12.4	
Approach LOS		C			B			A			B	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 36 (60%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 12.9
 Intersection Capacity Utilization 84.3%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service E

Splits and Phases: 11: Webster St & Lincoln Ave



Lanes, Volumes, Timings
12: 8th St/Constitution Way & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔	↔	
Traffic Volume (vph)	30	492	95	17	394	176	101	352	30	736	442	26
Future Volume (vph)	30	492	95	17	394	176	101	352	30	736	442	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		60	200		0
Storage Lanes	0		0	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.97	1.00	1.00
Ped Bike Factor		0.99			1.00			1.00		0.99	1.00	
Fr _t		0.977			0.955			0.991			0.992	
Fl _t Protected		0.998			0.999			0.990		0.950		
Satd. Flow (prot)	0	3464	0	0	3444	0	0	3535	0	3467	1864	0
Fl _t Permitted		0.865			0.923			0.990		0.950		
Satd. Flow (perm)	0	3002	0	0	3182	0	0	3533	0	3424	1864	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			69			7				3
Link Speed (mph)		25			25			25				25
Link Distance (ft)		1168			670			684				583
Travel Time (s)		31.9			18.3			18.7				15.9
Confl. Peds. (#/hr)			14	14			6		15	15		6
Confl. Bikes (#/hr)			1						3			
Peak Hour Factor	0.90	0.90	0.90	0.94	0.94	0.94	0.83	0.83	0.83	0.89	0.89	0.89
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Adj. Flow (vph)	33	547	106	18	419	187	122	424	36	827	497	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	686	0	0	624	0	0	582	0	827	526	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru										
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
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	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
12: 8th St/Constitution Way & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020

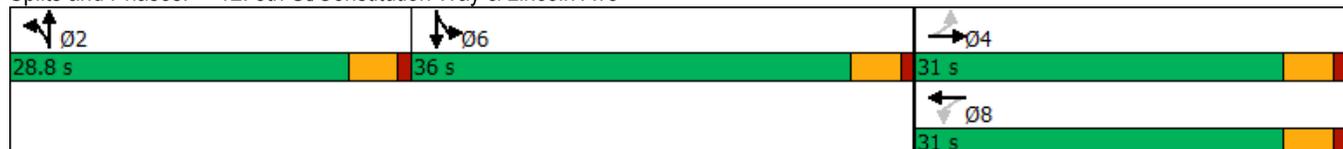


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		4			8		2	2		6	6	
Permitted Phases	4			8								
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.6	24.6		12.6	12.6		27.0	27.0		27.0	27.0	
Total Split (s)	31.0	31.0		31.0	31.0		28.8	28.8		36.0	36.0	
Total Split (%)	32.4%	32.4%		32.4%	32.4%		30.1%	30.1%		37.6%	37.6%	
Maximum Green (s)	26.4	26.4		26.4	26.4		24.2	24.2		31.4	31.4	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		4.6			4.6			4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.5	1.5		1.5	1.5	
Recall Mode	None	None										
Walk Time (s)	10.0	10.0					10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	27.0	27.0					16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	14	14					15	15		6	6	
Act Effct Green (s)		24.1			24.1			18.2		28.1	28.1	
Actuated g/C Ratio		0.28			0.28			0.21		0.33	0.33	
v/c Ratio		0.79			0.66			0.76		0.72	0.85	
Control Delay		35.3			27.9			39.4		31.0	43.1	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		35.3			27.9			39.4		31.0	43.1	
LOS		D			C			D		C	D	
Approach Delay		35.3			27.9			39.4			35.7	
Approach LOS		D			C			D			D	

Intersection Summary

Area Type:	Other
Cycle Length:	95.8
Actuated Cycle Length:	84.8
Natural Cycle:	90
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.85
Intersection Signal Delay:	34.8
Intersection LOS:	C
Intersection Capacity Utilization:	92.8%
ICU Level of Service:	F
Analysis Period (min):	15

Splits and Phases: 12: 8th St/Constitution Way & Lincoln Ave



Lanes, Volumes, Timings
13: Sherman St & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	800	109	10	609	38	26	157	16	166	278	46
Future Volume (vph)	50	800	109	10	609	38	26	157	16	166	278	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	60		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	80			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00			1.00			1.00			1.00	
Fr _t		0.982			0.991			0.989			0.987	
Fl _t Protected	0.950				0.999			0.993			0.983	
Satd. Flow (prot)	1805	3530	0	0	3532	0	0	1863	0	0	1839	0
Fl _t Permitted	0.231				0.937			0.904			0.811	
Satd. Flow (perm)	437	3530	0	0	3313	0	0	1695	0	0	1515	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			13			12			13	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		546			554			667			570	
Travel Time (s)		14.9			15.1			18.2			15.5	
Confl. Peds. (#/hr)	8		10	10		8	22		8	8		22
Confl. Bikes (#/hr)									2			3
Peak Hour Factor	0.95	0.95	0.95	0.83	0.83	0.83	0.82	0.82	0.82	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	53	842	115	12	734	46	32	191	20	193	323	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	53	957	0	0	792	0	0	243	0	0	569	0
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			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
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	19.0	19.0		19.0	19.0		21.6	21.6		21.6	21.6	
Total Split (s)	22.8	22.8		22.8	22.8		31.0	31.0		31.0	31.0	
Total Split (%)	42.4%	42.4%		42.4%	42.4%		57.6%	57.6%		57.6%	57.6%	
Maximum Green (s)	18.6	18.6		18.6	18.6		26.4	26.4		26.4	26.4	
Yellow Time (s)	3.2	3.2		3.2	3.2		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.2	4.2		4.2	4.2		4.6	4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		20.0	20.0		20.0	20.0	

Lanes, Volumes, Timings
13: Sherman St & Lincoln Ave

Central Avenue Safety Improvement

05/22/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)	10	10		8	8		8	8		22	22	
Act Effect Green (s)	18.6	18.6			18.6			26.4			26.4	
Actuated g/C Ratio	0.35	0.35			0.35			0.49			0.49	
v/c Ratio	0.35	0.77			0.69			0.29			0.76	
Control Delay	21.1	20.6			18.6			8.9			19.6	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	21.1	20.6			18.6			8.9			19.6	
LOS	C	C			B			A			B	
Approach Delay		20.6			18.6			8.9			19.6	
Approach LOS		C			B			A			B	

Intersection Summary

Area Type: Other

Cycle Length: 53.8

Actuated Cycle Length: 53.8

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

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 18.7

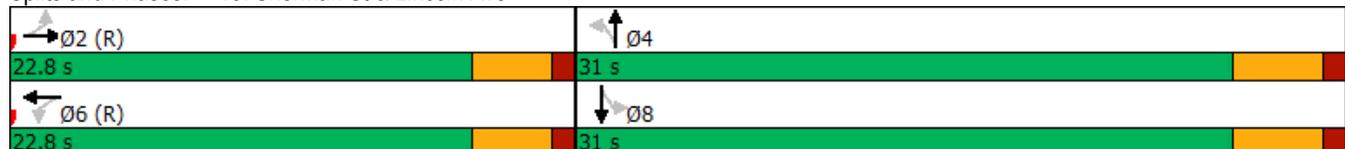
Intersection LOS: B

Intersection Capacity Utilization 102.0%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 13: Sherman St & Lincoln Ave



Lanes, Volumes, Timings

Central Avenue Safety Improvement

1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)

09/07/2020



Lane Group	EBL2	EBT	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL2	SBL
Lane Configurations		↕		↕				↕				
Traffic Volume (vph)	27	4	53	29	165	3	1	273	5	35	4	72
Future Volume (vph)	27	4	53	29	165	3	1	273	5	35	4	72
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	11	12	11	12	12
Storage Length (ft)			0		0		100		400			0
Storage Lanes			0		0		0		0			0
Taper Length (ft)			25				115					25
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
Ped Bike Factor												
Frt				0.909				0.983				
Flt Protected		0.958		0.990								
Satd. Flow (prot)	0	1456	0	1644	0	0	0	1753	0	0	0	0
Flt Permitted		0.958		0.990								
Satd. Flow (perm)	0	1456	0	1644	0	0	0	1753	0	0	0	0
Link Speed (mph)		25		25				25				
Link Distance (ft)		1144		887				1060				
Travel Time (s)		31.2		24.2				28.9				
Confl. Peds. (#/hr)			3				4			19		19
Confl. Bikes (#/hr)					1	1				10		
Peak Hour Factor	0.50	0.50	0.66	0.66	0.66	0.66	0.79	0.79	0.79	0.79	0.65	0.65
Heavy Vehicles (%)	25%	25%	4%	4%	4%	4%	3%	3%	3%	3%	4%	4%
Adj. Flow (vph)	54	8	80	44	250	5	1	346	6	44	6	111
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	62	0	379	0	0	0	397	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Left	Right	Right	Left	Left	Right	Right	Left	Left
Median Width(ft)		0		0				0				
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	1.00	1.04	1.00	1.04	1.00	1.00
Turning Speed (mph)	15		15		9	9	15		9	9	15	15
Sign Control		Yield		Yield				Yield				

Intersection Summary

Area Type: Other

Control Type: Roundabout

Intersection Capacity Utilization 56.3% ICU Level of Service B

Analysis Period (min) 15



Lane Group	SBT	SBR
Lane Configurations	↕	↗
Traffic Volume (vph)	210	142
Future Volume (vph)	210	142
Ideal Flow (vphpl)	1900	1900
Lane Width (ft)	12	12
Storage Length (ft)		0
Storage Lanes		1
Taper Length (ft)		
Lane Util. Factor	1.00	1.00
Ped Bike Factor		
Frt		0.850
Flt Protected	0.987	
Satd. Flow (prot)	1803	1553
Flt Permitted	0.987	
Satd. Flow (perm)	1803	1553
Link Speed (mph)	25	
Link Distance (ft)	774	
Travel Time (s)	21.1	
Confl. Peds. (#/hr)		4
Confl. Bikes (#/hr)		1
Peak Hour Factor	0.65	0.65
Heavy Vehicles (%)	4%	4%
Adj. Flow (vph)	323	218
Shared Lane Traffic (%)		
Lane Group Flow (vph)	440	218
Enter Blocked Intersection	No	No
Lane Alignment	Left	Right
Median Width(ft)	0	
Link Offset(ft)	24	
Crosswalk Width(ft)	16	
Two way Left Turn Lane		
Headway Factor	1.00	1.00
Turning Speed (mph)		9
Sign Control	Yield	
Intersection Summary		

Lanes, Volumes, Timings
2: 3rd St & Central Ave

Central Avenue Safety Improvement

09/07/2020



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations			↔			↔				↔		
Traffic Volume (vph)	10	6	208	21	192	276	76	9	14	15	1	100
Future Volume (vph)	10	6	208	21	192	276	76	9	14	15	1	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	11	11	12	12	12	12	12	12	12	12
Storage Length (ft)		100		0	80		0		0		100	
Storage Lanes		0		0	0		0		0		0	
Taper Length (ft)		25			50				25			
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
Ped Bike Factor												
Frt			0.989			0.979				0.895		
Flt Protected			0.997			0.983				0.995		
Satd. Flow (prot)	0	0	1725	0	0	1810	0	0	0	1692	0	0
Flt Permitted			0.997			0.983				0.995		
Satd. Flow (perm)	0	0	1725	0	0	1810	0	0	0	1692	0	0
Link Speed (mph)			25			25				25		
Link Distance (ft)			782			216				641		
Travel Time (s)			21.3			5.9				17.5		
Confl. Peds. (#/hr)	60	28		25	25		60	28	88		28	
Confl. Bikes (#/hr)				1				8			8	
Peak Hour Factor	0.67	0.67	0.67	0.67	0.83	0.83	0.83	0.83	0.50	0.50	0.50	0.50
Heavy Vehicles (%)	5%	5%	5%	5%	1%	1%	1%	1%	0%	0%	0%	0%
Adj. Flow (vph)	15	9	310	31	231	333	92	11	28	30	2	200
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	365	0	0	667	0	0	0	260	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Left	Right	Right	Left	Left	Right	Right
Median Width(ft)			0			0				0		
Link Offset(ft)			0			0				0		
Crosswalk Width(ft)			16			16				16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.04	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	15		9	15		9	9	15		9	9
Sign Control			Yield			Yield				Yield		

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	84.0%
ICU Level of Service	E
Analysis Period (min)	15

Lanes, Volumes, Timings
2: 3rd St & Central Ave

Central Avenue Safety Improvement

09/07/2020



Lane Group	SBL2	SBL	SBT	SBR	SWL2	SWL	SWR	SWR2
Lane Configurations			↕			↕		
Traffic Volume (vph)	9	41	22	19	8	2	14	32
Future Volume (vph)	9	41	22	19	8	2	14	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12
Storage Length (ft)		0		0		0		0
Storage Lanes		0		0		1		0
Taper Length (ft)		25				25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								
Frt			0.971			0.889		
Flt Protected			0.973			0.991		
Satd. Flow (prot)	0	0	1795	0	0	1674	0	0
Flt Permitted			0.973			0.991		
Satd. Flow (perm)	0	0	1795	0	0	1674	0	0
Link Speed (mph)			25			25		
Link Distance (ft)			365			251		
Travel Time (s)			10.0			6.8		
Confl. Peds. (#/hr)	28			88		25	88	60
Confl. Bikes (#/hr)								
Peak Hour Factor	0.87	0.87	0.87	0.87	0.44	0.44	0.44	0.44
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	10	47	25	22	18	5	32	73
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	104	0	0	128	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Left	Right	Right
Median Width(ft)			0			12		
Link Offset(ft)			0			0		
Crosswalk Width(ft)			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
Turning Speed (mph)	15	15		9	15	15	9	9
Sign Control			Yield			Yield		
Intersection Summary								

Lanes, Volumes, Timings
3: Ballena Blvd/4th St & Central Ave

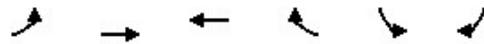
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	311	9	49	428	25	33	16	82	74	11	30
Future Volume (vph)	35	311	9	49	428	25	33	16	82	74	11	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	10	11	12	12	11	12	12	12	12
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
Ped Bike Factor												
Fr _t		0.996			0.993			0.915			0.965	
Fl _t Protected		0.995			0.995			0.988			0.969	
Satd. Flow (prot)	0	1784	0	0	1797	0	0	1612	0	0	1777	0
Fl _t Permitted		0.995			0.995			0.988			0.969	
Satd. Flow (perm)	0	1784	0	0	1797	0	0	1612	0	0	1777	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		501			1066			474			334	
Travel Time (s)		13.7			29.1			12.9			9.1	
Confl. Peds. (#/hr)	9		57	57		9	14		27	27		14
Confl. Bikes (#/hr)			1			11						
Peak Hour Factor	0.58	0.58	0.58	0.76	0.76	0.76	0.80	0.80	0.80	0.72	0.72	0.72
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	3%	3%	3%	0%	0%	0%
Adj. Flow (vph)	60	536	16	64	563	33	41	20	103	103	15	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	612	0	0	660	0	0	164	0	0	160	0
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)		11			11			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.04	1.04	1.04	1.09	1.04	1.00	1.00	1.04	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	55.5%
ICU Level of Service	B
Analysis Period (min)	15

Lanes, Volumes, Timings
4: Central Ave & 5th St

Central Avenue Safety Improvement

09/07/2020



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	141	442	523	52	61	75
Future Volume (vph)	141	442	523	52	61	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	11	12	12	12
Storage Length (ft)	75			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	40				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.988		0.925	
Flt Protected	0.950				0.978	
Satd. Flow (prot)	1668	1756	1779	0	1719	0
Flt Permitted	0.950				0.978	
Satd. Flow (perm)	1668	1756	1779	0	1719	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		1066	1602		412	
Travel Time (s)		29.1	43.7		11.2	
Confl. Peds. (#/hr)	47			47		102
Confl. Bikes (#/hr)				10		
Peak Hour Factor	0.80	0.80	0.82	0.82	0.76	0.76
Heavy Vehicles (%)	1%	1%	2%	2%	0%	0%
Adj. Flow (vph)	176	553	638	63	80	99
Shared Lane Traffic (%)						
Lane Group Flow (vph)	176	553	701	0	179	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		10	10		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.09	1.09	1.04	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Stop	Stop		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	62.1%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings
5: Central Ave & Webster St

Central Avenue Safety Improvement

09/07/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	407	5	18	630	300	22	45	58	327	30	71
Future Volume (vph)	78	407	5	18	630	300	22	45	58	327	30	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	140		0	80		140	0		0	0		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	40			65			25			25		
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
Ped Bike Factor		1.00			0.97			0.94		0.95	0.91	
Frt		0.998			0.952			0.937			0.894	
Flt Protected	0.950			0.950				0.991		0.950		
Satd. Flow (prot)	1652	1796	0	1711	1665	0	0	1653	0	1770	1509	0
Flt Permitted	0.092			0.275				0.932		0.567		
Satd. Flow (perm)	160	1796	0	495	1665	0	0	1528	0	1003	1509	0
Right Turn on Red			No			Yes			No			Yes
Satd. Flow (RTOR)					37							81
Link Speed (mph)		25			25			25		25		25
Link Distance (ft)		1602			1180			338		695		
Travel Time (s)		43.7			32.2			9.2		19.0		
Confl. Peds. (#/hr)	50		31	31		50	40		37	37		40
Confl. Bikes (#/hr)			6			28			5			2
Peak Hour Factor	0.76	0.76	0.76	0.85	0.85	0.85	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	103	536	7	21	741	353	25	51	66	372	34	81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	103	543	0	21	1094	0	0	142	0	372	115	0
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)		11			11			12		12		12
Link Offset(ft)		0			0			0		0		0
Crosswalk Width(ft)		16			16			16		16		16
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.09	1.04	1.00	1.04	1.04	1.04	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
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	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	

Lanes, Volumes, Timings
5: Central Ave & Webster St

Central Avenue Safety Improvement

09/07/2020

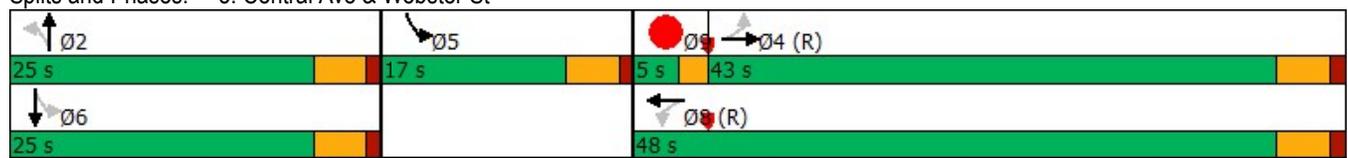


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		5	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		5	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.8	9.8		21.2	21.2		25.0	25.0		17.0	17.0	
Total Split (s)	43.0	43.0		48.0	48.0		25.0	25.0		17.0	25.0	
Total Split (%)	47.8%	47.8%		53.3%	53.3%		27.8%	27.8%		18.9%	27.8%	
Maximum Green (s)	38.2	38.2		43.2	43.2		20.4	20.4		12.4	20.4	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.2	1.2		1.2	1.2		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.8	4.8		4.8	4.8		4.6	4.6		4.6	4.6	
Lead/Lag	Lag	Lag										
Lead-Lag Optimize?												
Vehicle Extension (s)	2.4	2.4		2.4	2.4		2.5	2.5		2.5	2.5	
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	Min	
Walk Time (s)				8.0	8.0		8.0	8.0		8.0	8.0	
Flash Dont Walk (s)				12.0	12.0		16.0	16.0		8.0	8.0	
Pedestrian Calls (#/hr)				50	50		37	37		40	40	
Act Effect Green (s)	44.3	44.3		47.3	47.3		15.9	15.9		28.7	15.9	
Actuated g/C Ratio	0.49	0.49		0.53	0.53		0.18	0.18		0.32	0.18	
v/c Ratio	1.32	0.61		0.08	1.23		0.53	0.53		0.87	0.35	
Control Delay	238.7	22.5		5.4	119.2		39.5	39.5		49.8	14.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	238.7	22.5		5.4	119.2		39.5	39.5		49.8	14.1	
LOS	F	C		A	F		D	D		D	B	
Approach Delay		56.9			117.1		39.5	39.5			41.3	
Approach LOS		E			F		D	D			D	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 35 (39%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.32
 Intersection Signal Delay: 80.8
 Intersection LOS: F
 Intersection Capacity Utilization 93.7%
 ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 5: Central Ave & Webster St



Lane Group	Ø9
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	6%
Maximum Green (s)	3.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	0.0
Flash Dont Walk (s)	5.0
Pedestrian Calls (#/hr)	31
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Lanes, Volumes, Timings
6: 8th St & Central Ave

Central Avenue Safety Improvement

09/07/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	296	383	16	589	147	330	329	8	51	313	23
Future Volume (vph)	5	296	383	16	589	147	330	329	8	51	313	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	11	10	11	12	12	12	12	12	12	12
Storage Length (ft)	50		400	100		0	85		0	60		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	90			50			25			25		
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
Ped Bike Factor	0.99			0.96	0.98		0.98	1.00		0.99	1.00	
Frt			0.850		0.970			0.996			0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1652	1801	1531	1652	1720	0	1770	1853	0	1770	1836	0
Flt Permitted	0.195			0.950			0.950			0.267		
Satd. Flow (perm)	336	1801	1531	1592	1720	0	1733	1853	0	490	1836	0
Right Turn on Red			No			Yes			No			Yes
Satd. Flow (RTOR)					18							4
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1180			656			751			703	
Travel Time (s)		32.2			17.9			20.5			19.2	
Confl. Peds. (#/hr)	22		14	14		22	19		16	16		19
Confl. Bikes (#/hr)			10			42			7			3
Peak Hour Factor	0.88	0.88	0.88	0.84	0.84	0.84	0.91	0.91	0.91	0.79	0.79	0.79
Adj. Flow (vph)	6	336	435	19	701	175	363	362	9	65	396	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	336	435	19	876	0	363	371	0	65	425	0
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)		11			11			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	1.09	1.04	1.04	1.09	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lane Group	Ø2	Ø9
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		

Lanes, Volumes, Timings
6: 8th St & Central Ave

Central Avenue Safety Improvement

09/07/2020

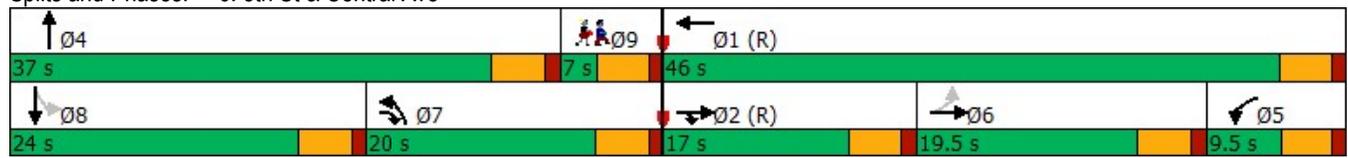


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	custom	NA	custom	Prot	NA		Prot	NA		Perm	NA	
Protected Phases		2 6	7 2	5	1		7	4				8
Permitted Phases	6									8		
Detector Phase	6	2 6	7 2	5	1		7	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0			5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	19.0			9.5	9.6		9.6	25.0		24.0	24.0	
Total Split (s)	19.5			9.5	46.0		20.0	37.0		24.0	24.0	
Total Split (%)	21.7%			10.6%	51.1%		22.2%	41.1%		26.7%	26.7%	
Maximum Green (s)	14.9			5.0	41.4		15.4	32.4		19.4	19.4	
Yellow Time (s)	3.6			3.5	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0			1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0			0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.6			4.5	4.6		4.6	4.6		4.6	4.6	
Lead/Lag	Lag						Lag			Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0			3.0	1.0		1.0	1.0		1.0	1.0	
Recall Mode	Min			None	C-Min		Min	Min		Min	Min	
Walk Time (s)	7.0							9.0		4.0	4.0	
Flash Dont Walk (s)	11.0							15.0		19.0	19.0	
Pedestrian Calls (#/hr)	14							16		19	19	
Act Effct Green (s)	20.5	36.8	31.7	6.3	41.4		15.4	34.5		19.4	19.4	
Actuated g/C Ratio	0.23	0.41	0.35	0.07	0.46		0.17	0.38		0.22	0.22	
v/c Ratio	0.08	0.46	0.81	0.17	1.09		1.20	0.52		0.62	1.07	
Control Delay	35.0	21.8	35.2	42.8	86.3		153.1	26.2		59.9	100.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	35.0	21.8	35.2	42.8	86.3		153.1	26.2		59.9	100.0	
LOS	C	C	D	D	F		F	C		E	F	
Approach Delay		29.4			85.4			89.0			94.7	
Approach LOS		C			F			F			F	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 1:WBT and 2:EBT, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.20
 Intersection Signal Delay: 72.8
 Intersection LOS: E
 Intersection Capacity Utilization 88.7%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 6: 8th St & Central Ave



Lane Group	Ø2	Ø9
Detector 2 Extend (s)		
Turn Type		
Protected Phases	2	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	1.5
Minimum Split (s)	12.0	7.0
Total Split (s)	17.0	7.0
Total Split (%)	19%	8%
Maximum Green (s)	12.4	2.5
Yellow Time (s)	3.6	3.5
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?		
Vehicle Extension (s)	1.0	3.0
Recall Mode	C-Min	None
Walk Time (s)	0.0	7.0
Flash Dont Walk (s)	11.0	0.0
Pedestrian Calls (#/hr)	22	22
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Lanes, Volumes, Timings
7: Sherman St & Encinal Ave & Central Ave

Central Avenue Safety Improvement

09/07/2020

												
Lane Group	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	SBL2	SBL	SBT	SBR	NWL2
Lane Configurations												
Traffic Volume (vph)	4	158	298	7	1	174	46	30	86	39	11	1
Future Volume (vph)	4	158	298	7	1	174	46	30	86	39	11	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	12	10	12	12	12	12	12	12
Storage Length (ft)	160		0		0		0		0		100	
Storage Lanes	0		0		0		0		0		0	
Taper Length (ft)	50				25				25			
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
Ped Bike Factor												
Fr _t		0.912				0.972				0.991		
Fl _t Protected										0.966		
Satd. Flow (prot)	0	1642	0	0	0	1690	0	0	0	1783	0	0
Fl _t Permitted										0.966		
Satd. Flow (perm)	0	1642	0	0	0	1690	0	0	0	1783	0	0
Link Speed (mph)		25				25				25		
Link Distance (ft)		342				729				722		
Travel Time (s)		9.3				19.9				19.7		
Confl. Peds. (#/hr)	14			11	11		14	24	17			11
Confl. Bikes (#/hr)				3			14				5	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.90	0.90	0.90	0.77	0.77	0.77	0.77	0.85
Adj. Flow (vph)	4	168	317	7	1	193	51	39	112	51	14	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	496	0	0	0	245	0	0	0	216	0	0
Enter Blocked Intersection	No	No	No	No	No	No						
Lane Alignment	Left	Left	Right	Right	Left	Left	Right	Left	Left	Left	Right	Left
Median Width(ft)		0				0				0		
Link Offset(ft)		0				0				-12		
Crosswalk Width(ft)		16				16				16		
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.04	1.04	1.00	1.00	1.09	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	9	15		9	15	15		9	15
Sign Control		Yield				Yield				Yield		
Intersection Summary												
Area Type:	Other											
Control Type:	Roundabout											
Intersection Capacity Utilization	84.2%						ICU Level of Service E					
Analysis Period (min)	15											



Lane Group	NWL	NWR	NWR2
Lane Configurations	↶ ↷ ↸		
Traffic Volume (vph)	424	60	1
Future Volume (vph)	424	60	1
Ideal Flow (vphpl)	1900	1900	1900
Lane Width (ft)	11	11	12
Storage Length (ft)	0	0	
Storage Lanes	1	0	
Taper Length (ft)	25		
Lane Util. Factor	1.00	1.00	1.00
Ped Bike Factor			
Frt	0.983		
Flt Protected	0.958		
Satd. Flow (prot)	1696	0	0
Flt Permitted	0.958		
Satd. Flow (perm)	1696	0	0
Link Speed (mph)	25		
Link Distance (ft)	680		
Travel Time (s)	18.5		
Confl. Peds. (#/hr)		14	24
Confl. Bikes (#/hr)		1	1
Peak Hour Factor	0.85	0.85	0.85
Adj. Flow (vph)	499	71	1
Shared Lane Traffic (%)			
Lane Group Flow (vph)	572	0	0
Enter Blocked Intersection	No	No	No
Lane Alignment	Left	Right	Right
Median Width(ft)	11		
Link Offset(ft)	0		
Crosswalk Width(ft)	16		
Two way Left Turn Lane			
Headway Factor	1.04	1.04	1.00
Turning Speed (mph)	15	9	9
Sign Control	Yield		
Intersection Summary			

Lanes, Volumes, Timings
8: Webster St & Santa Clara Ave

Central Avenue Safety Improvement

09/07/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	83	23	16	94	100	5	360	18	45	319	19
Future Volume (vph)	23	83	23	16	94	100	5	360	18	45	319	19
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	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor		0.99			0.96			1.00			1.00	
Frt		0.976			0.936			0.993			0.993	
Flt Protected		0.991			0.996			0.999			0.994	
Satd. Flow (prot)	0	1760	0	0	1612	0	0	3501	0	0	3485	0
Flt Permitted		0.929			0.970			0.950			0.869	
Satd. Flow (perm)	0	1643	0	0	1569	0	0	3328	0	0	3040	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			81			9			13	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		745			1178			695			689	
Travel Time (s)		20.3			32.1			19.0			18.8	
Confl. Peds. (#/hr)	45		13	13		45	24		42	42		24
Confl. Bikes (#/hr)			2			42			2			3
Peak Hour Factor	0.69	0.69	0.69	0.89	0.89	0.89	0.89	0.89	0.89	0.79	0.79	0.79
Heavy Vehicles (%)	4%	4%	4%	6%	6%	6%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	33	120	33	18	106	112	6	404	20	57	404	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	186	0	0	236	0	0	430	0	0	485	0
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)		0			0			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	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
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	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			6		5	2	

Lanes, Volumes, Timings
8: Webster St & Santa Clara Ave

Central Avenue Safety Improvement

09/07/2020

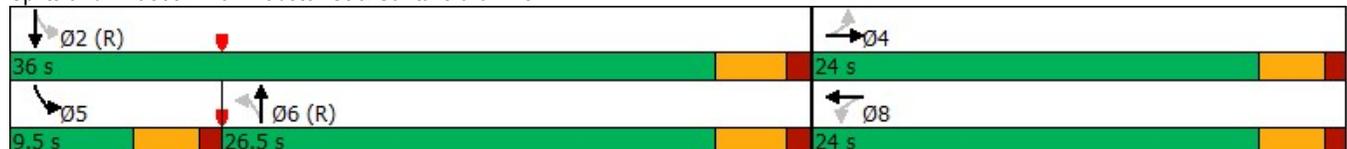


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			6			2		
Detector Phase	4	4		8	8		6	6		5	2	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		5.0	5.0		4.0	5.0	
Minimum Split (s)	23.0	23.0		23.0	23.0		24.0	24.0		9.5	31.0	
Total Split (s)	24.0	24.0		24.0	24.0		26.5	26.5		9.5	36.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		44.2%	44.2%		15.8%	60.0%	
Maximum Green (s)	20.0	20.0		20.0	20.0		22.1	22.1		5.5	31.6	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.2	3.2		3.0	3.2	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.2	1.2		1.0	1.2	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.0			4.0			4.4			4.4	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.0	1.5	
Recall Mode	None	None		None	None		C-Max	C-Max		None	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		23.0	23.0			23.0	
Pedestrian Calls (#/hr)	13	13		45	45		42	42			24	
Act Effect Green (s)		14.6			14.6			37.0			37.0	
Actuated g/C Ratio		0.24			0.24			0.62			0.62	
v/c Ratio		0.45			0.53			0.21			0.26	
Control Delay		18.9			15.6			6.6			2.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		18.9			15.6			6.6			2.1	
LOS		B			B			A			A	
Approach Delay		18.9			15.6			6.6			2.1	
Approach LOS		B			B			A			A	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 10 (17%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.53
 Intersection Signal Delay: 8.3
 Intersection Capacity Utilization 69.6%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service C

Splits and Phases: 8: Webster St & Santa Clara Ave



Lanes, Volumes, Timings
9: 8th St & Santa Clara Ave

Central Avenue Safety Improvement

09/07/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	156	17	6	192	62	9	442	37	38	331	18
Future Volume (vph)	26	156	17	6	192	62	9	442	37	38	331	18
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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.97			0.99			0.99	
Frt		0.989			0.968			0.990			0.994	
Flt Protected		0.993			0.999			0.999			0.995	
Satd. Flow (prot)	0	1781	0	0	1691	0	0	1824	0	0	1814	0
Flt Permitted		0.923			0.992			0.991			0.921	
Satd. Flow (perm)	0	1652	0	0	1678	0	0	1808	0	0	1672	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			27			8			5	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1178			660			703			684	
Travel Time (s)		32.1			18.0			19.2			18.7	
Confl. Peds. (#/hr)	26		53	53		26	59		64	64		59
Confl. Bikes (#/hr)			7			57			1			1
Peak Hour Factor	0.73	0.73	0.73	0.69	0.69	0.69	0.94	0.94	0.94	0.86	0.86	0.86
Heavy Vehicles (%)	4%	4%	4%	6%	6%	6%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	36	214	23	9	278	90	10	470	39	44	385	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	273	0	0	377	0	0	519	0	0	450	0
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)		0			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
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	29.0	29.0		29.0	29.0		20.0	20.0		20.0	20.0	
Total Split (s)	31.8	31.8		31.8	31.8		37.0	37.0		37.0	37.0	
Total Split (%)	46.2%	46.2%		46.2%	46.2%		53.8%	53.8%		53.8%	53.8%	
Maximum Green (s)	27.6	27.6		27.6	27.6		32.4	32.4		32.4	32.4	
Yellow Time (s)	3.2	3.2		3.2	3.2		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.2			4.2			4.6			4.6	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	18.0	18.0		18.0	18.0		4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	53	53		26	26		64	64		59	59	
Act Effct Green (s)		27.6			27.6			32.4			32.4	
Actuated g/C Ratio		0.40			0.40			0.47			0.47	

Lanes, Volumes, Timings
9: 8th St & Santa Clara Ave

Central Avenue Safety Improvement

09/07/2020

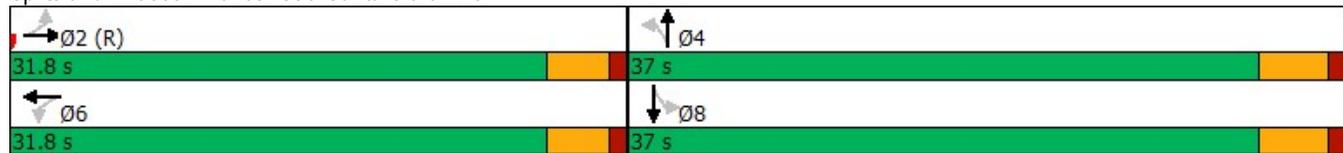


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.41			0.55			0.61			0.57	
Control Delay		16.6			18.2			17.0			16.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		16.6			18.2			17.0			16.5	
LOS		B			B			B			B	
Approach Delay		16.6			18.3			17.0			16.5	
Approach LOS		B			B			B			B	

Intersection Summary

Area Type:	Other
Cycle Length:	68.8
Actuated Cycle Length:	68.8
Offset:	0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle:	55
Control Type:	Pretimed
Maximum v/c Ratio:	0.61
Intersection Signal Delay:	17.1
Intersection LOS:	B
Intersection Capacity Utilization	70.7%
ICU Level of Service	C
Analysis Period (min)	15

Splits and Phases: 9: 8th St & Santa Clara Ave



Lanes, Volumes, Timings
10: Sherman St & Santa Clara Ave

Central Avenue Safety Improvement

09/07/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	197	20	7	209	47	27	308	11	27	167	20
Future Volume (vph)	32	197	20	7	209	47	27	308	11	27	167	20
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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr _t		0.989			0.976			0.996			0.987	
Fl _t Protected		0.994			0.999			0.996			0.994	
Satd. Flow (prot)	0	1813	0	0	1764	0	0	1866	0	0	1810	0
Fl _t Permitted		0.994			0.999			0.996			0.994	
Satd. Flow (perm)	0	1813	0	0	1764	0	0	1866	0	0	1810	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		526			571			722			667	
Travel Time (s)		14.3			15.6			19.7			18.2	
Confl. Peds. (#/hr)	13		5	5		13	4		10	10		4
Confl. Bikes (#/hr)			4			23			2			
Peak Hour Factor	0.86	0.86	0.86	0.78	0.78	0.78	0.88	0.88	0.88	0.86	0.86	0.86
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	1%	1%	1%	3%	3%	3%
Adj. Flow (vph)	37	229	23	9	268	60	31	350	13	31	194	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	289	0	0	337	0	0	394	0	0	248	0
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)		0			0			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
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	56.2%					ICU Level of Service B						
Analysis Period (min)	15											

Lanes, Volumes, Timings
11: Webster St & Lincoln Ave

Central Avenue Safety Improvement

09/07/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	339	66	26	503	289	47	418	26	394	313	87
Future Volume (vph)	190	339	66	26	503	289	47	418	26	394	313	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	165		0	140		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	80			40			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	1.00	1.00		1.00	0.99			1.00				0.99
Fr _t		0.975			0.945			0.992				0.984
Fl _t Protected	0.950			0.950				0.995				0.976
Satd. Flow (prot)	1752	3406	0	1787	3340	0	0	3486	0	0	3389	0
Fl _t Permitted	0.201			0.427				0.777				0.602
Satd. Flow (perm)	369	3406	0	800	3340	0	0	2721	0	0	2076	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		51			192			11				26
Link Speed (mph)		25			25			25				25
Link Distance (ft)		742			1168			689				384
Travel Time (s)		20.2			31.9			18.8				10.5
Confl. Peds. (#/hr)	27		10	10		27	21		38	38		21
Peak Hour Factor	0.77	0.77	0.77	0.81	0.81	0.81	0.92	0.92	0.92	0.84	0.84	0.84
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	247	440	86	32	621	357	51	454	28	469	373	104
Shared Lane Traffic (%)												
Lane Group Flow (vph)	247	526	0	32	978	0	0	533	0	0	946	0
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			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	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
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	
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
11: Webster St & Lincoln Ave

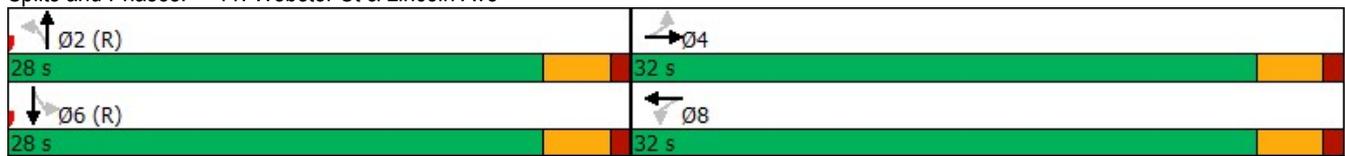


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		27.0	27.0		24.0	24.0		25.0	25.0	
Total Split (s)	32.0	32.0		32.0	32.0		28.0	28.0		28.0	28.0	
Total Split (%)	53.3%	53.3%		53.3%	53.3%		46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	28.0	28.0		28.0	28.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	1.5	1.5		1.5	1.5		1.5	1.5		1.5	1.5	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		10.0	10.0		7.0	7.0		8.0	8.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	10	10		27	27		38	38		21	21	
Act Effect Green (s)	28.0	28.0		28.0	28.0			24.0			24.0	
Actuated g/C Ratio	0.47	0.47		0.47	0.47			0.40			0.40	
v/c Ratio	1.44	0.33		0.09	0.59			0.49			1.50dl	
Control Delay	248.3	9.7		9.7	11.0			15.7			89.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	248.3	9.7		9.7	11.0			15.7			89.9	
LOS	F	A		A	B			B			F	
Approach Delay		85.9			10.9			15.7			89.9	
Approach LOS		F			B			B			F	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 36 (60%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 55
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.44
 Intersection Signal Delay: 52.4 Intersection LOS: D
 Intersection Capacity Utilization 90.2% ICU Level of Service E
 Analysis Period (min) 15
 dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 11: Webster St & Lincoln Ave



Lanes, Volumes, Timings
12: 8th St/Constitution Way & Lincoln Ave

Central Avenue Safety Improvement

09/07/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	388	202	19	546	239	195	516	22	201	192	11
Future Volume (vph)	26	388	202	19	546	239	195	516	22	201	192	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		60	200		0
Storage Lanes	0		0	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.97	1.00	1.00
Ped Bike Factor		0.99			1.00			1.00		0.98	1.00	
Fr _t		0.951			0.955			0.996			0.992	
Fl _t Protected		0.998			0.999			0.987		0.950		
Satd. Flow (prot)	0	3298	0	0	3396	0	0	3474	0	3400	1827	0
Fl _t Permitted		0.777			0.923			0.987		0.950		
Satd. Flow (perm)	0	2568	0	0	3138	0	0	3465	0	3330	1827	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		101			79			3				3
Link Speed (mph)		25			25			25				25
Link Distance (ft)		1168			670			684				583
Travel Time (s)		31.9			18.3			18.7				15.9
Confl. Peds. (#/hr)			5	5			14		36	36		14
Confl. Bikes (#/hr)						2			1			1
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.94	0.94	0.94	0.79	0.79	0.79
Heavy Vehicles (%)	3%	3%	3%	1%	1%	1%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	34	504	262	24	683	299	207	549	23	254	243	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	800	0	0	1006	0	0	779	0	254	257	0
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			24				24
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
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	
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												

Lanes, Volumes, Timings
12: 8th St/Constitution Way & Lincoln Ave

Central Avenue Safety Improvement

09/07/2020

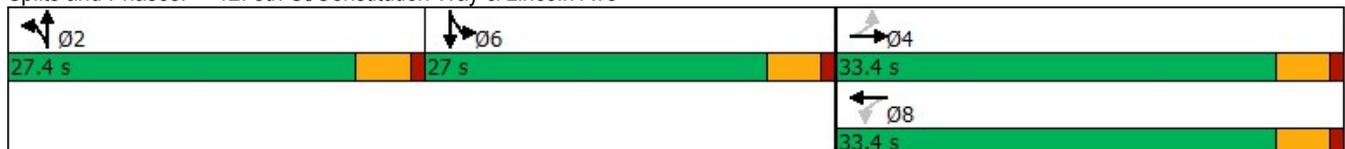


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		4			8		2	2		6	6	
Permitted Phases	4			8								
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.6	22.6		12.6	12.6		27.0	27.0		27.0	27.0	
Total Split (s)	33.4	33.4		33.4	33.4		27.4	27.4		27.0	27.0	
Total Split (%)	38.0%	38.0%		38.0%	38.0%		31.2%	31.2%		30.8%	30.8%	
Maximum Green (s)	28.8	28.8		28.8	28.8		22.8	22.8		22.4	22.4	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		4.6			4.6			4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.5	1.5		1.5	1.5	
Recall Mode	None	None										
Walk Time (s)	10.0	10.0					10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	27.0	27.0					16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	5	5					36	36		14	14	
Act Effct Green (s)		29.2			29.2			21.8		15.7	15.7	
Actuated g/C Ratio		0.36			0.36			0.27		0.19	0.19	
v/c Ratio		0.81			0.85			0.83		0.38	0.72	
Control Delay		29.3			31.7			38.2		31.0	43.4	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		29.3			31.7			38.2		31.0	43.4	
LOS		C			C			D		C	D	
Approach Delay		29.3			31.7			38.2			37.2	
Approach LOS		C			C			D			D	

Intersection Summary

Area Type:	Other
Cycle Length:	87.8
Actuated Cycle Length:	81
Natural Cycle:	90
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.85
Intersection Signal Delay:	33.6
Intersection LOS:	C
Intersection Capacity Utilization:	85.2%
ICU Level of Service:	E
Analysis Period (min):	15

Splits and Phases: 12: 8th St/Constitution Way & Lincoln Ave



Lanes, Volumes, Timings
13: Sherman St & Lincoln Ave

Central Avenue Safety Improvement

09/07/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	478	53	10	557	67	66	304	15	47	159	39
Future Volume (vph)	36	478	53	10	557	67	66	304	15	47	159	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	60		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	80			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00			1.00			1.00			1.00	
Fr _t		0.985			0.984			0.995			0.979	
Fl _t Protected	0.950				0.999			0.991			0.990	
Satd. Flow (prot)	1805	3546	0	0	3534	0	0	1835	0	0	1801	0
Fl _t Permitted	0.218				0.943			0.888			0.872	
Satd. Flow (perm)	412	3546	0	0	3336	0	0	1644	0	0	1586	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			28			5			22	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		546			554			667			570	
Travel Time (s)		14.9			15.1			18.2			15.5	
Confl. Peds. (#/hr)	12		4	4		12	5		6	6		5
Confl. Bikes (#/hr)			1			1			6			3
Peak Hour Factor	0.84	0.84	0.84	0.72	0.72	0.72	0.85	0.85	0.85	0.75	0.75	0.75
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	43	569	63	14	774	93	78	358	18	63	212	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	632	0	0	881	0	0	454	0	0	327	0
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			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
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	19.0	19.0		19.0	19.0		21.6	21.6		21.6	21.6	
Total Split (s)	25.8	25.8		25.8	25.8		28.0	28.0		28.0	28.0	
Total Split (%)	48.0%	48.0%		48.0%	48.0%		52.0%	52.0%		52.0%	52.0%	
Maximum Green (s)	21.6	21.6		21.6	21.6		23.4	23.4		23.4	23.4	
Yellow Time (s)	3.2	3.2		3.2	3.2		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0			0.0	
Total Lost Time (s)	4.2	4.2			4.2			4.6			4.6	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		20.0	20.0		20.0	20.0	

Lanes, Volumes, Timings
13: Sherman St & Lincoln Ave

Central Avenue Safety Improvement

09/07/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)	4	4		12	12		6	6		5	5	
Act Effect Green (s)	21.6	21.6			21.6			23.4			23.4	
Actuated g/C Ratio	0.40	0.40			0.40			0.43			0.43	
v/c Ratio	0.26	0.44			0.65			0.63			0.47	
Control Delay	15.9	12.4			15.3			16.6			12.7	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	15.9	12.4			15.3			16.6			12.7	
LOS	B	B			B			B			B	
Approach Delay		12.6			15.3			16.6			12.7	
Approach LOS		B			B			B			B	

Intersection Summary

Area Type: Other

Cycle Length: 53.8

Actuated Cycle Length: 53.8

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

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 14.4

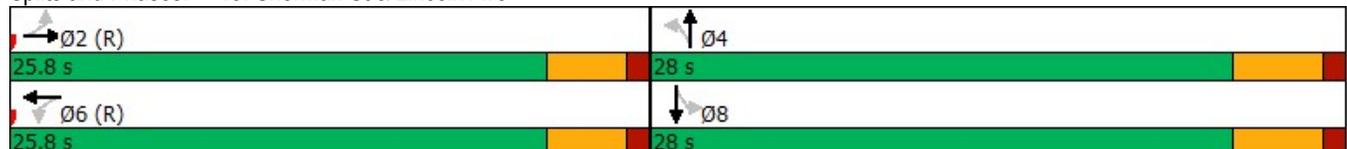
Intersection LOS: B

Intersection Capacity Utilization 63.9%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 13: Sherman St & Lincoln Ave



Lanes, Volumes, Timings

Central Avenue Safety Improvement

1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)

09/07/2020



Lane Group	EBL2	EBT	WBL	WBT	WBR	WBR2	NBL	NBT	NBR2	SBL2	SBL	SBT
Lane Configurations		↕		↕				↕				↕
Traffic Volume (vph)	138	27	5	17	73	6	2	172	22	2	116	286
Future Volume (vph)	138	27	5	17	73	6	2	172	22	2	116	286
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	11	11	12	12	12
Storage Length (ft)			0		0		100					0
Storage Lanes			0		0		0					0
Taper Length (ft)			25				115					25
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
Ped Bike Factor												
Frt				0.894				0.985				
Flt Protected		0.960		0.998				0.999				0.986
Satd. Flow (prot)	0	1824	0	1662	0	0	0	1789	0	0	0	1873
Flt Permitted		0.960		0.998				0.999				0.986
Satd. Flow (perm)	0	1824	0	1662	0	0	0	1789	0	0	0	1873
Link Speed (mph)		25		25				25				25
Link Distance (ft)		1144		887				1060				774
Travel Time (s)		31.2		24.2				28.9				21.1
Confl. Peds. (#/hr)			5				11		3			3
Confl. Bikes (#/hr)												
Peak Hour Factor	0.83	0.83	0.78	0.78	0.78	0.78	0.73	0.73	0.73	0.78	0.78	0.78
Heavy Vehicles (%)	0%	0%	2%	2%	2%	2%	1%	1%	1%	0%	0%	0%
Adj. Flow (vph)	166	33	6	22	94	8	3	236	30	3	149	367
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	199	0	130	0	0	0	269	0	0	0	519
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Left	Right	Right	Left	Left	Right	Left	Left	Left
Median Width(ft)		0		0				0				0
Link Offset(ft)		0		0				0				24
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	1.04	1.04	1.00	1.00	1.00
Turning Speed (mph)	15		15		9	9	15		9	15	15	
Sign Control		Yield		Yield				Yield				Yield

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	58.1%
ICU Level of Service	B
Analysis Period (min)	15



Lane Group	SBR
Lane Configurations	7
Traffic Volume (vph)	66
Future Volume (vph)	66
Ideal Flow (vphpl)	1900
Lane Width (ft)	12
Storage Length (ft)	0
Storage Lanes	1
Taper Length (ft)	
Lane Util. Factor	1.00
Ped Bike Factor	
Fr _t	0.850
Flt Protected	
Satd. Flow (prot)	1615
Flt Permitted	
Satd. Flow (perm)	1615
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	11
Confl. Bikes (#/hr)	4
Peak Hour Factor	0.78
Heavy Vehicles (%)	0%
Adj. Flow (vph)	85
Shared Lane Traffic (%)	
Lane Group Flow (vph)	85
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.00
Turning Speed (mph)	9
Sign Control	
Intersection Summary	

Lanes, Volumes, Timings
2: 3rd St & Central Ave

Central Avenue Safety Improvement

09/07/2020



Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations			↔			↔				↔		
Traffic Volume (vph)	6	2	311	12	47	172	47	2	8	23	1	76
Future Volume (vph)	6	2	311	12	47	172	47	2	8	23	1	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	11	11	12	12	12	12	12	12	12	12
Storage Length (ft)		100		0	80		0		0		100	
Storage Lanes		0		0	0		0		0		0	
Taper Length (ft)		25			50				25			
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
Ped Bike Factor												
Frt			0.995			0.976				0.904		
Flt Protected			0.999			0.991				0.996		
Satd. Flow (prot)	0	0	1808	0	0	1838	0	0	0	1711	0	0
Flt Permitted			0.999			0.991				0.996		
Satd. Flow (perm)	0	0	1808	0	0	1838	0	0	0	1711	0	0
Link Speed (mph)			25			25				25		
Link Distance (ft)			782			216				641		
Travel Time (s)			21.3			5.9				17.5		
Confl. Peds. (#/hr)	13	4		23	23		13	4	23		4	
Confl. Bikes (#/hr)				12								
Peak Hour Factor	0.77	0.77	0.77	0.77	0.82	0.82	0.82	0.82	0.59	0.59	0.59	0.59
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	8	3	404	16	57	210	57	2	14	39	2	129
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	431	0	0	326	0	0	0	184	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Left	Right	Right	Left	Left	Right	Right
Median Width(ft)			0			0				0		
Link Offset(ft)			0			0				0		
Crosswalk Width(ft)			16			16				16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.04	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	15		9	15		9	9	15		9	9
Sign Control			Yield			Yield				Yield		

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	67.7%
ICU Level of Service	C
Analysis Period (min)	15

Lanes, Volumes, Timings
2: 3rd St & Central Ave

Central Avenue Safety Improvement

09/07/2020



Lane Group	SBL2	SBL	SBT	SBR	SWL2	SWL	SWR	SWR2
Lane Configurations								
Traffic Volume (vph)	5	69	23	12	2	1	5	2
Future Volume (vph)	5	69	23	12	2	1	5	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12
Storage Length (ft)		0		0		0		0
Storage Lanes		0		0		1		0
Taper Length (ft)		25				25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								
Frt			0.985			0.905		
Flt Protected			0.967			0.985		
Satd. Flow (prot)	0	0	1810	0	0	1694	0	0
Flt Permitted			0.967			0.985		
Satd. Flow (perm)	0	0	1810	0	0	1694	0	0
Link Speed (mph)			25			25		
Link Distance (ft)			365			251		
Travel Time (s)			10.0			6.8		
Confl. Peds. (#/hr)	4			23		23	23	13
Confl. Bikes (#/hr)				1			1	
Peak Hour Factor	0.68	0.68	0.68	0.68	0.50	0.50	0.50	0.50
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	7	101	34	18	4	2	10	4
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	160	0	0	20	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Left	Right	Right
Median Width(ft)			0			12		
Link Offset(ft)			0			0		
Crosswalk Width(ft)			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
Turning Speed (mph)	15	15		9	15	15	9	9
Sign Control			Yield			Yield		
Intersection Summary								

Lanes, Volumes, Timings
3: Ballena Blvd/4th St & Central Ave

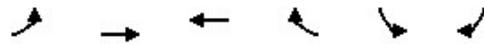
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	333	57	102	237	21	21	11	94	17	34	3
Future Volume (vph)	1	333	57	102	237	21	21	11	94	17	34	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	10	11	12	12	11	12	12	12	12
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
Ped Bike Factor												
Frt		0.980			0.992			0.900			0.992	
Flt Protected					0.986			0.992			0.984	
Satd. Flow (prot)	0	1782	0	0	1796	0	0	1640	0	0	1855	0
Flt Permitted					0.986			0.992			0.984	
Satd. Flow (perm)	0	1782	0	0	1796	0	0	1640	0	0	1855	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		501			1066			474			334	
Travel Time (s)		13.7			29.1			12.9			9.1	
Confl. Peds. (#/hr)	9		30	30		9	16		7	7		16
Confl. Bikes (#/hr)			12						2			1
Peak Hour Factor	0.84	0.84	0.84	0.81	0.81	0.81	0.88	0.88	0.88	0.75	0.75	0.75
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	396	68	126	293	26	24	13	107	23	45	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	465	0	0	445	0	0	144	0	0	72	0
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)		11			11			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.04	1.04	1.04	1.09	1.04	1.00	1.00	1.04	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	60.8%
ICU Level of Service	B
Analysis Period (min)	15

Lanes, Volumes, Timings
4: Central Ave & 5th St

Central Avenue Safety Improvement

09/07/2020



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	43	414	373	70	46	133
Future Volume (vph)	43	414	373	70	46	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	11	12	12	12
Storage Length (ft)	75			0	0	0
Storage Lanes	1			0	1	0
Taper Length (ft)	40				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.979		0.900	
Flt Protected	0.950				0.987	
Satd. Flow (prot)	1668	1756	1798	0	1671	0
Flt Permitted	0.950				0.987	
Satd. Flow (perm)	1668	1756	1798	0	1671	0
Link Speed (mph)		25	25		25	
Link Distance (ft)		1066	1602		412	
Travel Time (s)		29.1	43.7		11.2	
Confl. Peds. (#/hr)	13			13		49
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.89	0.89	0.97	0.97	0.74	0.74
Heavy Vehicles (%)	1%	1%	0%	0%	1%	1%
Adj. Flow (vph)	48	465	385	72	62	180
Shared Lane Traffic (%)						
Lane Group Flow (vph)	48	465	457	0	242	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		10	10		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	1.09	1.09	1.04	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Stop	Stop		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	51.1%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
5: Central Ave & Webster St

Central Avenue Safety Improvement

09/07/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	474	4	36	401	270	18	47	40	684	30	86
Future Volume (vph)	63	474	4	36	401	270	18	47	40	684	30	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	140		0	80		140	0		0	0		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	40			65			25			25		
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
Ped Bike Factor		1.00			0.96			0.94		0.95	0.86	
Frt		0.999			0.940			0.949			0.889	
Flt Protected	0.950			0.950				0.992		0.950		
Satd. Flow (prot)	1652	1798	0	1711	1622	0	0	1693	0	1770	1422	0
Flt Permitted	0.123			0.125				0.936		0.577		
Satd. Flow (perm)	214	1798	0	225	1622	0	0	1560	0	1022	1422	0
Right Turn on Red			No			Yes			No			Yes
Satd. Flow (RTOR)					45							91
Link Speed (mph)		25			25			25		25		25
Link Distance (ft)		1602			1180			338		695		
Travel Time (s)		43.7			32.2			9.2		19.0		
Confl. Peds. (#/hr)	67		32	32		67	59		36	36		59
Confl. Bikes (#/hr)			10			6			3			6
Peak Hour Factor	0.83	0.83	0.83	0.90	0.90	0.90	0.74	0.74	0.74	0.94	0.94	0.94
Adj. Flow (vph)	76	571	5	40	446	300	24	64	54	728	32	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	76	576	0	40	746	0	0	142	0	728	123	0
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)		11			11			12		12		12
Link Offset(ft)		0			0			0		0		0
Crosswalk Width(ft)		16			16			16		16		16
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.09	1.04	1.00	1.04	1.04	1.04	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
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	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	

Lanes, Volumes, Timings
5: Central Ave & Webster St

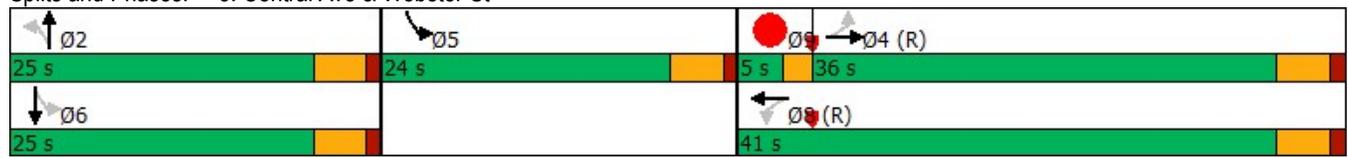


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		5	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		5	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.8	9.8		21.2	21.2		25.0	25.0		17.0	17.0	
Total Split (s)	36.0	36.0		41.0	41.0		25.0	25.0		24.0	25.0	
Total Split (%)	40.0%	40.0%		45.6%	45.6%		27.8%	27.8%		26.7%	27.8%	
Maximum Green (s)	31.2	31.2		36.2	36.2		20.4	20.4		19.4	20.4	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.2	1.2		1.2	1.2		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.8	4.8		4.8	4.8		4.6	4.6		4.6	4.6	
Lead/Lag	Lag	Lag										
Lead-Lag Optimize?												
Vehicle Extension (s)	2.4	2.4		2.4	2.4		2.5	2.5		2.5	2.5	
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	Min	
Walk Time (s)				8.0	8.0		8.0	8.0		8.0	8.0	
Flash Dont Walk (s)				12.0	12.0		16.0	16.0		8.0	8.0	
Pedestrian Calls (#/hr)				67	67		37	37		61	61	
Act Effect Green (s)	33.2	33.2		36.2	36.2		16.9	16.9		39.8	16.9	
Actuated g/C Ratio	0.37	0.37		0.40	0.40		0.19	0.19		0.44	0.19	
v/c Ratio	0.96	0.87		0.44	1.10		0.48	0.48		1.13	0.36	
Control Delay	128.5	43.1		20.4	75.1		37.2	37.2		106.5	13.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	128.5	43.1		20.4	75.1		37.2	37.2		106.5	13.4	
LOS	F	D		C	E		D	D		F	B	
Approach Delay		53.0			72.4			37.2			93.0	
Approach LOS		D			E			D			F	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 37 (41%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.13
 Intersection Signal Delay: 72.4
 Intersection LOS: E
 Intersection Capacity Utilization 100.1%
 ICU Level of Service G
 Analysis Period (min) 15

Splits and Phases: 5: Central Ave & Webster St



Lane Group	Ø9
Detector 2 Extend (s)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	6%
Maximum Green (s)	3.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	0.0
Flash Dont Walk (s)	5.0
Pedestrian Calls (#/hr)	32
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Lanes, Volumes, Timings
6: 8th St & Central Ave

Central Avenue Safety Improvement
09/07/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	500	694	26	436	97	276	478	14	48	442	10
Future Volume (vph)	14	500	694	26	436	97	276	478	14	48	442	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	11	11	10	11	12	12	12	12	12	12	12
Storage Length (ft)	50		400	100		0	85		0	60		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	90			50			25			25		
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
Ped Bike Factor	0.98			0.97	0.99		0.96	1.00		1.00	1.00	
Frt			0.850		0.973			0.996				0.997
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1652	1801	1531	1652	1738	0	1770	1853	0	1770	1853	0
Flt Permitted	0.272			0.950			0.950			0.161		
Satd. Flow (perm)	463	1801	1531	1602	1738	0	1698	1853	0	299	1853	0
Right Turn on Red			No			Yes			No			Yes
Satd. Flow (RTOR)					17							1
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1180			656			751			703	
Travel Time (s)		32.2			17.9			20.5			19.2	
Confl. Peds. (#/hr)	19		18	18		19	40		4	4		40
Confl. Bikes (#/hr)			12			3			11			5
Peak Hour Factor	0.78	0.78	0.78	0.91	0.91	0.91	0.85	0.85	0.85	0.96	0.96	0.96
Adj. Flow (vph)	18	641	890	29	479	107	325	562	16	50	460	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	18	641	890	29	586	0	325	578	0	50	470	0
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)		11			11			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	1.09	1.04	1.04	1.09	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100		20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lane Group	Ø2	Ø9
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Lane Util. Factor		
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		

Lanes, Volumes, Timings
6: 8th St & Central Ave

Central Avenue Safety Improvement

09/07/2020

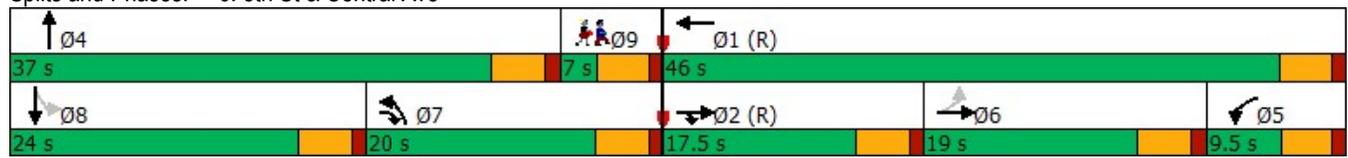


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	custom	NA	custom	Prot	NA		Prot	NA		Perm	NA	
Protected Phases		2 6	7 2	5	1		7	4				8
Permitted Phases	6									8		
Detector Phase	6	2 6	7 2	5	1		7	4		8	8	
Switch Phase												
Minimum Initial (s)	5.0			5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	19.0			9.5	9.6		9.6	25.0		24.0	24.0	
Total Split (s)	19.0			9.5	46.0		20.0	37.0		24.0	24.0	
Total Split (%)	21.1%			10.6%	51.1%		22.2%	41.1%		26.7%	26.7%	
Maximum Green (s)	14.4			5.0	41.4		15.4	32.4		19.4	19.4	
Yellow Time (s)	3.6			3.5	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0			1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0			0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.6			4.5	4.6		4.6	4.6		4.6	4.6	
Lead/Lag	Lag						Lag			Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0			3.0	1.0		1.0	1.0		1.0	1.0	
Recall Mode	Min			None	C-Min		Min	Min		Min	Min	
Walk Time (s)	7.0							9.0		4.0	4.0	
Flash Dont Walk (s)	11.0							15.0		19.0	19.0	
Pedestrian Calls (#/hr)	20							4		40	40	
Act Effct Green (s)	14.7	32.2	32.9	5.0	36.0		15.4	42.0		24.8	24.8	
Actuated g/C Ratio	0.16	0.36	0.37	0.06	0.40		0.17	0.47		0.28	0.28	
v/c Ratio	0.24	1.00	1.59	0.32	0.83		1.08	0.67		0.61	0.92	
Control Delay	38.6	55.3	295.6	50.5	34.4		111.3	26.1		66.3	59.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	38.6	55.3	295.6	50.5	34.4		111.3	26.1		66.3	59.5	
LOS	D	E	F	D	C		F	C		E	E	
Approach Delay		193.1			35.2			56.8			60.1	
Approach LOS		F			D			E			E	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 88 (98%), Referenced to phase 1:WBT and 2:EBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.59
 Intersection Signal Delay: 112.4 Intersection LOS: F
 Intersection Capacity Utilization 84.3% ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 6: 8th St & Central Ave



Lane Group	Ø2	Ø9
Detector 2 Extend (s)		
Turn Type		
Protected Phases	2	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	1.5
Minimum Split (s)	12.0	7.0
Total Split (s)	17.5	7.0
Total Split (%)	19%	8%
Maximum Green (s)	12.9	2.5
Yellow Time (s)	3.6	3.5
All-Red Time (s)	1.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?		
Vehicle Extension (s)	1.0	3.0
Recall Mode	C-Min	None
Walk Time (s)	0.0	7.0
Flash Dont Walk (s)	11.0	0.0
Pedestrian Calls (#/hr)	21	21
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Intersection Summary		

Lanes, Volumes, Timings
7: Sherman St & Encinal Ave & Central Ave



Lane Group	EBL	EBT	EBR	EBR2	WBT	WBR	SBL2	SBL	SBT	SBR	NWL2	NWL
Lane Configurations		↕			↕				↕			↕
Traffic Volume (vph)	7	156	444	14	240	34	24	121	81	10	52	389
Future Volume (vph)	7	156	444	14	240	34	24	121	81	10	52	389
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	10	12	12	12	12	12	12	11
Storage Length (ft)	160		0			0		0		100		0
Storage Lanes	0		0			0		0		0		1
Taper Length (ft)	60							25				25
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
Ped Bike Factor												
Fr _t		0.900			0.983				0.994			0.986
Fl _t Protected		0.999							0.970			0.957
Satd. Flow (prot)	0	1619	0	0	1709	0	0	0	1796	0	0	1699
Fl _t Permitted		0.999							0.970			0.957
Satd. Flow (perm)	0	1619	0	0	1709	0	0	0	1796	0	0	1699
Link Speed (mph)		25			25				25			25
Link Distance (ft)		342			729				722			680
Travel Time (s)		9.3			19.9				19.7			18.5
Confl. Peds. (#/hr)	14			8		14	11	8			8	
Confl. Bikes (#/hr)				1		2				4		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.85	0.85	0.90	0.90	0.90	0.90	0.92	0.92
Adj. Flow (vph)	7	166	472	15	282	40	27	134	90	11	57	423
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	660	0	0	322	0	0	0	262	0	0	537
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Right	Left	Right	Left	Left	Left	Right	Left	Left
Median Width(ft)		0			0				0			11
Link Offset(ft)		0			0				-12			0
Crosswalk Width(ft)		16			16				16			16
Two way Left Turn Lane		Yes										
Headway Factor	1.00	1.04	1.04	1.00	1.09	1.00	1.00	1.00	1.00	1.00	1.00	1.04
Turning Speed (mph)	15		9	9		9	15	15		9	15	15
Sign Control		Yield			Yield				Yield			Yield

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	100.5%
ICU Level of Service	G
Analysis Period (min)	15



Lane Group	NWR
Lane Configurations	
Traffic Volume (vph)	52
Future Volume (vph)	52
Ideal Flow (vphpl)	1900
Lane Width (ft)	11
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	1.00
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	14
Confl. Bikes (#/hr)	1
Peak Hour Factor	0.92
Adj. Flow (vph)	57
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.04
Turning Speed (mph)	9
Sign Control	
Intersection Summary	

Lanes, Volumes, Timings
8: Webster St & Santa Clara Ave

Central Avenue Safety Improvement

09/07/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	58	14	25	71	62	14	260	27	73	602	46
Future Volume (vph)	18	58	14	25	71	62	14	260	27	73	602	46
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	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor		0.99			0.98			0.99			0.99	
Frt		0.979			0.947			0.987			0.990	
Flt Protected		0.990			0.992			0.998			0.995	
Satd. Flow (prot)	0	1740	0	0	1668	0	0	3457	0	0	3468	0
Flt Permitted		0.926			0.943			0.920			0.881	
Satd. Flow (perm)	0	1620	0	0	1579	0	0	3184	0	0	3058	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			56			20			18	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		745			1178			695			689	
Travel Time (s)		20.3			32.1			19.0			18.8	
Confl. Peds. (#/hr)	43		40	40		43	60		70	70		60
Confl. Bikes (#/hr)			9			3			5			3
Peak Hour Factor	0.77	0.77	0.77	0.88	0.88	0.88	0.87	0.87	0.87	0.96	0.96	0.96
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	23	75	18	28	81	70	16	299	31	76	627	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	116	0	0	179	0	0	346	0	0	751	0
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)		0			0			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	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
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	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			6		5	2	

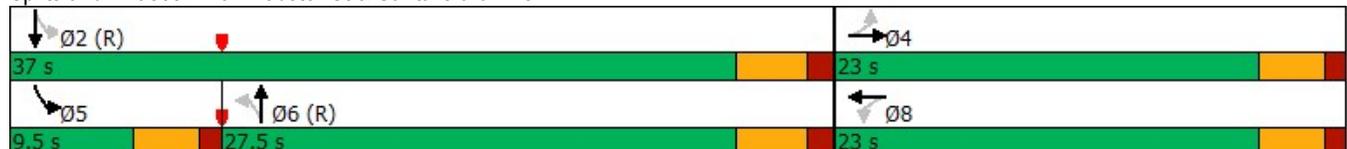
Lanes, Volumes, Timings
8: Webster St & Santa Clara Ave

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			6			2		
Detector Phase	4	4		8	8		6	6		5	2	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		5.0	5.0		4.0	5.0	
Minimum Split (s)	23.0	23.0		23.0	23.0		24.0	24.0		9.5	31.0	
Total Split (s)	23.0	23.0		23.0	23.0		27.5	27.5		9.5	37.0	
Total Split (%)	38.3%	38.3%		38.3%	38.3%		45.8%	45.8%		15.8%	61.7%	
Maximum Green (s)	19.0	19.0		19.0	19.0		23.1	23.1		5.5	32.6	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.2	3.2		3.0	3.2	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.2	1.2		1.0	1.2	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.0			4.0			4.4			4.4	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	1.8	1.8		1.8	1.8		2.0	2.0		0.2	2.0	
Recall Mode	None	None		None	None		C-Max	C-Max		None	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0		23.0	23.0			23.0	
Pedestrian Calls (#/hr)	40	40		43	43		71	71			60	
Act Effect Green (s)		13.6			13.6			38.0			38.0	
Actuated g/C Ratio		0.23			0.23			0.63			0.63	
v/c Ratio		0.31			0.45			0.17			0.39	
Control Delay		16.5			15.5			5.8			2.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		16.5			15.5			5.8			2.3	
LOS		B			B			A			A	
Approach Delay		16.5			15.5			5.8			2.3	
Approach LOS		B			B			A			A	

Intersection Summary

Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	19 (32%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.45
Intersection Signal Delay:	6.0
Intersection LOS:	A
Intersection Capacity Utilization	77.6%
ICU Level of Service	D
Analysis Period (min)	15

Splits and Phases: 8: Webster St & Santa Clara Ave



Lanes, Volumes, Timings
9: 8th St & Santa Clara Ave

Central Avenue Safety Improvement

09/07/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	161	13	7	132	67	11	485	27	48	407	18
Future Volume (vph)	22	161	13	7	132	67	11	485	27	48	407	18
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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.98			1.00			0.99	
Frt		0.991			0.956			0.993			0.995	
Flt Protected		0.994			0.998			0.999			0.995	
Satd. Flow (prot)	0	1772	0	0	1693	0	0	1877	0	0	1855	0
Flt Permitted		0.953			0.990			0.987			0.899	
Satd. Flow (perm)	0	1695	0	0	1678	0	0	1853	0	0	1673	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			29			5			4	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1178			660			703			684	
Travel Time (s)		32.1			18.0			19.2			18.7	
Confl. Peds. (#/hr)	23		33	33		23	37		26	26		37
Confl. Bikes (#/hr)			14			3			3			1
Peak Hour Factor	0.92	0.92	0.92	0.93	0.93	0.93	0.86	0.86	0.86	0.84	0.84	0.84
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	0%	0%	0%	1%	1%	1%
Adj. Flow (vph)	24	175	14	8	142	72	13	564	31	57	485	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	213	0	0	222	0	0	608	0	0	563	0
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)		0			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
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	29.0	29.0		29.0	29.0		20.0	20.0		20.0	20.0	
Total Split (s)	32.8	32.8		32.8	32.8		56.0	56.0		56.0	56.0	
Total Split (%)	36.9%	36.9%		36.9%	36.9%		63.1%	63.1%		63.1%	63.1%	
Maximum Green (s)	28.6	28.6		28.6	28.6		51.4	51.4		51.4	51.4	
Yellow Time (s)	3.2	3.2		3.2	3.2		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.2			4.2			4.6			4.6	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	18.0	18.0		18.0	18.0		4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	33	33		23	23		26	26		37	37	
Act Effct Green (s)		28.6			28.6			51.4			51.4	
Actuated g/C Ratio		0.32			0.32			0.58			0.58	

Lanes, Volumes, Timings
9: 8th St & Santa Clara Ave

Central Avenue Safety Improvement

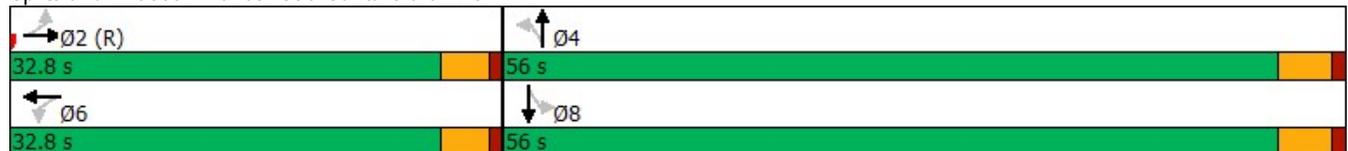
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio		0.39			0.40			0.57			0.58	
Control Delay		25.5			22.7			14.2			14.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		25.5			22.7			14.2			14.8	
LOS		C			C			B			B	
Approach Delay		25.5			22.7			14.2			14.8	
Approach LOS		C			C			B			B	

Intersection Summary

Area Type:	Other
Cycle Length:	88.8
Actuated Cycle Length:	88.8
Offset:	0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle:	60
Control Type:	Pretimed
Maximum v/c Ratio:	0.58
Intersection Signal Delay:	17.1
Intersection LOS:	B
Intersection Capacity Utilization	79.0%
ICU Level of Service	D
Analysis Period (min)	15

Splits and Phases: 9: 8th St & Santa Clara Ave



Lanes, Volumes, Timings
10: Sherman St & Santa Clara Ave

Central Avenue Safety Improvement

09/07/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	254	31	10	213	33	16	144	5	92	260	31
Future Volume (vph)	19	254	31	10	213	33	16	144	5	92	260	31
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	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr _t		0.986			0.982			0.996			0.989	
Fl _t Protected		0.997			0.998			0.995			0.988	
Satd. Flow (prot)	0	1813	0	0	1808	0	0	1883	0	0	1857	0
Fl _t Permitted		0.997			0.998			0.995			0.988	
Satd. Flow (perm)	0	1813	0	0	1808	0	0	1883	0	0	1857	0
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		526			571			722			667	
Travel Time (s)		14.3			15.6			19.7			18.2	
Confl. Peds. (#/hr)	13		23	23		13	1		19	19		1
Confl. Bikes (#/hr)			8			6			2			
Peak Hour Factor	0.84	0.84	0.84	0.90	0.90	0.90	0.91	0.91	0.91	0.98	0.98	0.98
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	23	302	37	11	237	37	18	158	5	94	265	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	362	0	0	285	0	0	181	0	0	391	0
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)		0			0			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
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	64.6%						ICU Level of Service C					
Analysis Period (min)	15											

Lanes, Volumes, Timings
11: Webster St & Lincoln Ave

Central Avenue Safety Improvement

09/07/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	351	47	56	288	502	6	299	63	434	646	198
Future Volume (vph)	87	351	47	56	288	502	6	299	63	434	646	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	165		0	140		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	80			40			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	1.00	1.00		0.99	0.98			0.99			0.99	
Fr _t		0.982			0.905			0.974			0.977	
Fl _t Protected	0.950			0.950				0.999			0.983	
Satd. Flow (prot)	1787	3496	0	1805	3210	0	0	3416	0	0	3372	0
Fl _t Permitted	0.206			0.460				0.937			0.705	
Satd. Flow (perm)	386	3496	0	864	3210	0	0	3204	0	0	2402	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28			366			56			49	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		742			1168			689			384	
Travel Time (s)		20.2			31.9			18.8			10.5	
Confl. Peds. (#/hr)	23		28	28		23	53		45	45		53
Confl. Bikes (#/hr)			2									1
Peak Hour Factor	0.94	0.94	0.94	0.87	0.87	0.87	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	93	373	50	64	331	577	6	318	67	462	687	211
Shared Lane Traffic (%)												
Lane Group Flow (vph)	93	423	0	64	908	0	0	391	0	0	1360	0
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			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	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	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	
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	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
11: Webster St & Lincoln Ave

Central Avenue Safety Improvement

09/07/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA										
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		27.0	27.0		24.0	24.0		25.0	25.0	
Total Split (s)	27.0	27.0		27.0	27.0		33.0	33.0		33.0	33.0	
Total Split (%)	45.0%	45.0%		45.0%	45.0%		55.0%	55.0%		55.0%	55.0%	
Maximum Green (s)	23.0	23.0		23.0	23.0		29.0	29.0		29.0	29.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0		10.0	10.0		7.0	7.0		8.0	8.0	
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	28	28		23	23		46	46		53	53	
Act Effect Green (s)	19.4	19.4		19.4	19.4			32.6			32.6	
Actuated g/C Ratio	0.32	0.32		0.32	0.32			0.54			0.54	
v/c Ratio	0.75	0.37		0.23	0.71			0.22			1.03	
Control Delay	54.4	14.6		15.3	13.0			8.0			50.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	54.4	14.6		15.3	13.0			8.0			50.3	
LOS	D	B		B	B			A			D	
Approach Delay		21.8			13.1			8.0			50.3	
Approach LOS		C			B			A			D	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 44 (73%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.03
 Intersection Signal Delay: 29.5
 Intersection LOS: C
 Intersection Capacity Utilization 100.3%
 ICU Level of Service G
 Analysis Period (min) 15

Splits and Phases: 11: Webster St & Lincoln Ave



Lanes, Volumes, Timings
12: 8th St/Constitution Way & Lincoln Ave

Central Avenue Safety Improvement

09/07/2020



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔	↔	
Traffic Volume (vph)	33	533	218	17	421	176	255	352	30	736	442	29
Future Volume (vph)	33	533	218	17	421	176	255	352	30	736	442	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		60	200		0
Storage Lanes	0		0	0		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.97	1.00	1.00
Ped Bike Factor		0.99			1.00			1.00		0.99	1.00	
Fr _t		0.958			0.957			0.993			0.991	
Fl _t Protected		0.998			0.999			0.980		0.950		
Satd. Flow (prot)	0	3380	0	0	3451	0	0	3508	0	3467	1862	0
Fl _t Permitted		0.857			0.852			0.980		0.950		
Satd. Flow (perm)	0	2903	0	0	2943	0	0	3503	0	3434	1862	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		61			65			5			4	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		1168			670			684			583	
Travel Time (s)		31.9			18.3			18.7			15.9	
Confl. Peds. (#/hr)			14	14			6		15	15		6
Confl. Bikes (#/hr)			1						3			
Peak Hour Factor	0.90	0.90	0.90	0.94	0.94	0.94	0.83	0.83	0.83	0.89	0.89	0.89
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Adj. Flow (vph)	37	592	242	18	448	187	307	424	36	827	497	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	871	0	0	653	0	0	767	0	827	530	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			24			24	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru										
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
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	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings
12: 8th St/Constitution Way & Lincoln Ave

Central Avenue Safety Improvement

09/07/2020

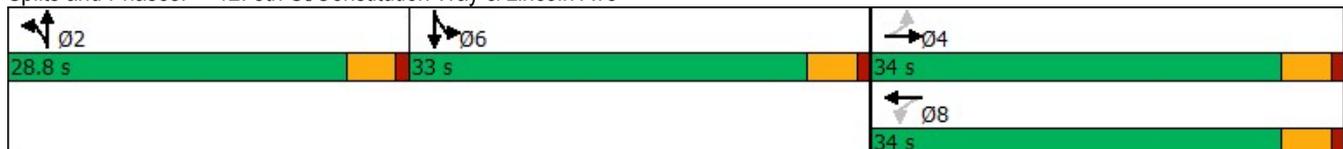


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		4			8		2	2		6	6	
Permitted Phases	4			8								
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.6	24.6		12.6	12.6		27.0	27.0		27.0	27.0	
Total Split (s)	34.0	34.0		34.0	34.0		28.8	28.8		33.0	33.0	
Total Split (%)	35.5%	35.5%		35.5%	35.5%		30.1%	30.1%		34.4%	34.4%	
Maximum Green (s)	29.4	29.4		29.4	29.4		24.2	24.2		28.4	28.4	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		4.6			4.6			4.6		4.6	4.6	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	1.0	1.0		1.0	1.0		1.5	1.5		1.5	1.5	
Recall Mode	None	None										
Walk Time (s)	10.0	10.0					10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	27.0	27.0					16.0	16.0		16.0	16.0	
Pedestrian Calls (#/hr)	14	14					15	15		6	6	
Act Effct Green (s)		29.6			29.6			23.0		27.9	27.9	
Actuated g/C Ratio		0.31			0.31			0.24		0.30	0.30	
v/c Ratio		0.91			0.68			0.90		0.81	0.96	
Control Delay		44.4			29.4			49.2		39.1	64.1	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		44.4			29.4			49.2		39.1	64.1	
LOS		D			C			D		D	E	
Approach Delay		44.4			29.4			49.2			48.8	
Approach LOS		D			C			D			D	

Intersection Summary

Area Type:	Other
Cycle Length:	95.8
Actuated Cycle Length:	94.4
Natural Cycle:	90
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.96
Intersection Signal Delay:	44.4
Intersection LOS:	D
Intersection Capacity Utilization:	103.5%
ICU Level of Service:	G
Analysis Period (min):	15

Splits and Phases: 12: 8th St/Constitution Way & Lincoln Ave



Lanes, Volumes, Timings
13: Sherman St & Lincoln Ave

Central Avenue Safety Improvement

09/07/2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	820	109	10	632	36	28	164	16	166	285	47
Future Volume (vph)	52	820	109	10	632	36	28	164	16	166	285	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	60		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	80			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00			1.00			1.00			1.00	
Fr _t		0.982			0.992			0.989			0.987	
Fl _t Protected	0.950				0.999			0.993			0.984	
Satd. Flow (prot)	1805	3531	0	0	3536	0	0	1863	0	0	1841	0
Fl _t Permitted	0.227				0.937			0.899			0.808	
Satd. Flow (perm)	430	3531	0	0	3317	0	0	1686	0	0	1510	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			12			11			13	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		546			554			667			570	
Travel Time (s)		14.9			15.1			18.2			15.5	
Confl. Peds. (#/hr)	8		10	10		8	22		8	8		22
Confl. Bikes (#/hr)									2			3
Peak Hour Factor	0.95	0.95	0.95	0.83	0.83	0.83	0.82	0.82	0.82	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	55	863	115	12	761	43	34	200	20	193	331	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	978	0	0	816	0	0	254	0	0	579	0
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			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
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Minimum Split (s)	19.0	19.0		19.0	19.0		21.6	21.6		21.6	21.6	
Total Split (s)	23.6	23.6		23.6	23.6		30.2	30.2		30.2	30.2	
Total Split (%)	43.9%	43.9%		43.9%	43.9%		56.1%	56.1%		56.1%	56.1%	
Maximum Green (s)	19.4	19.4		19.4	19.4		25.6	25.6		25.6	25.6	
Yellow Time (s)	3.2	3.2		3.2	3.2		3.6	3.6		3.6	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0			0.0	
Total Lost Time (s)	4.2	4.2			4.2			4.6			4.6	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		20.0	20.0		20.0	20.0	

Lanes, Volumes, Timings
13: Sherman St & Lincoln Ave

Central Avenue Safety Improvement

09/07/2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)	10	10		8	8		8	8		22	22	
Act Effect Green (s)	19.4	19.4			19.4			25.6			25.6	
Actuated g/C Ratio	0.36	0.36			0.36			0.48			0.48	
v/c Ratio	0.35	0.76			0.68			0.31			0.80	
Control Delay	20.6	19.3			17.8			9.6			22.7	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	20.6	19.3			17.8			9.6			22.7	
LOS	C	B			B			A			C	
Approach Delay		19.4			17.8			9.6			22.7	
Approach LOS		B			B			A			C	

Intersection Summary

Area Type:	Other
Cycle Length:	53.8
Actuated Cycle Length:	53.8
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	50
Control Type:	Pretimed
Maximum v/c Ratio:	0.80
Intersection Signal Delay:	18.7
Intersection LOS:	B
Intersection Capacity Utilization	104.1%
ICU Level of Service	G
Analysis Period (min)	15

Splits and Phases: 13: Sherman St & Lincoln Ave

Ø2 (R) 23.6 s	Ø4 30.2 s
Ø6 (R) 23.6 s	Ø8 30.2 s

HCM Signalized Intersection Capacity Analysis

Central Avenue Safety Improvement

1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)

05/17/2020



Movement	EBL2	EBT	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL2	SBL	
Lane Configurations		↕		↕	↕			↕	↕			↕	
Traffic Volume (vph)	12	0	53	18	165	3	1	273	5	35	4	72	
Future Volume (vph)	12	0	53	18	165	3	1	273	5	35	4	72	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.6		4.6	4.6			4.6	4.6			5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00			1.00	
Frpb, ped/bikes		1.00		1.00	0.97			1.00	0.96			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00			0.99	
Frt		1.00		1.00	0.85			1.00	0.85			1.00	
Flt Protected		0.95		0.96	1.00			1.00	1.00			0.95	
Satd. Flow (prot)		1444		1753	1511			1844	1505			1724	
Flt Permitted		0.23		0.76	1.00			1.00	1.00			0.15	
Satd. Flow (perm)		356		1391	1511			1843	1505			277	
Peak-hour factor, PHF	0.50	0.50	0.66	0.66	0.66	0.66	0.79	0.79	0.79	0.79	0.65	0.65	
Adj. Flow (vph)	24	0	80	27	250	5	1	346	6	44	6	111	
RTOR Reduction (vph)	0	0	0	0	112	0	0	0	38	0	0	0	
Lane Group Flow (vph)	0	24	0	107	143	0	0	347	12	0	0	117	
Confl. Peds. (#/hr)			3				4			19		19	
Confl. Bikes (#/hr)					1	1				10			
Heavy Vehicles (%)	25%	25%	4%	4%	4%	4%	3%	3%	3%	3%	4%	4%	
Turn Type	Perm	NA	Perm	NA	Perm		Perm	NA	Perm		Perm	Perm	
Protected Phases		2		1				4					
Permitted Phases	2		1		1		4		4		3	3	
Actuated Green, G (s)		17.1		10.8	10.8			24.1	24.1			26.2	
Effective Green, g (s)		17.1		10.8	10.8			24.1	24.1			26.2	
Actuated g/C Ratio		0.18		0.11	0.11			0.25	0.25			0.27	
Clearance Time (s)		4.6		4.6	4.6			4.6	4.6			5.0	
Vehicle Extension (s)		1.5		2.0	2.0			2.0	2.0			2.0	
Lane Grp Cap (vph)		62		154	168			457	373			74	
v/s Ratio Prot													
v/s Ratio Perm		c0.07		0.08	c0.09			c0.19	0.01			c0.42	
v/c Ratio		0.39		0.69	0.85			0.76	0.03			1.58	
Uniform Delay, d1		35.3		41.5	42.3			33.8	27.6			35.4	
Progression Factor		1.00		1.00	1.00			1.00	1.00			1.00	
Incremental Delay, d2		17.3		10.4	30.7			11.3	0.2			316.2	
Delay (s)		52.6		51.9	73.0			45.0	27.8			351.6	
Level of Service		D		D	E			D	C			F	
Approach Delay (s)		52.6		66.8				42.8					
Approach LOS		D		E				D					
Intersection Summary													
HCM 2000 Control Delay			77.6									HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			0.96										
Actuated Cycle Length (s)			97.0									Sum of lost time (s)	18.8
Intersection Capacity Utilization			83.6%									ICU Level of Service	E
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)



Movement	SBT	SBR
Lane Configurations	↕	↗
Traffic Volume (vph)	210	47
Future Volume (vph)	210	47
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.0	
Lane Util. Factor	1.00	
Frpb, ped/bikes	0.99	
Flpb, ped/bikes	1.00	
Frt	0.97	
Flt Protected	1.00	
Satd. Flow (prot)	1768	
Flt Permitted	1.00	
Satd. Flow (perm)	1768	
Peak-hour factor, PHF	0.65	0.65
Adj. Flow (vph)	323	72
RTOR Reduction (vph)	8	0
Lane Group Flow (vph)	387	0
Confl. Peds. (#/hr)		4
Confl. Bikes (#/hr)		1
Heavy Vehicles (%)	4%	4%
Turn Type	NA	
Protected Phases	3	
Permitted Phases		
Actuated Green, G (s)	26.2	
Effective Green, g (s)	26.2	
Actuated g/C Ratio	0.27	
Clearance Time (s)	5.0	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	477	
v/s Ratio Prot	0.22	
v/s Ratio Perm		
v/c Ratio	0.81	
Uniform Delay, d1	33.1	
Progression Factor	1.00	
Incremental Delay, d2	9.6	
Delay (s)	42.7	
Level of Service	D	
Approach Delay (s)	113.3	
Approach LOS	F	
Intersection Summary		

Intersection												
Int Delay, s/veh	13.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	13	208	21	104	276	85	14	15	85	50	18	19
Future Vol, veh/h	13	208	21	104	276	85	14	15	85	50	18	19
Conflicting Peds, #/hr	60	0	25	25	0	60	88	0	0	0	0	88
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	67	67	67	83	83	83	50	50	50	87	87	87
Heavy Vehicles, %	5	5	5	1	1	1	0	0	0	0	0	0
Mvmt Flow	19	310	31	125	333	102	28	30	170	57	21	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	393	0	0	366	0	0	1082	1032	351	1107	1047	481
Stage 1	-	-	-	-	-	-	389	389	-	643	643	-
Stage 2	-	-	-	-	-	-	693	643	-	464	404	-
Critical Hdwy	4.15	-	-	4.11	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.209	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1149	-	-	1198	-	0	197	235	697	189	230	589
Stage 1	-	-	-	-	-	0	639	612	-	465	472	-
Stage 2	-	-	-	-	-	0	437	472	-	582	603	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1083	-	-	1169	-	-	136	184	680	104	180	509
Mov Cap-2 Maneuver	-	-	-	-	-	-	136	184	-	104	180	-
Stage 1	-	-	-	-	-	-	610	584	-	429	387	-
Stage 2	-	-	-	-	-	-	315	387	-	405	576	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.5			2.3			29.5			76.6		
HCM LOS							D			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	368	1083	-	-	1169	-	141
HCM Lane V/C Ratio	0.62	0.018	-	-	0.107	-	0.709
HCM Control Delay (s)	29.5	8.4	-	-	8.4	0	76.6
HCM Lane LOS		D	A	-	-	A	F
HCM 95th %tile Q(veh)		4	0.1	-	-	0.4	-

HCM 6th Signalized Intersection Summary
3: Ballena Blvd/4th St & Central Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (veh/h)	35	311	9	42	410	25	33	16	73	74	11	30
Future Volume (veh/h)	35	311	9	42	410	25	33	16	73	74	11	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.91	0.97		0.95	0.96		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1856	1856	1856	1900	1900	1900
Adj Flow Rate, veh/h	60	536	16	55	539	33	41	20	91	103	15	0
Peak Hour Factor	0.58	0.58	0.58	0.76	0.76	0.76	0.80	0.80	0.80	0.72	0.72	0.72
Percent Heavy Veh, %	2	2	2	1	1	1	3	3	3	0	0	0
Cap, veh/h	106	1625	48	100	1562	95	302	121	256	319	37	
Arrive On Green	0.06	0.46	0.46	0.06	0.46	0.46	0.17	0.17	0.17	0.17	0.17	0.00
Sat Flow, veh/h	1781	3517	105	1795	3407	208	951	706	1498	953	214	0
Grp Volume(v), veh/h	60	270	282	55	283	289	61	0	91	118	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1845	1795	1791	1824	1657	0	1498	1167	0	0
Q Serve(g_s), s	1.4	4.2	4.2	1.3	4.4	4.4	0.0	0.0	2.3	3.2	0.0	0.0
Cycle Q Clear(g_c), s	1.4	4.2	4.2	1.3	4.4	4.4	1.2	0.0	2.3	4.4	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.11	0.67		1.00	0.87		0.00
Lane Grp Cap(c), veh/h	106	821	853	100	821	836	423	0	256	356	0	
V/C Ratio(X)	0.57	0.33	0.33	0.55	0.34	0.35	0.14	0.00	0.36	0.33	0.00	
Avail Cap(c_a), veh/h	289	1278	1327	292	1288	1312	517	0	351	439	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	19.7	7.4	7.4	19.8	7.5	7.5	15.3	0.0	15.8	16.9	0.0	0.0
Incr Delay (d2), s/veh	1.8	0.1	0.1	1.7	0.1	0.1	0.1	0.0	0.4	0.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	1.2	1.3	0.5	1.3	1.3	0.5	0.0	0.7	1.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.5	7.5	7.5	21.5	7.6	7.6	15.4	0.0	16.2	17.2	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	B	A	B	B	A	
Approach Vol, veh/h		612			627			152			118	A
Approach Delay, s/veh		8.9			8.9			15.9			17.2	
Approach LOS		A			A			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.6	24.5		12.0	6.8	24.4		12.0				
Change Period (Y+Rc), s	* 4.2	4.6		4.6	* 4.2	4.6		4.6				
Max Green Setting (Gmax), s	* 7	31.0		10.1	* 7	31.0		10.1				
Max Q Clear Time (g_c+I1), s	3.3	6.2		6.4	3.4	6.4		4.3				
Green Ext Time (p_c), s	0.0	2.6		0.1	0.0	2.7		0.2				
Intersection Summary												
HCM 6th Ctrl Delay				10.2								
HCM 6th LOS				B								
Notes												
User approved pedestrian interval to be less than phase max green.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection	
Intersection Delay, s/veh	17.6
Intersection LOS	C

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔		↔↔	
Traffic Vol, veh/h	131	442	509	48	61	75
Future Vol, veh/h	131	442	509	48	61	75
Peak Hour Factor	0.80	0.80	0.82	0.82	0.76	0.76
Heavy Vehicles, %	1	1	2	2	0	0
Mvmt Flow	164	553	621	59	80	99
Number of Lanes	0	2	2	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	2
HCM Control Delay	18	18.6	12.4
HCM LOS	C	C	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	47%	0%	0%	0%	45%
Vol Thru, %	53%	100%	100%	78%	0%
Vol Right, %	0%	0%	0%	22%	55%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	278	295	339	218	136
LT Vol	131	0	0	0	61
Through Vol	147	295	339	170	0
RT Vol	0	0	0	48	75
Lane Flow Rate	348	368	414	265	179
Geometry Grp	7	7	7	7	2
Degree of Util (X)	0.604	0.615	0.701	0.438	0.318
Departure Headway (Hd)	6.25	6.011	6.095	5.938	6.39
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	578	600	592	605	562
Service Time	3.997	3.758	3.844	3.687	4.433
HCM Lane V/C Ratio	0.602	0.613	0.699	0.438	0.319
HCM Control Delay	18.1	17.9	22	13.3	12.4
HCM Lane LOS	C	C	C	B	B
HCM 95th-tile Q	4	4.2	5.6	2.2	1.4

HCM Signalized Intersection Capacity Analysis
5: Central Ave & Webster St

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	407	5	14	597	266	22	42	44	307	27	58
Future Volume (vph)	73	407	5	14	597	266	22	42	44	307	27	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.8			4.8			4.6		4.6	4.6	
Lane Util. Factor		0.95			0.95			1.00		0.95	0.95	
Frpb, ped/bikes		1.00			0.97			0.97		1.00	0.98	
Flpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	
Frt		1.00			0.95			0.95		1.00	0.95	
Flt Protected		0.99			1.00			0.99		0.95	0.97	
Satd. Flow (prot)		3503			3256			1691		1681	1608	
Flt Permitted		0.52			0.92			0.99		0.95	0.97	
Satd. Flow (perm)		1849			3010			1691		1681	1608	
Peak-hour factor, PHF	0.76	0.76	0.76	0.85	0.85	0.85	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	96	536	7	16	702	313	25	48	50	349	31	66
RTOR Reduction (vph)	0	1	0	0	41	0	0	24	0	0	11	0
Lane Group Flow (vph)	0	638	0	0	990	0	0	99	0	227	208	0
Confl. Peds. (#/hr)	50		31	31		50	40		37	37		40
Confl. Bikes (#/hr)			6			28			5			2
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		4			8		2	2		6	6	
Permitted Phases	4			8								
Actuated Green, G (s)		33.2			33.2			17.5		55.3	55.3	
Effective Green, g (s)		33.2			33.2			17.5		55.3	55.3	
Actuated g/C Ratio		0.28			0.28			0.15		0.46	0.46	
Clearance Time (s)		4.8			4.8			4.6		4.6	4.6	
Vehicle Extension (s)		2.4			2.4			2.5		2.5	2.5	
Lane Grp Cap (vph)		511			832			246		774	741	
v/s Ratio Prot								c0.06		c0.14	0.13	
v/s Ratio Perm		c0.35			0.33							
v/c Ratio		1.55dl			1.19			0.40		0.29	0.28	
Uniform Delay, d1		43.4			43.4			46.5		20.2	20.0	
Progression Factor		1.00			1.00			1.00		0.97	0.96	
Incremental Delay, d2		127.6			97.6			0.8		0.9	0.9	
Delay (s)		171.0			141.0			47.3		20.4	20.3	
Level of Service		F			F			D		C	C	
Approach Delay (s)		171.0			141.0			47.3			20.3	
Approach LOS		F			F			D			C	
Intersection Summary												
HCM 2000 Control Delay			120.4				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			14.0		
Intersection Capacity Utilization			74.6%				ICU Level of Service			D		
Analysis Period (min)			15									
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
6: 8th St & Central Ave

Central Avenue Safety Improvement
05/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	286	383	16	530	147	316	309	8	50	167	22
Future Volume (veh/h)	5	286	383	16	530	147	316	309	8	50	167	22
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.93	0.99		0.88	1.00		0.96	1.00		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	6	325	435	19	631	175	347	340	9	63	211	28
Peak Hour Factor	0.88	0.88	0.88	0.84	0.84	0.84	0.91	0.91	0.91	0.79	0.79	0.79
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	51	818	389	59	677	185	501	509	13	103	344	46
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	0.28	0.28	0.28	0.27	0.27	0.27
Sat Flow, veh/h	5	3082	1468	34	2551	697	1781	1812	48	378	1267	168
Grp Volume(v), veh/h	158	173	435	456	0	369	347	0	349	302	0	0
Grp Sat Flow(s),veh/h/ln	1470	1617	1468	1814	0	1468	1781	0	1860	1814	0	0
Q Serve(g_s), s	0.4	6.7	20.1	7.9	0.0	18.7	13.2	0.0	12.6	11.0	0.0	0.0
Cycle Q Clear(g_c), s	19.1	6.7	20.1	18.6	0.0	18.7	13.2	0.0	12.6	11.0	0.0	0.0
Prop In Lane	0.04		1.00	0.04		0.47	1.00		0.03	0.21		0.09
Lane Grp Cap(c), veh/h	439	429	389	531	0	389	501	0	523	493	0	0
V/C Ratio(X)	0.36	0.40	1.12	0.86	0.00	0.95	0.69	0.00	0.67	0.61	0.00	0.00
Avail Cap(c_a), veh/h	439	429	389	531	0	389	752	0	785	553	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	22.5	22.9	27.8	27.1	0.0	27.3	24.3	0.0	24.1	24.1	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.2	81.3	12.8	0.0	31.8	0.6	0.0	0.6	0.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	2.5	15.6	9.7	0.0	9.7	5.5	0.0	5.4	4.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.6	23.1	109.1	40.0	0.0	59.1	25.0	0.0	24.7	25.1	0.0	0.0
LnGrp LOS	C	C	F	D	A	E	C	A	C	C	A	A
Approach Vol, veh/h		766			825			696			302	
Approach Delay, s/veh		71.9			48.6			24.8			25.1	
Approach LOS		E			D			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		24.7		25.9		24.7		25.2				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		20.1		32.0		20.1		23.1				
Max Q Clear Time (g_c+I1), s		20.7		15.2		22.1		13.0				
Green Ext Time (p_c), s		0.0		0.8		0.0		0.5				
Intersection Summary												
HCM 6th Ctrl Delay			46.3									
HCM 6th LOS			D									
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM Signalized Intersection Capacity Analysis
7: Sherman St & Encinal Ave & Central Ave

													
Movement	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	
Lane Configurations													
Traffic Volume (vph)	4	149	281	7	1	162	46	75	91	2	5	18	
Future Volume (vph)	4	149	281	7	1	162	46	75	91	2	5	18	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.9	4.8			4.9			4.6				
Lane Util. Factor		1.00	0.88			1.00			1.00				
Frpb, ped/bikes		1.00	0.92			0.98			0.99				
Flpb, ped/bikes		1.00	1.00			1.00			1.00				
Frt		1.00	0.85			0.97			0.99				
Flt Protected		1.00	1.00			1.00			0.98				
Satd. Flow (prot)		1860	2576			1780			1802				
Flt Permitted		0.99	1.00			1.00			0.81				
Satd. Flow (perm)		1847	2576			1778			1487				
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.90	0.90	0.90	0.71	0.71	0.71	0.71	0.77	
Adj. Flow (vph)	4	159	299	7	1	180	51	106	128	3	7	23	
RTOR Reduction (vph)	0	0	9	0	0	14	0	0	2	0	0	0	
Lane Group Flow (vph)	0	163	297	0	0	218	0	0	242	0	0	0	
Confl. Peds. (#/hr)	14			11	11		14			24	17	24	
Confl. Bikes (#/hr)				3			14			7	7		
Turn Type	Perm	NA	custom		Perm	NA		Perm	NA			Perm	
Protected Phases		5				5			4				
Permitted Phases	5		2		5			4				4	
Actuated Green, G (s)		17.1	45.6			17.1			15.0				
Effective Green, g (s)		17.1	45.6			17.1			15.0				
Actuated g/C Ratio		0.24	0.65			0.24			0.21				
Clearance Time (s)		4.9	4.8			4.9			4.6				
Vehicle Extension (s)		0.2	3.0			0.2			3.0				
Lane Grp Cap (vph)		451	1678			434			318				
v/s Ratio Prot													
v/s Ratio Perm		0.09	0.12			c0.12			c0.16				
v/c Ratio		0.36	0.18			0.50			0.76				
Uniform Delay, d1		21.9	4.8			22.8			25.8				
Progression Factor		1.00	1.00			1.00			1.00				
Incremental Delay, d2		2.2	0.2			4.1			15.8				
Delay (s)		24.2	5.0			26.9			41.6				
Level of Service		C	A			C			D				
Approach Delay (s)		11.7				26.9			41.6				
Approach LOS		B				C			D				
Intersection Summary													
HCM 2000 Control Delay			22.7									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.54										
Actuated Cycle Length (s)			70.0									Sum of lost time (s)	13.9
Intersection Capacity Utilization			47.6%									ICU Level of Service	A
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Sherman St & Encinal Ave & Central Ave

Central Avenue Safety Improvement

05/17/2020



Movement	SBL	SBT	SBR	NWL2	NWL	NWR	NWR2
Lane Configurations		↕			↕		
Traffic Volume (vph)	51	35	11	1	395	60	1
Future Volume (vph)	51	35	11	1	395	60	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.6			4.4		
Lane Util. Factor		1.00			0.97		
Frpb, ped/bikes		1.00			1.00		
Flpb, ped/bikes		1.00			0.97		
Fr t		0.99			0.98		
Fl t Protected		0.97			0.96		
Satd. Flow (prot)		1782			3279		
Fl t Permitted		0.64			0.95		
Satd. Flow (perm)		1182			3265		
Peak-hour factor, PHF	0.77	0.77	0.77	0.85	0.85	0.85	0.85
Adj. Flow (vph)	66	45	14	1	465	71	1
RTOR Reduction (vph)	0	6	0	0	66	0	0
Lane Group Flow (vph)	0	143	0	0	472	0	0
Confl. Peds. (#/hr)	17			11			
Confl. Bikes (#/hr)			5			1	1
Turn Type	Perm	NA		Perm	Prot		
Protected Phases		4			6		
Permitted Phases	4			6			
Actuated Green, G (s)		15.0			24.0		
Effective Green, g (s)		15.0			24.0		
Actuated g/C Ratio		0.21			0.34		
Clearance Time (s)		4.6			4.4		
Vehicle Extension (s)		3.0			3.0		
Lane Grp Cap (vph)		253			1119		
v/s Ratio Prot							
v/s Ratio Perm		0.12			0.14		
v/c Ratio		0.56			0.42		
Uniform Delay, d1		24.6			17.7		
Progression Factor		1.00			1.00		
Incremental Delay, d2		8.8			1.2		
Delay (s)		33.4			18.8		
Level of Service		C			B		
Approach Delay (s)		33.4			18.8		
Approach LOS		C			B		
Intersection Summary							

HCM Signalized Intersection Capacity Analysis
8: Webster St & Santa Clara Ave

Central Avenue Safety Improvement

05/17/2020

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	19	80	22	16	94	100	5	306	18	45	300	18	
Future Volume (vph)	19	80	22	16	94	100	5	306	18	45	300	18	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0			4.0			4.4			4.4		
Lane Util. Factor		1.00			1.00			0.95			0.95		
Frpb, ped/bikes		1.00			0.96			1.00			1.00		
Flpb, ped/bikes		1.00			1.00			1.00			1.00		
Fr t		0.98			0.94			0.99			0.99		
Fl t Protected		0.99			1.00			1.00			0.99		
Satd. Flow (prot)		1754			1606			3495			3472		
Fl t Permitted		0.94			0.97			0.95			0.87		
Satd. Flow (perm)		1661			1567			3321			3053		
Peak-hour factor, PHF	0.69	0.69	0.69	0.89	0.89	0.89	0.89	0.89	0.89	0.79	0.79	0.79	
Adj. Flow (vph)	28	116	32	18	106	112	6	344	20	57	380	23	
RTOR Reduction (vph)	0	16	0	0	63	0	0	4	0	0	5	0	
Lane Group Flow (vph)	0	160	0	0	173	0	0	366	0	0	455	0	
Confl. Peds. (#/hr)	45		13	13		45	24		42	42		24	
Confl. Bikes (#/hr)			2			42			2			3	
Heavy Vehicles (%)	4%	4%	4%	6%	6%	6%	2%	2%	2%	2%	2%	2%	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA		
Protected Phases		4			8			6		5	2		
Permitted Phases	4			8			6			2			
Actuated Green, G (s)		15.7			15.7			35.9			35.9		
Effective Green, g (s)		15.7			15.7			35.9			35.9		
Actuated g/C Ratio		0.26			0.26			0.60			0.60		
Clearance Time (s)		4.0			4.0			4.4			4.4		
Vehicle Extension (s)		1.5			1.5			1.5			1.5		
Lane Grp Cap (vph)		434			410			1987			1826		
v/s Ratio Prot													
v/s Ratio Perm		0.10			0.11			0.11			0.15		
v/c Ratio		0.37			0.42			0.18			0.25		
Uniform Delay, d1		18.1			18.4			5.4			5.7		
Progression Factor		1.00			1.00			1.71			0.84		
Incremental Delay, d2		0.2			0.3			0.0			0.0		
Delay (s)		18.3			18.6			9.3			4.8		
Level of Service		B			B			A			A		
Approach Delay (s)		18.3			18.6			9.3			4.8		
Approach LOS		B			B			A			A		
Intersection Summary													
HCM 2000 Control Delay			10.7									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.33										
Actuated Cycle Length (s)			60.0									Sum of lost time (s)	12.4
Intersection Capacity Utilization			69.0%									ICU Level of Service	C
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
9: 8th St & Santa Clara Ave

Central Avenue Safety Improvement
05/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	153	14	6	192	62	6	442	37	37	189	18
Future Volume (veh/h)	26	153	14	6	192	62	6	442	37	37	189	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.91	0.96		0.87	0.97		0.91	0.99		0.91
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1811	1811	1811	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	36	210	19	9	278	90	6	470	39	43	220	21
Peak Hour Factor	0.73	0.73	0.73	0.69	0.69	0.69	0.94	0.94	0.94	0.86	0.86	0.86
Percent Heavy Veh, %	4	4	4	6	6	6	2	2	2	3	3	3
Cap, veh/h	119	622	53	59	547	173	55	733	60	130	608	54
Arrive On Green	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
Sat Flow, veh/h	136	1426	121	12	1254	397	6	1681	138	160	1394	124
Grp Volume(v), veh/h	265	0	0	377	0	0	515	0	0	284	0	0
Grp Sat Flow(s),veh/h/ln	1683	0	0	1664	0	0	1825	0	0	1678	0	0
Q Serve(g_s), 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
Cycle Q Clear(g_c), s	6.7	0.0	0.0	11.3	0.0	0.0	15.2	0.0	0.0	7.2	0.0	0.0
Prop In Lane	0.14		0.07	0.02		0.24	0.01		0.08	0.15		0.07
Lane Grp Cap(c), veh/h	793	0	0	779	0	0	849	0	0	792	0	0
V/C Ratio(X)	0.33	0.00	0.00	0.48	0.00	0.00	0.61	0.00	0.00	0.36	0.00	0.00
Avail Cap(c_a), veh/h	793	0	0	779	0	0	849	0	0	792	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	12.8	0.0	0.0	14.1	0.0	0.0	15.2	0.0	0.0	13.0	0.0	0.0
Incr Delay (d2), s/veh	1.1	0.0	0.0	2.1	0.0	0.0	3.2	0.0	0.0	1.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.0	0.0	4.4	0.0	0.0	6.6	0.0	0.0	3.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.0	0.0	0.0	16.3	0.0	0.0	18.4	0.0	0.0	14.2	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	B	A	A	B	A	A
Approach Vol, veh/h		265			377			515				284
Approach Delay, s/veh		14.0			16.3			18.4				14.2
Approach LOS		B			B			B				B
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		34.2		34.6		34.2		34.6				
Change Period (Y+Rc), s		* 4.2		4.6		* 4.2		4.6				
Max Green Setting (Gmax), s		* 30		30.0		* 30		30.0				
Max Q Clear Time (g_c+I1), s		8.7		17.2		13.3		9.2				
Green Ext Time (p_c), s		1.7		2.9		2.3		1.9				
Intersection Summary												
HCM 6th Ctrl Delay				16.2								
HCM 6th LOS				B								
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

Intersection	
Intersection Delay, s/veh	19.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	28	197	20	7	209	47	27	308	11	27	113	14
Future Vol, veh/h	28	197	20	7	209	47	27	308	11	27	113	14
Peak Hour Factor	0.86	0.86	0.86	0.78	0.78	0.78	0.88	0.88	0.88	0.86	0.86	0.86
Heavy Vehicles, %	3	3	3	5	5	5	1	1	1	3	3	3
Mvmt Flow	33	229	23	9	268	60	31	350	13	31	131	16
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	17	19.2	23.2	13.8
HCM LOS	C	C	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	11%	3%	18%
Vol Thru, %	89%	80%	79%	73%
Vol Right, %	3%	8%	18%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	346	245	263	154
LT Vol	27	28	7	27
Through Vol	308	197	209	113
RT Vol	11	20	47	14
Lane Flow Rate	393	285	337	179
Geometry Grp	1	1	1	1
Degree of Util (X)	0.7	0.526	0.608	0.347
Departure Headway (Hd)	6.409	6.653	6.49	6.983
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	562	538	553	512
Service Time	4.483	4.736	4.568	5.078
HCM Lane V/C Ratio	0.699	0.53	0.609	0.35
HCM Control Delay	23.2	17	19.2	13.8
HCM Lane LOS	C	C	C	B
HCM 95th-tile Q	5.5	3	4	1.5

HCM 6th Signalized Intersection Summary
 11: Webster St & Lincoln Ave

Central Avenue Safety Improvement

05/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	170	290	66	20	424	26	47	359	20	26	298	78
Future Volume (veh/h)	170	290	66	20	424	26	47	359	20	26	298	78
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.98	0.99		0.98	0.99		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1885	1885	1885	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	221	377	86	25	523	32	51	390	22	31	355	93
Peak Hour Factor	0.77	0.77	0.77	0.81	0.81	0.81	0.92	0.92	0.92	0.84	0.84	0.84
Percent Heavy Veh, %	3	3	3	1	1	1	2	2	2	2	2	2
Cap, veh/h	369	1149	259	409	1383	84	189	1330	74	121	1187	300
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.15	0.15	0.15	0.46	0.46	0.46
Sat Flow, veh/h	840	2846	641	928	3424	209	251	2875	160	116	2564	647
Grp Volume(v), veh/h	221	232	231	25	273	282	234	0	229	254	0	225
Grp Sat Flow(s),veh/h/ln	840	1763	1725	928	1791	1842	1618	0	1668	1761	0	1566
Q Serve(g_s), s	15.1	5.4	5.5	1.1	6.4	6.5	0.0	0.0	7.3	0.0	0.0	5.4
Cycle Q Clear(g_c), s	21.5	5.4	5.5	6.7	6.4	6.5	6.6	0.0	7.3	5.1	0.0	5.4
Prop In Lane	1.00		0.37	1.00		0.11	0.22		0.10	0.12		0.41
Lane Grp Cap(c), veh/h	369	712	697	409	723	744	822	0	772	882	0	725
V/C Ratio(X)	0.60	0.33	0.33	0.06	0.38	0.38	0.28	0.00	0.30	0.29	0.00	0.31
Avail Cap(c_a), veh/h	394	764	747	436	776	798	822	0	772	882	0	725
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.64	0.64	0.64	0.99	0.00	0.99	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.2	12.3	12.3	14.6	12.6	12.6	16.5	0.0	16.8	10.0	0.0	10.1
Incr Delay (d2), s/veh	1.4	0.1	0.1	0.0	0.1	0.1	0.9	0.0	1.0	0.8	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	2.0	2.0	0.2	2.4	2.4	3.1	0.0	3.1	2.0	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.6	12.4	12.4	14.6	12.7	12.7	17.3	0.0	17.7	10.8	0.0	11.2
LnGrp LOS	C	B	B	B	B	B	B	A	B	B	A	B
Approach Vol, veh/h		684			580			463				479
Approach Delay, s/veh		15.4			12.7			17.5				11.0
Approach LOS		B			B			B				B
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		31.8		28.2		31.8		28.2				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		26.0		26.0		26.0		26.0				
Max Q Clear Time (g_c+I1), s		9.3		23.5		7.4		8.7				
Green Ext Time (p_c), s		1.5		0.7		1.6		1.8				
Intersection Summary												
HCM 6th Ctrl Delay				14.2								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary
 12: 8th St/Constitution Way & Lincoln Ave

Central Avenue Safety Improvement

05/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	257	23	19	366	239	24	516	22	201	192	10
Future Volume (veh/h)	11	257	23	19	366	239	24	516	22	201	192	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.95	1.00		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1885	1885	1885	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	14	334	30	24	458	299	26	549	23	254	243	13
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.94	0.94	0.94	0.79	0.79	0.79
Percent Heavy Veh, %	3	3	3	1	1	1	2	2	2	3	3	3
Cap, veh/h	69	749	71	75	539	343	40	894	39	825	419	22
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	0.26	0.26	0.26	0.24	0.24	0.24
Sat Flow, veh/h	20	2765	262	49	1988	1266	154	3394	149	3428	1739	93
Grp Volume(v), veh/h	190	0	188	436	0	345	315	0	283	254	0	256
Grp Sat Flow(s),veh/h/ln	1408	0	1639	1844	0	1459	1863	0	1834	1714	0	1832
Q Serve(g_s), s	0.5	0.0	5.8	5.3	0.0	13.8	9.2	0.0	8.2	3.7	0.0	7.6
Cycle Q Clear(g_c), s	14.3	0.0	5.8	13.8	0.0	13.8	9.2	0.0	8.2	3.7	0.0	7.6
Prop In Lane	0.07		0.16	0.05		0.87	0.08		0.08	1.00		0.05
Lane Grp Cap(c), veh/h	445	0	444	562	0	395	491	0	483	825	0	441
V/C Ratio(X)	0.43	0.00	0.42	0.78	0.00	0.87	0.64	0.00	0.59	0.31	0.00	0.58
Avail Cap(c_a), veh/h	481	0	480	602	0	428	759	0	747	1731	0	925
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.3	0.0	18.4	21.3	0.0	21.4	20.0	0.0	19.7	19.1	0.0	20.6
Incr Delay (d2), s/veh	0.2	0.0	0.2	5.2	0.0	15.6	0.5	0.0	0.4	0.1	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	2.1	6.4	0.0	6.1	3.8	0.0	3.4	1.4	0.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.5	0.0	18.7	26.5	0.0	37.0	20.6	0.0	20.1	19.2	0.0	21.0
LnGrp LOS	B	A	B	C	A	D	C	A	C	B	A	C
Approach Vol, veh/h		378			781			598			510	
Approach Delay, s/veh		18.6			31.1			20.3			20.1	
Approach LOS		B			C			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		20.8		21.2		19.4		21.2				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		25.0		18.0		31.0		18.0				
Max Q Clear Time (g_c+I1), s		11.2		16.3		9.6		15.8				
Green Ext Time (p_c), s		1.7		0.2		1.1		0.6				
Intersection Summary												
HCM 6th Ctrl Delay				23.7								
HCM 6th LOS				C								
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 6th Signalized Intersection Summary
13: Sherman St & Lincoln Ave

Central Avenue Safety Improvement

05/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	402	44	10	487	67	66	303	15	47	108	16
Future Volume (veh/h)	20	402	44	10	487	67	66	303	15	47	108	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	1.00		0.97	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	24	479	52	14	676	93	78	356	18	63	144	21
Peak Hour Factor	0.84	0.84	0.84	0.72	0.72	0.72	0.85	0.85	0.85	0.75	0.75	0.75
Percent Heavy Veh, %	0	0	0	0	0	0	2	2	2	2	2	2
Cap, veh/h	405	1704	184	79	1602	217	146	462	22	178	363	46
Arrive On Green	0.52	0.52	0.52	0.52	0.52	0.52	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	709	3274	354	20	3078	418	215	1463	70	292	1148	146
Grp Volume(v), veh/h	24	263	268	418	0	365	452	0	0	228	0	0
Grp Sat Flow(s),veh/h/ln	709	1805	1823	1877	0	1638	1747	0	0	1586	0	0
Q Serve(g_s), s	1.2	4.4	4.4	0.0	0.0	7.4	7.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	8.6	4.4	4.4	7.3	0.0	7.4	12.7	0.0	0.0	5.3	0.0	0.0
Prop In Lane	1.00		0.19	0.03		0.26	0.17		0.04	0.28		0.09
Lane Grp Cap(c), veh/h	405	939	949	1046	0	852	631	0	0	586	0	0
V/C Ratio(X)	0.06	0.28	0.28	0.40	0.00	0.43	0.72	0.00	0.00	0.39	0.00	0.00
Avail Cap(c_a), veh/h	405	939	949	1046	0	852	631	0	0	586	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	10.6	7.2	7.3	7.9	0.0	8.0	16.8	0.0	0.0	14.4	0.0	0.0
Incr Delay (d2), s/veh	0.3	0.7	0.7	1.1	0.0	1.6	6.9	0.0	0.0	1.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.6	1.6	2.8	0.0	2.5	5.8	0.0	0.0	2.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.9	8.0	8.0	9.1	0.0	9.5	23.7	0.0	0.0	16.3	0.0	0.0
LnGrp LOS	B	A	A	A	A	A	C	A	A	B	A	A
Approach Vol, veh/h		555			783			452			228	
Approach Delay, s/veh		8.1			9.3			23.7			16.3	
Approach LOS		A			A			C			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		32.2		21.6		32.2		21.6				
Change Period (Y+Rc), s		* 4.2		4.6		* 4.2		4.6				
Max Green Setting (Gmax), s		* 28		17.0		* 28		17.0				
Max Q Clear Time (g_c+I1), s		10.6		14.7		9.4		7.3				
Green Ext Time (p_c), s		3.3		0.7		5.2		1.0				
Intersection Summary												
HCM 6th Ctrl Delay				13.0								
HCM 6th LOS				B								
Notes												
User approved pedestrian interval to be less than phase max green.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM Signalized Intersection Capacity Analysis

Central Avenue Safety Improvement

1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)

05/17/2020

													
Movement	EBL2	EBT	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL2	SBL	
Lane Configurations													
Traffic Volume (vph)	44	16	5	9	73	6	2	172	0	22	2	116	
Future Volume (vph)	44	16	5	9	73	6	2	172	0	22	2	116	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.6		4.6	4.6			4.6	4.6			5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00			1.00	
Frpb, ped/bikes		1.00		1.00	1.00			1.00	0.98			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00			1.00	
Frt		1.00		1.00	0.85			1.00	0.85			1.00	
Flt Protected		0.96		0.98	1.00			1.00	1.00			0.95	
Satd. Flow (prot)		1833		1826	1583			1880	1575			1805	
Flt Permitted		0.21		0.89	1.00			1.00	1.00			0.13	
Satd. Flow (perm)		407		1646	1583			1872	1575			254	
Peak-hour factor, PHF	0.83	0.83	0.78	0.78	0.78	0.78	0.73	0.73	0.73	0.73	0.78	0.78	
Adj. Flow (vph)	53	19	6	12	94	8	3	236	0	30	3	149	
RTOR Reduction (vph)	0	0	0	0	94	0	0	0	23	0	0	0	
Lane Group Flow (vph)	0	72	0	18	8	0	0	239	7	0	0	152	
Confl. Peds. (#/hr)			5				11			3		3	
Confl. Bikes (#/hr)													
Heavy Vehicles (%)	0%	0%	2%	2%	2%	2%	1%	1%	1%	1%	0%	0%	
Turn Type	Perm	NA	Perm	NA	Perm		Perm	NA	Perm		Perm	Perm	
Protected Phases		2		1				4					
Permitted Phases	2		1		1		4		4		3	3	
Actuated Green, G (s)		16.2		8.0	8.0			24.1	24.1			29.9	
Effective Green, g (s)		16.2		8.0	8.0			24.1	24.1			29.9	
Actuated g/C Ratio		0.17		0.08	0.08			0.25	0.25			0.31	
Clearance Time (s)		4.6		4.6	4.6			4.6	4.6			5.0	
Vehicle Extension (s)		1.5		2.0	2.0			2.0	2.0			2.0	
Lane Grp Cap (vph)		67		135	130			465	391			78	
v/s Ratio Prot													
v/s Ratio Perm		c0.18		c0.01	0.01			c0.13	0.00			c0.60	
v/c Ratio		1.07		0.13	0.06			0.51	0.02			1.95	
Uniform Delay, d1		40.4		41.3	41.0			31.4	27.5			33.5	
Progression Factor		1.00		1.00	1.00			1.00	1.00			1.00	
Incremental Delay, d2		132.0		0.2	0.1			4.0	0.1			470.0	
Delay (s)		172.4		41.4	41.1			35.4	27.6			503.5	
Level of Service		F		D	D			D	C			F	
Approach Delay (s)		172.4		41.2				34.6					
Approach LOS		F		D				C					
Intersection Summary													
HCM 2000 Control Delay			115.2									HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio			1.13										
Actuated Cycle Length (s)			97.0									Sum of lost time (s)	18.8
Intersection Capacity Utilization			84.6%									ICU Level of Service	E
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)



Movement	SBT	SBR
Lane Configurations	↕	↗
Traffic Volume (vph)	286	18
Future Volume (vph)	286	18
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.0	
Lane Util. Factor	1.00	
Frpb, ped/bikes	1.00	
Flpb, ped/bikes	1.00	
Frt	0.99	
Flt Protected	1.00	
Satd. Flow (prot)	1878	
Flt Permitted	1.00	
Satd. Flow (perm)	1878	
Peak-hour factor, PHF	0.78	0.78
Adj. Flow (vph)	367	23
RTOR Reduction (vph)	2	0
Lane Group Flow (vph)	388	0
Confl. Peds. (#/hr)		11
Confl. Bikes (#/hr)		4
Heavy Vehicles (%)	0%	0%
Turn Type	NA	
Protected Phases	3	
Permitted Phases		
Actuated Green, G (s)	29.9	
Effective Green, g (s)	29.9	
Actuated g/C Ratio	0.31	
Clearance Time (s)	5.0	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	578	
v/s Ratio Prot	0.21	
v/s Ratio Perm		
v/c Ratio	0.67	
Uniform Delay, d1	29.3	
Progression Factor	1.00	
Incremental Delay, d2	2.4	
Delay (s)	31.7	
Level of Service	C	
Approach Delay (s)	164.0	
Approach LOS	F	
Intersection Summary		

Intersection												
Int Delay, s/veh	6.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	8	311	12	24	172	49	8	17	22	74	15	9
Future Vol, veh/h	8	311	12	24	172	49	8	17	22	74	15	9
Conflicting Peds, #/hr	17	0	23	23	0	17	23	0	0	0	0	23
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	82	82	82	59	59	59	68	68	68
Heavy Vehicles, %	1	1	1	0	0	0	0	0	0	0	0	0
Mvmt Flow	10	404	16	29	210	60	14	29	37	109	22	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	227	0	0	443	0	0	764	740	435	750	748	250
Stage 1	-	-	-	-	-	-	455	455	-	285	285	-
Stage 2	-	-	-	-	-	-	309	285	-	465	463	-
Critical Hdwy	4.11	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.209	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1347	-	-	1128	-	0	323	347	625	330	343	794
Stage 1	-	-	-	-	-	0	589	572	-	727	679	-
Stage 2	-	-	-	-	-	0	705	679	-	581	568	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1325	-	-	1103	-	-	279	321	611	276	317	764
Mov Cap-2 Maneuver	-	-	-	-	-	-	279	321	-	276	317	-
Stage 1	-	-	-	-	-	-	570	554	-	708	648	-
Stage 2	-	-	-	-	-	-	635	648	-	512	550	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1	16.2	27.8
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	400	1325	-	-	1103	-	299
HCM Lane V/C Ratio	0.199	0.008	-	-	0.027	-	0.482
HCM Control Delay (s)	16.2	7.7	-	-	8.4	0	27.8
HCM Lane LOS	C	A	-	-	A	A	D
HCM 95th %tile Q(veh)	0.7	0	-	-	0.1	-	2.5

HCM 6th Signalized Intersection Summary
3: Ballena Blvd/4th St & Central Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	333	57	85	237	21	19	11	90	17	16	3
Future Volume (veh/h)	1	333	57	85	237	21	19	11	90	17	16	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	0.97		0.96	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	1	396	68	105	293	26	22	12	102	23	21	0
Peak Hour Factor	0.84	0.84	0.84	0.81	0.81	0.81	0.88	0.88	0.88	0.75	0.75	0.75
Percent Heavy Veh, %	1	1	1	0	0	0	0	0	0	0	0	0
Cap, veh/h	5	1157	197	163	1570	138	293	125	246	242	167	
Arrive On Green	0.00	0.38	0.38	0.09	0.47	0.47	0.16	0.16	0.16	0.16	0.16	0.00
Sat Flow, veh/h	1795	3040	517	1810	3346	294	809	782	1541	568	1048	0
Grp Volume(v), veh/h	1	232	232	105	157	162	34	0	102	44	0	0
Grp Sat Flow(s),veh/h/ln	1795	1791	1766	1810	1805	1836	1591	0	1541	1616	0	0
Q Serve(g_s), s	0.0	3.3	3.4	2.0	1.8	1.9	0.0	0.0	2.2	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	3.3	3.4	2.0	1.8	1.9	0.6	0.0	2.2	0.7	0.0	0.0
Prop In Lane	1.00		0.29	1.00		0.16	0.65		1.00	0.52		0.00
Lane Grp Cap(c), veh/h	5	681	672	163	847	861	418	0	246	409	0	
V/C Ratio(X)	0.20	0.34	0.35	0.64	0.19	0.19	0.08	0.00	0.41	0.11	0.00	
Avail Cap(c_a), veh/h	347	1532	1510	350	1544	1570	599	0	429	589	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	18.1	8.0	8.0	15.9	5.6	5.6	13.0	0.0	13.7	13.1	0.0	0.0
Incr Delay (d2), s/veh	7.2	0.2	0.2	1.6	0.1	0.1	0.0	0.0	0.6	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.0	1.0	0.8	0.5	0.5	0.2	0.0	0.7	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.3	8.1	8.2	17.5	5.6	5.7	13.1	0.0	14.3	13.2	0.0	0.0
LnGrp LOS	C	A	A	B	A	A	B	A	B	B	A	
Approach Vol, veh/h		465			424			136			44	A
Approach Delay, s/veh		8.2			8.6			14.0			13.2	
Approach LOS		A			A			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.5	18.4		10.4	4.3	21.6		10.4				
Change Period (Y+Rc), s	* 4.2	4.6		4.6	* 4.2	4.6		4.6				
Max Green Setting (Gmax), s	* 7	31.0		10.1	* 7	31.0		10.1				
Max Q Clear Time (g_c+I1), s	4.0	5.4		2.7	2.0	3.9		4.2				
Green Ext Time (p_c), s	0.0	2.2		0.1	0.0	1.4		0.1				

Intersection Summary

HCM 6th Ctrl Delay	9.3
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Intersection Delay, s/veh	11.1
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔		↔↔	
Traffic Vol, veh/h	43	414	373	60	46	42
Future Vol, veh/h	43	414	373	60	46	42
Peak Hour Factor	0.89	0.89	0.97	0.97	0.74	0.74
Heavy Vehicles, %	1	1	0	0	1	1
Mvmt Flow	48	465	385	62	62	57
Number of Lanes	0	2	2	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	2
HCM Control Delay	11.7	10.7	10.1
HCM LOS	B	B	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	24%	0%	0%	0%	52%
Vol Thru, %	76%	100%	100%	67%	0%
Vol Right, %	0%	0%	0%	33%	48%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	181	276	249	184	88
LT Vol	43	0	0	0	46
Through Vol	138	276	249	124	0
RT Vol	0	0	0	60	42
Lane Flow Rate	203	310	256	190	119
Geometry Grp	7	7	7	7	2
Degree of Util (X)	0.305	0.455	0.381	0.27	0.187
Departure Headway (Hd)	5.405	5.285	5.351	5.122	5.67
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	661	676	667	696	627
Service Time	3.178	3.059	3.126	2.897	3.758
HCM Lane V/C Ratio	0.307	0.459	0.384	0.273	0.19
HCM Control Delay	10.6	12.5	11.4	9.8	10.1
HCM Lane LOS	B	B	B	A	B
HCM 95th-tile Q	1.3	2.4	1.8	1.1	0.7

HCM Signalized Intersection Capacity Analysis
5: Central Ave & Webster St

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	474	4	17	401	205	18	39	31	559	30	86
Future Volume (vph)	61	474	4	17	401	205	18	39	31	559	30	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.8			4.8			4.6		4.6	4.6	
Lane Util. Factor		0.95			0.95			1.00		0.95	0.95	
Frpb, ped/bikes		1.00			0.96			0.98		1.00	0.97	
Flpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	
Fr t		1.00			0.95			0.95		1.00	0.96	
Fl t Protected		0.99			1.00			0.99		0.95	0.97	
Satd. Flow (prot)		3502			3215			1713		1681	1605	
Fl t Permitted		0.55			0.82			0.99		0.95	0.97	
Satd. Flow (perm)		1945			2629			1713		1681	1605	
Peak-hour factor, PHF	0.83	0.83	0.83	0.90	0.90	0.90	0.74	0.74	0.74	0.94	0.94	0.94
Adj. Flow (vph)	73	571	5	19	446	228	24	53	42	595	32	91
RTOR Reduction (vph)	0	1	0	0	50	0	0	19	0	0	8	0
Lane Group Flow (vph)	0	648	0	0	643	0	0	100	0	363	347	0
Confl. Peds. (#/hr)	67		32	32		67	59		36	36		59
Confl. Bikes (#/hr)			10			6			3			6
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		4			8		2	2		6	6	
Permitted Phases	4			8								
Actuated Green, G (s)		28.2			28.2			17.6		60.2	60.2	
Effective Green, g (s)		28.2			28.2			17.6		60.2	60.2	
Actuated g/C Ratio		0.23			0.23			0.15		0.50	0.50	
Clearance Time (s)		4.8			4.8			4.6		4.6	4.6	
Vehicle Extension (s)		2.4			2.4			2.5		2.5	2.5	
Lane Grp Cap (vph)		457			617			251		843	805	
v/s Ratio Prot								c0.06		c0.22	0.22	
v/s Ratio Perm		c0.33			0.24							
v/c Ratio		1.42			1.04			0.40		0.43	0.43	
Uniform Delay, d1		45.9			45.9			46.4		19.0	19.0	
Progression Factor		1.00			1.00			1.00		1.20	1.21	
Incremental Delay, d2		200.8			47.8			0.8		1.5	1.6	
Delay (s)		246.7			93.7			47.2		24.3	24.5	
Level of Service		F			F			D		C	C	
Approach Delay (s)		246.7			93.7			47.2			24.4	
Approach LOS		F			F			D			C	
Intersection Summary												
HCM 2000 Control Delay			113.9				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			14.0		
Intersection Capacity Utilization			74.3%				ICU Level of Service			D		
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th Signalized Intersection Summary
6: 8th St & Central Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	425	694	26	363	92	276	260	14	48	322	10
Future Volume (veh/h)	14	425	694	26	363	92	276	260	14	48	322	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.93	1.00		0.94	1.00		0.94	1.00		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	18	545	890	29	399	101	325	306	16	50	335	10
Peak Hour Factor	0.78	0.78	0.78	0.91	0.91	0.91	0.85	0.85	0.85	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	857	381	67	587	153	517	509	27	64	427	13
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.29	0.29	0.29	0.27	0.27	0.27
Sat Flow, veh/h	44	3305	1470	61	2264	592	1781	1755	92	234	1566	47
Grp Volume(v), veh/h	293	270	890	264	0	265	325	0	322	395	0	0
Grp Sat Flow(s),veh/h/ln	1732	1617	1470	1366	0	1551	1781	0	1847	1847	0	0
Q Serve(g_s), s	0.2	11.5	20.1	1.8	0.0	11.8	12.3	0.0	11.6	15.3	0.0	0.0
Cycle Q Clear(g_c), s	12.0	11.5	20.1	13.3	0.0	11.8	12.3	0.0	11.6	15.3	0.0	0.0
Prop In Lane	0.06		1.00	0.11		0.38	1.00		0.05	0.13		0.03
Lane Grp Cap(c), veh/h	499	419	381	406	0	402	517	0	536	503	0	0
V/C Ratio(X)	0.59	0.64	2.33	0.65	0.00	0.66	0.63	0.00	0.60	0.79	0.00	0.00
Avail Cap(c_a), veh/h	499	419	381	406	0	402	736	0	763	551	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	25.2	25.5	28.7	25.0	0.0	25.6	23.9	0.0	23.6	26.1	0.0	0.0
Incr Delay (d2), s/veh	1.2	2.6	608.3	2.9	0.0	3.1	0.5	0.0	0.4	5.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	4.6	71.3	4.4	0.0	4.6	5.1	0.0	5.0	7.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.4	28.1	637.0	27.9	0.0	28.8	24.3	0.0	24.0	32.0	0.0	0.0
LnGrp LOS	C	C	F	C	A	C	C	A	C	C	A	A
Approach Vol, veh/h		1453			529			647			395	
Approach Delay, s/veh		400.7			28.3			24.2			32.0	
Approach LOS		F			C			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		24.7		27.1		24.7		25.7				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		20.1		32.0		20.1		23.1				
Max Q Clear Time (g_c+I1), s		15.3		14.3		22.1		17.3				
Green Ext Time (p_c), s		0.8		0.8		0.0		0.5				
Intersection Summary												
HCM 6th Ctrl Delay			206.9									
HCM 6th LOS			F									
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM Signalized Intersection Capacity Analysis
7: Sherman St & Encinal Ave & Central Ave

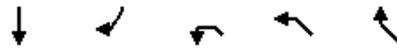
												
Movement	EBL	EBT	EBR	EBR2	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	SBL
Lane Configurations			 					 				
Traffic Volume (vph)	7	132	376	13	197	24	27	25	5	4	24	121
Future Volume (vph)	7	132	376	13	197	24	27	25	5	4	24	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.8		4.9			4.6				
Lane Util. Factor		1.00	0.88		1.00			1.00				
Frpb, ped/bikes		1.00	0.94		0.99			0.99				
Flpb, ped/bikes		1.00	1.00		1.00			1.00				
Frt		1.00	0.85		0.99			0.98				
Flt Protected		1.00	1.00		1.00			0.98				
Satd. Flow (prot)		1857	2620		1826			1764				
Flt Permitted		0.98	1.00		1.00			0.83				
Satd. Flow (perm)		1826	2620		1826			1493				
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.85	0.85	0.85	0.85	0.85	0.85	0.90	0.90
Adj. Flow (vph)	7	140	400	14	232	28	32	29	6	5	27	134
RTOR Reduction (vph)	0	0	9	0	6	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	147	405	0	254	0	0	68	0	0	0	0
Confl. Peds. (#/hr)	14			8		14			11	8	11	8
Confl. Bikes (#/hr)				1		2			4	4		
Turn Type	Perm	NA	custom		NA		Perm	NA			Perm	Perm
Protected Phases		5			5			4				
Permitted Phases	5		2				4				4	4
Actuated Green, G (s)		17.1	45.6		17.1			15.0				
Effective Green, g (s)		17.1	45.6		17.1			15.0				
Actuated g/C Ratio		0.24	0.65		0.24			0.21				
Clearance Time (s)		4.9	4.8		4.9			4.6				
Vehicle Extension (s)		0.2	3.0		0.2			3.0				
Lane Grp Cap (vph)		446	1706		446			319				
v/s Ratio Prot					c0.14							
v/s Ratio Perm		0.08	0.15					0.05				
v/c Ratio		0.33	0.24		0.57			0.21				
Uniform Delay, d1		21.7	5.0		23.2			22.6				
Progression Factor		1.00	1.00		1.00			1.00				
Incremental Delay, d2		2.0	0.3		5.2			1.5				
Delay (s)		23.7	5.4		28.4			24.2				
Level of Service		C	A		C			C				
Approach Delay (s)		10.2			28.4			24.2				
Approach LOS		B			C			C				
Intersection Summary												
HCM 2000 Control Delay			22.3		HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			70.0		Sum of lost time (s)			13.9				
Intersection Capacity Utilization			56.3%		ICU Level of Service			B				
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Sherman St & Encinal Ave & Central Ave

Central Avenue Safety Improvement

05/17/2020



Movement	SBT	SBR	NWL2	NWL	NWR
Lane Configurations	↕			↙	↘
Traffic Volume (vph)	76	9	2	319	37
Future Volume (vph)	76	9	2	319	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	4.6			4.4	
Lane Util. Factor	1.00			0.97	
Frpb, ped/bikes	1.00			1.00	
Flpb, ped/bikes	0.97			0.98	
Frt	0.99			0.98	
Flt Protected	0.97			0.96	
Satd. Flow (prot)	1738			3329	
Flt Permitted	0.79			0.95	
Satd. Flow (perm)	1423			3316	
Peak-hour factor, PHF	0.90	0.90	0.92	0.92	0.92
Adj. Flow (vph)	84	10	2	347	40
RTOR Reduction (vph)	2	0	0	0	0
Lane Group Flow (vph)	253	0	0	389	0
Confl. Peds. (#/hr)			8		
Confl. Bikes (#/hr)		4			1
Turn Type	NA		Perm	Prot	
Protected Phases	4			6	
Permitted Phases			6		
Actuated Green, G (s)	15.0			24.0	
Effective Green, g (s)	15.0			24.0	
Actuated g/C Ratio	0.21			0.34	
Clearance Time (s)	4.6			4.4	
Vehicle Extension (s)	3.0			3.0	
Lane Grp Cap (vph)	304			1136	
v/s Ratio Prot					
v/s Ratio Perm	c0.18			c0.12	
v/c Ratio	0.83			0.34	
Uniform Delay, d1	26.3			17.1	
Progression Factor	1.00			1.00	
Incremental Delay, d2	22.5			0.8	
Delay (s)	48.8			17.9	
Level of Service	D			B	
Approach Delay (s)	48.8			17.9	
Approach LOS	D			B	
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
8: Webster St & Santa Clara Ave

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	18	55	13	25	67	62	9	255	27	70	552	38	
Future Volume (vph)	18	55	13	25	67	62	9	255	27	70	552	38	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0			4.0			4.4			4.4		
Lane Util. Factor		1.00			1.00			0.95			0.95		
Frpb, ped/bikes		0.99			0.98			0.99			1.00		
Flpb, ped/bikes		0.99			1.00			1.00			1.00		
Frt		0.98			0.95			0.99			0.99		
Flt Protected		0.99			0.99			1.00			0.99		
Satd. Flow (prot)		1731			1657			3453			3457		
Flt Permitted		0.92			0.95			0.94			0.88		
Satd. Flow (perm)		1616			1579			3241			3060		
Peak-hour factor, PHF	0.77	0.77	0.77	0.88	0.88	0.88	0.87	0.87	0.87	0.96	0.96	0.96	
Adj. Flow (vph)	23	71	17	28	76	70	10	293	31	73	575	40	
RTOR Reduction (vph)	0	13	0	0	48	0	0	8	0	0	6	0	
Lane Group Flow (vph)	0	98	0	0	126	0	0	326	0	0	682	0	
Confl. Peds. (#/hr)	43		40	40		43	60		70	70		60	
Confl. Bikes (#/hr)			9			3			5			3	
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	2%	2%	2%	2%	2%	2%	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA		
Protected Phases		4			8			6		5	2		
Permitted Phases	4			8			6			2			
Actuated Green, G (s)		15.3			15.3			36.3			36.3		
Effective Green, g (s)		15.3			15.3			36.3			36.3		
Actuated g/C Ratio		0.26			0.26			0.60			0.60		
Clearance Time (s)		4.0			4.0			4.4			4.4		
Vehicle Extension (s)		1.8			1.8			2.0			2.0		
Lane Grp Cap (vph)		412			402			1960			1851		
v/s Ratio Prot													
v/s Ratio Perm		0.06			0.08			0.10			0.22		
v/c Ratio		0.24			0.31			0.17			0.37		
Uniform Delay, d1		17.7			18.1			5.2			6.0		
Progression Factor		1.00			1.00			1.52			0.58		
Incremental Delay, d2		0.1			0.2			0.0			0.0		
Delay (s)		17.8			18.3			7.9			3.6		
Level of Service		B			B			A			A		
Approach Delay (s)		17.8			18.3			7.9			3.6		
Approach LOS		B			B			A			A		
Intersection Summary													
HCM 2000 Control Delay			7.8									HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.38										
Actuated Cycle Length (s)			60.0									Sum of lost time (s)	12.4
Intersection Capacity Utilization			77.6%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
9: 8th St & Santa Clara Ave

Central Avenue Safety Improvement

05/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	157	9	7	127	66	8	321	27	48	386	18
Future Volume (veh/h)	22	157	9	7	127	66	8	321	27	48	386	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.93	0.98		0.94	1.00		0.94	0.99		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826	1900	1900	1900	1885	1885	1885
Adj Flow Rate, veh/h	24	171	10	8	137	71	9	373	31	57	460	21
Peak Hour Factor	0.92	0.92	0.92	0.93	0.93	0.93	0.86	0.86	0.86	0.84	0.84	0.84
Percent Heavy Veh, %	5	5	5	5	5	5	0	0	0	1	1	1
Cap, veh/h	103	680	38	51	498	248	47	765	63	103	704	31
Arrive On Green	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Sat Flow, veh/h	129	1510	84	19	1105	551	13	1698	139	128	1563	69
Grp Volume(v), veh/h	205	0	0	216	0	0	413	0	0	538	0	0
Grp Sat Flow(s),veh/h/ln	1723	0	0	1675	0	0	1850	0	0	1760	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	0.0	0.0
Cycle Q Clear(g_c), s	6.3	0.0	0.0	7.2	0.0	0.0	13.9	0.0	0.0	20.6	0.0	0.0
Prop In Lane	0.12		0.05	0.04		0.33	0.02		0.08	0.11		0.04
Lane Grp Cap(c), veh/h	821	0	0	797	0	0	875	0	0	838	0	0
V/C Ratio(X)	0.25	0.00	0.00	0.27	0.00	0.00	0.47	0.00	0.00	0.64	0.00	0.00
Avail Cap(c_a), veh/h	821	0	0	797	0	0	875	0	0	838	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	15.1	0.0	0.0	15.4	0.0	0.0	17.2	0.0	0.0	18.9	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.8	0.0	0.0	1.8	0.0	0.0	3.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	0.0	0.0	2.9	0.0	0.0	6.2	0.0	0.0	9.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.9	0.0	0.0	16.2	0.0	0.0	19.1	0.0	0.0	22.7	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	B	A	A	C	A	A
Approach Vol, veh/h		205			216			413			538	
Approach Delay, s/veh		15.9			16.2			19.1			22.7	
Approach LOS		B			B			B			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		44.2		44.6		44.2		44.6				
Change Period (Y+Rc), s		* 4.2		4.6		* 4.2		4.6				
Max Green Setting (Gmax), s		* 40		40.0		* 40		40.0				
Max Q Clear Time (g_c+I1), s		8.3		15.9		9.2		22.6				
Green Ext Time (p_c), s		1.3		2.8		1.5		3.6				
Intersection Summary												
HCM 6th Ctrl Delay				19.5								
HCM 6th LOS				B								
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

Intersection	
Intersection Delay, s/veh	18.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	13	254	31	7	212	33	16	114	5	92	260	25
Future Vol, veh/h	13	254	31	7	212	33	16	114	5	92	260	25
Peak Hour Factor	0.84	0.84	0.84	0.90	0.90	0.90	0.91	0.91	0.91	0.98	0.98	0.98
Heavy Vehicles, %	3	3	3	3	3	3	0	0	0	0	0	0
Mvmt Flow	15	302	37	8	236	37	18	125	5	94	265	26
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	19.2	15.9	12.7	21.4
HCM LOS	C	C	B	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	12%	4%	3%	24%
Vol Thru, %	84%	85%	84%	69%
Vol Right, %	4%	10%	13%	7%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	135	298	252	377
LT Vol	16	13	7	92
Through Vol	114	254	212	260
RT Vol	5	31	33	25
Lane Flow Rate	148	355	280	385
Geometry Grp	1	1	1	1
Degree of Util (X)	0.284	0.62	0.501	0.672
Departure Headway (Hd)	6.892	6.294	6.44	6.291
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	519	571	557	573
Service Time	4.972	4.357	4.508	4.352
HCM Lane V/C Ratio	0.285	0.622	0.503	0.672
HCM Control Delay	12.7	19.2	15.9	21.4
HCM Lane LOS	B	C	C	C
HCM 95th-tile Q	1.2	4.2	2.8	5

HCM 6th Signalized Intersection Summary
11: Webster St & Lincoln Ave

Central Avenue Safety Improvement

05/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	87	283	47	41	190	29	6	299	35	48	593	97
Future Volume (veh/h)	87	283	47	41	190	29	6	299	35	48	593	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.96	0.98		0.97	0.99		0.97	0.98		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1900	1900	1900	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	93	301	50	47	218	33	6	318	37	51	631	103
Peak Hour Factor	0.94	0.94	0.94	0.87	0.87	0.87	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	0	0	0	2	2	2	2	2	2
Cap, veh/h	362	832	136	317	853	127	70	1847	211	147	1654	263
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	1.00	1.00	1.00	0.59	0.59	0.59
Sat Flow, veh/h	1115	3058	500	1029	3137	467	14	3107	354	134	2781	442
Grp Volume(v), veh/h	93	174	177	47	124	127	191	0	170	412	0	373
Grp Sat Flow(s),veh/h/ln	1115	1791	1768	1029	1805	1798	1848	0	1627	1756	0	1601
Q Serve(g_s), s	4.3	4.7	4.8	2.3	3.2	3.3	0.0	0.0	0.0	0.0	0.0	7.4
Cycle Q Clear(g_c), s	7.6	4.7	4.8	7.2	3.2	3.3	0.0	0.0	0.0	6.9	0.0	7.4
Prop In Lane	1.00		0.28	1.00		0.26	0.03		0.22	0.12		0.28
Lane Grp Cap(c), veh/h	362	487	481	317	491	489	1161	0	967	1112	0	952
V/C Ratio(X)	0.26	0.36	0.37	0.15	0.25	0.26	0.16	0.00	0.18	0.37	0.00	0.39
Avail Cap(c_a), veh/h	542	776	766	483	782	779	1161	0	967	1112	0	952
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.85	0.85	0.85	0.99	0.00	0.99	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.1	17.6	17.7	20.6	17.1	17.1	0.0	0.0	0.0	6.3	0.0	6.4
Incr Delay (d2), s/veh	0.3	0.3	0.3	0.1	0.2	0.2	0.3	0.0	0.4	1.0	0.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	1.9	1.9	0.5	1.3	1.3	0.1	0.0	0.1	2.5	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.4	17.9	18.0	20.7	17.2	17.3	0.3	0.0	0.4	7.3	0.0	7.6
LnGrp LOS	C	B	B	C	B	B	A	A	A	A	A	A
Approach Vol, veh/h		444			298			361			785	
Approach Delay, s/veh		18.5			17.8			0.3			7.4	
Approach LOS		B			B			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		39.7		20.3		39.7		20.3				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		26.0		26.0		26.0		26.0				
Max Q Clear Time (g_c+I1), s		2.0		9.6		9.4		9.2				
Green Ext Time (p_c), s		1.9		1.9		4.2		1.3				
Intersection Summary												
HCM 6th Ctrl Delay				10.3								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary
 12: 8th St/Constitution Way & Lincoln Ave

Central Avenue Safety Improvement

05/17/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	279	18	17	168	176	28	352	30	736	442	16
Future Volume (veh/h)	4	279	18	17	168	176	28	352	30	736	442	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.94	0.98		0.98	1.00		0.96	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1900	1900	1900	1900	1900	1900	1885	1885	1885
Adj Flow Rate, veh/h	4	310	20	18	179	187	34	424	36	827	497	18
Peak Hour Factor	0.90	0.90	0.90	0.94	0.94	0.94	0.83	0.83	0.83	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	0	0	0	0	0	0	1	1	1
Cap, veh/h	68	615	39	85	326	266	54	701	62	1214	630	23
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.22	0.22	0.22	0.35	0.35	0.35
Sat Flow, veh/h	13	3312	211	79	1756	1432	246	3195	284	3483	1807	65
Grp Volume(v), veh/h	176	0	158	197	0	187	261	0	233	827	0	515
Grp Sat Flow(s),veh/h/ln	1874	0	1662	1835	0	1432	1888	0	1837	1742	0	1872
Q Serve(g_s), s	0.0	0.0	4.8	0.0	0.0	6.8	7.0	0.0	6.3	11.4	0.0	13.8
Cycle Q Clear(g_c), s	4.7	0.0	4.8	5.3	0.0	6.8	7.0	0.0	6.3	11.4	0.0	13.8
Prop In Lane	0.02		0.13	0.09		1.00	0.13		0.15	1.00		0.03
Lane Grp Cap(c), veh/h	414	0	308	411	0	266	414	0	403	1214	0	652
V/C Ratio(X)	0.43	0.00	0.51	0.48	0.00	0.70	0.63	0.00	0.58	0.68	0.00	0.79
Avail Cap(c_a), veh/h	731	0	594	714	0	512	1012	0	984	1991	0	1070
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.5	0.0	20.5	20.7	0.0	21.4	19.8	0.0	19.5	15.6	0.0	16.4
Incr Delay (d2), s/veh	0.3	0.0	0.5	0.3	0.0	1.3	0.6	0.0	0.5	0.3	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	1.8	2.2	0.0	2.2	2.9	0.0	2.6	4.1	0.0	5.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.7	0.0	21.0	21.0	0.0	22.6	20.4	0.0	20.0	15.8	0.0	17.2
LnGrp LOS	C	A	C	C	A	C	C	A	C	B	A	B
Approach Vol, veh/h		334			384			494			1342	
Approach Delay, s/veh		20.9			21.8			20.2			16.4	
Approach LOS		C			C			C			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		16.9		15.0		24.1		15.0				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		30.0		20.0		32.0		20.0				
Max Q Clear Time (g_c+I1), s		9.0		6.8		15.8		8.8				
Green Ext Time (p_c), s		1.5		0.6		2.8		0.8				
Intersection Summary												
HCM 6th Ctrl Delay				18.5								
HCM 6th LOS				B								
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 6th Signalized Intersection Summary
13: Sherman St & Lincoln Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	666	109	10	323	28	26	128	16	166	277	26
Future Volume (veh/h)	24	666	109	10	323	28	26	128	16	166	277	26
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.97	0.99		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1885	1885	1885	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	25	701	115	12	389	34	32	156	20	193	322	30
Peak Hour Factor	0.95	0.95	0.95	0.83	0.83	0.83	0.82	0.82	0.82	0.86	0.86	0.86
Percent Heavy Veh, %	0	0	0	1	1	1	0	0	0	0	0	0
Cap, veh/h	575	1613	264	85	1662	142	121	459	53	260	322	29
Arrive On Green	0.52	0.52	0.52	0.52	0.52	0.52	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	975	3100	508	29	3194	274	138	1452	169	537	1019	91
Grp Volume(v), veh/h	25	408	408	228	0	207	208	0	0	545	0	0
Grp Sat Flow(s),veh/h/ln	975	1805	1803	1834	0	1663	1759	0	0	1646	0	0
Q Serve(g_s), s	0.8	7.5	7.5	0.0	0.0	3.7	0.0	0.0	0.0	12.4	0.0	0.0
Cycle Q Clear(g_c), s	4.4	7.5	7.5	3.6	0.0	3.7	4.6	0.0	0.0	17.0	0.0	0.0
Prop In Lane	1.00		0.28	0.05		0.16	0.15		0.10	0.35		0.06
Lane Grp Cap(c), veh/h	575	939	938	1025	0	866	633	0	0	611	0	0
V/C Ratio(X)	0.04	0.43	0.43	0.22	0.00	0.24	0.33	0.00	0.00	0.89	0.00	0.00
Avail Cap(c_a), veh/h	575	939	938	1025	0	866	633	0	0	611	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	8.3	8.0	8.0	7.0	0.0	7.1	14.2	0.0	0.0	18.5	0.0	0.0
Incr Delay (d2), s/veh	0.1	1.5	1.5	0.5	0.0	0.7	1.4	0.0	0.0	17.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.8	2.8	1.3	0.0	1.2	2.0	0.0	0.0	9.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.4	9.5	9.5	7.5	0.0	7.7	15.6	0.0	0.0	36.3	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	B	A	A	D	A	A
Approach Vol, veh/h		841			435			208			545	
Approach Delay, s/veh		9.4			7.6			15.6			36.3	
Approach LOS		A			A			B			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		32.2		21.6		32.2		21.6				
Change Period (Y+Rc), s		* 4.2		4.6		* 4.2		4.6				
Max Green Setting (Gmax), s		* 28		17.0		* 28		17.0				
Max Q Clear Time (g_c+I1), s		9.5		6.6		5.7		19.0				
Green Ext Time (p_c), s		5.5		0.9		2.8		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				16.9								
HCM 6th LOS				B								
Notes												
User approved pedestrian interval to be less than phase max green.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM Signalized Intersection Capacity Analysis

Central Avenue Safety Improvement

1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)

05/19/2020

Movement	EBL2	EBT	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL2	SBL	
Lane Configurations													
Traffic Volume (vph)	25	4	53	24	165	3	1	358	7	35	4	72	
Future Volume (vph)	25	4	53	24	165	3	1	358	7	35	4	72	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.6		4.6	4.6			4.6	4.6			5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00			1.00	
Frpb, ped/bikes		1.00		1.00	0.97			1.00	0.96			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00			0.99	
Frt		1.00		1.00	0.85			1.00	0.85			1.00	
Flt Protected		0.96		0.97	1.00			1.00	1.00			0.95	
Satd. Flow (prot)		1457		1759	1511			1844	1505			1725	
Flt Permitted		0.19		0.76	1.00			1.00	1.00			0.17	
Satd. Flow (perm)		286		1379	1511			1843	1505			303	
Peak-hour factor, PHF	0.50	0.50	0.66	0.66	0.66	0.66	0.79	0.79	0.79	0.79	0.65	0.65	
Adj. Flow (vph)	50	8	80	36	250	5	1	453	9	44	6	111	
RTOR Reduction (vph)	0	0	0	0	113	0	0	0	40	0	0	0	
Lane Group Flow (vph)	0	58	0	116	142	0	0	454	13	0	0	117	
Confl. Peds. (#/hr)			3				4			19		19	
Confl. Bikes (#/hr)					1	1				10			
Heavy Vehicles (%)	25%	25%	4%	4%	4%	4%	3%	3%	3%	3%	4%	4%	
Turn Type	Perm	NA	Perm	NA	Perm		Perm	NA	Perm		Perm	Perm	
Protected Phases		2		1				4					
Permitted Phases	2		1		1		4		4		3	3	
Actuated Green, G (s)		19.8		10.0	10.0			24.4	24.4			24.0	
Effective Green, g (s)		19.8		10.0	10.0			24.4	24.4			24.0	
Actuated g/C Ratio		0.20		0.10	0.10			0.25	0.25			0.25	
Clearance Time (s)		4.6		4.6	4.6			4.6	4.6			5.0	
Vehicle Extension (s)		1.5		2.0	2.0			2.0	2.0			2.0	
Lane Grp Cap (vph)		58		142	155			463	378			74	
v/s Ratio Prot													
v/s Ratio Perm		c0.20		0.08	c0.09			c0.25	0.01			0.39	
v/c Ratio		1.00		0.82	0.92			0.98	0.04			1.58	
Uniform Delay, d1		38.6		42.6	43.1			36.1	27.4			36.5	
Progression Factor		1.00		1.00	1.00			1.00	1.00			1.00	
Incremental Delay, d2		118.2		27.8	47.2			37.3	0.2			316.2	
Delay (s)		156.8		70.4	90.3			73.3	27.6			352.7	
Level of Service		F		E	F			E	C			F	
Approach Delay (s)		156.8		84.1				68.6					
Approach LOS		F		F				E					
Intersection Summary													
HCM 2000 Control Delay			195.6									HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio			1.17										
Actuated Cycle Length (s)			97.0									Sum of lost time (s)	18.8
Intersection Capacity Utilization			94.0%									ICU Level of Service	F
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)



Movement	SBT	SBR
Lane Configurations	↓	↙
Traffic Volume (vph)	315	143
Future Volume (vph)	315	143
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.0	
Lane Util. Factor	1.00	
Frpb, ped/bikes	0.99	
Flpb, ped/bikes	1.00	
Frt	0.95	
Flt Protected	1.00	
Satd. Flow (prot)	1726	
Flt Permitted	1.00	
Satd. Flow (perm)	1726	
Peak-hour factor, PHF	0.65	0.65
Adj. Flow (vph)	485	220
RTOR Reduction (vph)	17	0
Lane Group Flow (vph)	688	0
Confl. Peds. (#/hr)		4
Confl. Bikes (#/hr)		1
Heavy Vehicles (%)	4%	4%
Turn Type	NA	
Protected Phases	3	
Permitted Phases		
Actuated Green, G (s)	24.0	
Effective Green, g (s)	24.0	
Actuated g/C Ratio	0.25	
Clearance Time (s)	5.0	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	427	
v/s Ratio Prot	c0.40	
v/s Ratio Perm		
v/c Ratio	1.61	
Uniform Delay, d1	36.5	
Progression Factor	1.00	
Incremental Delay, d2	286.2	
Delay (s)	322.7	
Level of Service	F	
Approach Delay (s)	327.0	
Approach LOS	F	
Intersection Summary		

Intersection												
Int Delay, s/veh	110.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	13	311	21	193	370	85	14	16	101	50	22	19
Future Vol, veh/h	13	311	21	193	370	85	14	16	101	50	22	19
Conflicting Peds, #/hr	60	0	25	25	0	60	88	0	0	0	0	88
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	67	67	67	83	83	83	50	50	50	87	87	87
Heavy Vehicles, %	5	5	5	1	1	1	0	0	0	0	0	0
Mvmt Flow	19	464	31	233	446	102	28	32	202	57	25	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	506	0	0	520	0	0	1567	1515	505	1607	1530	594
Stage 1	-	-	-	-	-	-	543	543	-	972	972	-
Stage 2	-	-	-	-	-	-	1024	972	-	635	558	-
Critical Hdwy	4.15	-	-	4.11	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.245	-	-	2.209	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1043	-	-	1051	-	0	91	121	571	85	118	509
Stage 1	-	-	-	-	-	0	528	523	-	306	333	-
Stage 2	-	-	-	-	-	0	286	333	-	470	515	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	983	-	-	1026	-	-	43	76	557	~ 26	74	440
Mov Cap-2 Maneuver	-	-	-	-	-	-	43	76	-	~ 26	74	-
Stage 1	-	-	-	-	-	-	502	497	-	281	219	-
Stage 2	-	-	-	-	-	-	154	219	-	273	489	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			3.3			270.5			\$ 946.2		
HCM LOS							F			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	183	983	-	-	1026	-	40
HCM Lane V/C Ratio	1.432	0.02	-	-	0.227	-	2.615
HCM Control Delay (s)	270.5	8.7	-	-	9.5	-	\$ 946.2
HCM Lane LOS	F	A	-	-	A	-	F
HCM 95th %tile Q(veh)	16	0.1	-	-	0.9	-	11.5

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th Signalized Intersection Summary
3: Ballena Blvd/4th St & Central Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	427	9	49	605	25	33	16	83	75	11	30
Future Volume (veh/h)	35	427	9	49	605	25	33	16	83	75	11	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.91	0.97		0.95	0.96		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1885	1885	1856	1856	1856	1900	1900	1900
Adj Flow Rate, veh/h	60	736	16	64	796	33	41	20	104	104	15	0
Peak Hour Factor	0.58	0.58	0.58	0.76	0.76	0.76	0.80	0.80	0.80	0.72	0.72	0.72
Percent Heavy Veh, %	2	2	2	1	1	1	3	3	3	0	0	0
Cap, veh/h	103	1683	37	109	1663	69	300	122	265	314	36	
Arrive On Green	0.06	0.47	0.47	0.06	0.48	0.48	0.18	0.18	0.18	0.18	0.18	0.00
Sat Flow, veh/h	1781	3552	77	1795	3489	145	965	689	1500	952	204	0
Grp Volume(v), veh/h	60	368	384	64	408	421	61	0	104	119	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1852	1795	1791	1843	1654	0	1500	1156	0	0
Q Serve(g_s), s	1.5	6.4	6.4	1.6	7.2	7.2	0.0	0.0	2.8	3.5	0.0	0.0
Cycle Q Clear(g_c), s	1.5	6.4	6.4	1.6	7.2	7.2	1.3	0.0	2.8	4.8	0.0	0.0
Prop In Lane	1.00		0.04	1.00		0.08	0.67		1.00	0.87		0.00
Lane Grp Cap(c), veh/h	103	842	878	109	853	878	422	0	265	350	0	
V/C Ratio(X)	0.58	0.44	0.44	0.59	0.48	0.48	0.14	0.00	0.39	0.34	0.00	
Avail Cap(c_a), veh/h	246	1183	1233	224	1170	1204	524	0	369	439	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	21.3	8.1	8.1	21.2	8.2	8.2	16.3	0.0	16.9	18.0	0.0	0.0
Incr Delay (d2), s/veh	1.9	0.2	0.2	1.9	0.2	0.2	0.1	0.0	0.5	0.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	2.0	2.0	0.7	2.2	2.3	0.5	0.0	0.9	1.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.2	8.3	8.3	23.1	8.5	8.5	16.3	0.0	17.4	18.3	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	B	A	B	B	A	
Approach Vol, veh/h		812			893			165			119	A
Approach Delay, s/veh		9.4			9.5			17.0			18.3	
Approach LOS		A			A			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.0	26.6		12.8	6.9	26.7		12.8				
Change Period (Y+Rc), s	* 4.2	4.6		4.6	* 4.2	4.6		4.6				
Max Green Setting (Gmax), s	* 5.8	30.9		11.4	* 6.4	30.3		11.4				
Max Q Clear Time (g_c+I1), s	3.6	8.4		6.8	3.5	9.2		4.8				
Green Ext Time (p_c), s	0.0	3.7		0.2	0.0	4.1		0.2				

Intersection Summary

HCM 6th Ctrl Delay	10.6
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Intersection Delay, s/veh	42.5
Intersection LOS	E

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔		↔↔	
Traffic Vol, veh/h	131	587	724	48	61	75
Future Vol, veh/h	131	587	724	48	61	75
Peak Hour Factor	0.80	0.80	0.82	0.82	0.76	0.76
Heavy Vehicles, %	1	1	2	2	0	0
Mvmt Flow	164	734	883	59	80	99
Number of Lanes	0	2	2	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	2
HCM Control Delay	33.1	57	13.2
HCM LOS	D	F	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	40%	0%	0%	0%	45%
Vol Thru, %	60%	100%	100%	83%	0%
Vol Right, %	0%	0%	0%	17%	55%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	327	391	483	289	136
LT Vol	131	0	0	0	61
Through Vol	196	391	483	241	0
RT Vol	0	0	0	48	75
Lane Flow Rate	408	489	589	353	179
Geometry Grp	7	7	7	7	2
Degree of Util (X)	0.748	0.869	1.059	0.623	0.332
Departure Headway (Hd)	6.747	6.544	6.474	6.356	6.854
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	539	558	559	568	528
Service Time	4.447	4.244	4.21	4.092	4.854
HCM Lane V/C Ratio	0.757	0.876	1.054	0.621	0.339
HCM Control Delay	26.8	38.3	79.7	19.1	13.2
HCM Lane LOS	D	E	F	C	B
HCM 95th-tile Q	6.4	9.6	17	4.3	1.4

HCM Signalized Intersection Capacity Analysis
5: Central Ave & Webster St

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	541	5	18	792	271	22	42	60	310	27	72
Future Volume (vph)	81	541	5	18	792	271	22	42	60	310	27	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.8			4.8			4.6		4.6	4.6	
Lane Util. Factor		0.95			0.95			1.00		0.95	0.95	
Frpb, ped/bikes		1.00			0.97			0.96		1.00	0.97	
Flpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	
Fr _t		1.00			0.96			0.93		1.00	0.95	
Fl _t Protected		0.99			1.00			0.99		0.95	0.98	
Satd. Flow (prot)		3509			3311			1665		1681	1591	
Fl _t Permitted		0.52			0.93			0.99		0.95	0.98	
Satd. Flow (perm)		1841			3082			1665		1681	1591	
Peak-hour factor, PHF	0.76	0.76	0.76	0.85	0.85	0.85	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	107	712	7	21	932	319	25	48	68	352	31	82
RTOR Reduction (vph)	0	1	0	0	29	0	0	29	0	0	15	0
Lane Group Flow (vph)	0	825	0	0	1243	0	0	112	0	236	214	0
Confl. Peds. (#/hr)	50		31	31		50	40		37	37		40
Confl. Bikes (#/hr)			6			28			5			2
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		4			8		2	2		6	6	
Permitted Phases	4			8								
Actuated Green, G (s)		58.2			58.2			15.9		31.9	31.9	
Effective Green, g (s)		58.2			58.2			15.9		31.9	31.9	
Actuated g/C Ratio		0.49			0.49			0.13		0.27	0.27	
Clearance Time (s)		4.8			4.8			4.6		4.6	4.6	
Vehicle Extension (s)		2.4			2.4			2.5		2.5	2.5	
Lane Grp Cap (vph)		892			1494			220		446	422	
v/s Ratio Prot								c0.07		c0.14	0.13	
v/s Ratio Perm		c0.45			0.40							
v/c Ratio		1.20dl			0.83			0.51		0.53	0.51	
Uniform Delay, d1		28.9			26.7			48.4		37.6	37.4	
Progression Factor		1.00			1.00			1.00		0.72	0.69	
Incremental Delay, d2		15.0			4.0			1.3		4.4	4.2	
Delay (s)		43.9			30.7			49.7		31.4	30.1	
Level of Service		D			C			D		C	C	
Approach Delay (s)		43.9			30.7			49.7			30.8	
Approach LOS		D			C			D			C	
Intersection Summary												
HCM 2000 Control Delay			35.7				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			14.0		
Intersection Capacity Utilization			81.4%				ICU Level of Service			D		
Analysis Period (min)			15									
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM 6th Signalized Intersection Summary
6: 8th St & Central Ave

Central Avenue Safety Improvement
05/19/2020

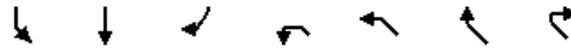
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	350	468	16	643	147	407	309	8	50	225	23
Future Volume (veh/h)	5	350	468	16	643	147	407	309	8	50	225	23
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.91	1.00		0.96	1.00		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	6	398	532	19	765	175	447	340	9	63	285	29
Peak Hour Factor	0.88	0.88	0.88	0.84	0.84	0.84	0.91	0.91	0.91	0.79	0.79	0.79
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	46	1174	514	53	930	210	474	482	13	70	318	32
Arrive On Green	0.35	0.35	0.35	0.35	0.35	0.35	0.27	0.27	0.27	0.23	0.23	0.23
Sat Flow, veh/h	12	3394	1488	29	2689	608	1781	1812	48	305	1378	140
Grp Volume(v), veh/h	212	192	532	522	0	437	447	0	349	377	0	0
Grp Sat Flow(s),veh/h/ln	1789	1617	1488	1808	0	1518	1781	0	1859	1823	0	0
Q Serve(g_s), s	0.1	7.7	30.4	6.6	0.0	23.3	21.6	0.0	14.9	17.6	0.0	0.0
Cycle Q Clear(g_c), s	23.4	7.7	30.4	22.9	0.0	23.3	21.6	0.0	14.9	17.6	0.0	0.0
Prop In Lane	0.03		1.00	0.04		0.40	1.00		0.03	0.17		0.08
Lane Grp Cap(c), veh/h	661	559	514	668	0	525	474	0	495	421	0	0
V/C Ratio(X)	0.32	0.34	1.03	0.78	0.00	0.83	0.94	0.00	0.70	0.90	0.00	0.00
Avail Cap(c_a), veh/h	661	559	514	668	0	525	474	0	495	444	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	21.2	21.3	28.7	26.1	0.0	26.4	31.6	0.0	29.1	32.8	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.1	48.7	5.5	0.0	10.4	27.2	0.0	3.9	18.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	2.9	17.4	10.7	0.0	9.7	12.7	0.0	7.1	9.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.3	21.5	77.5	31.6	0.0	36.8	58.8	0.0	33.0	51.7	0.0	0.0
LnGrp LOS	C	C	F	C	A	D	E	A	C	D	A	A
Approach Vol, veh/h		936			959			796			377	
Approach Delay, s/veh		53.3			34.0			47.5			51.7	
Approach LOS		D			C			D			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		35.0		28.0		35.0		24.9				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		30.4		23.4		30.4		21.4				
Max Q Clear Time (g_c+I1), s		25.3		23.6		32.4		19.6				
Green Ext Time (p_c), s		1.5		0.0		0.0		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			45.5									
HCM 6th LOS			D									
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM Signalized Intersection Capacity Analysis
7: Sherman St & Encinal Ave & Central Ave

													
Movement	EBL	EBT	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	
Lane Configurations													
Traffic Volume (vph)	4	168	318	7	1	182	46	75	95	10	24	32	
Future Volume (vph)	4	168	318	7	1	182	46	75	95	10	24	32	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.9	4.8			4.9			4.6				
Lane Util. Factor		1.00	0.88			1.00			1.00				
Frpb, ped/bikes		1.00	0.92			0.98			0.98				
Flpb, ped/bikes		1.00	1.00			1.00			1.00				
Frt		1.00	0.85			0.97			0.98				
Flt Protected		1.00	1.00			1.00			0.98				
Satd. Flow (prot)		1860	2576			1784			1746				
Flt Permitted		0.99	1.00			1.00			0.82				
Satd. Flow (perm)		1848	2576			1783			1455				
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.90	0.90	0.90	0.71	0.71	0.71	0.71	0.77	
Adj. Flow (vph)	4	179	338	7	1	202	51	106	134	14	34	42	
RTOR Reduction (vph)	0	0	11	0	0	13	0	0	7	0	0	0	
Lane Group Flow (vph)	0	183	334	0	0	241	0	0	281	0	0	0	
Confl. Peds. (#/hr)	14			11	11		14			24	17	24	
Confl. Bikes (#/hr)				3			14			7	7		
Turn Type	Perm	NA	custom		Perm	NA		Perm	NA			Perm	
Protected Phases		5				5			4				
Permitted Phases	5		2		5			4				4	
Actuated Green, G (s)		15.1	39.2			15.1			21.4				
Effective Green, g (s)		15.1	39.2			15.1			21.4				
Actuated g/C Ratio		0.22	0.56			0.22			0.31				
Clearance Time (s)		4.9	4.8			4.9			4.6				
Vehicle Extension (s)		0.2	3.0			0.2			3.0				
Lane Grp Cap (vph)		398	1442			384			444				
v/s Ratio Prot													
v/s Ratio Perm		0.10	0.13			0.14			0.19				
v/c Ratio		0.46	0.23			0.63			0.63				
Uniform Delay, d1		23.9	7.8			24.9			20.9				
Progression Factor		1.00	1.00			1.00			1.00				
Incremental Delay, d2		3.8	0.4			7.6			6.7				
Delay (s)		27.7	8.2			32.5			27.6				
Level of Service		C	A			C			C				
Approach Delay (s)		14.9				32.5			27.6				
Approach LOS		B				C			C				
Intersection Summary													
HCM 2000 Control Delay			24.1									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.62										
Actuated Cycle Length (s)			70.0									Sum of lost time (s)	13.9
Intersection Capacity Utilization			56.9%									ICU Level of Service	B
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Sherman St & Encinal Ave & Central Ave



Movement	SBL	SBT	SBR	NWL2	NWL	NWR	NWR2
Lane Configurations		↕			↕		
Traffic Volume (vph)	90	39	11	1	443	60	1
Future Volume (vph)	90	39	11	1	443	60	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.6			4.4		
Lane Util. Factor		1.00			0.97		
Frpb, ped/bikes		1.00			1.00		
Flpb, ped/bikes		1.00			0.97		
Fr _t		0.99			0.98		
Fl _t Protected		0.97			0.96		
Satd. Flow (prot)		1782			3288		
Fl _t Permitted		0.59			0.95		
Satd. Flow (perm)		1082			3276		
Peak-hour factor, PHF	0.77	0.77	0.77	0.85	0.85	0.85	0.85
Adj. Flow (vph)	117	51	14	1	521	71	1
RTOR Reduction (vph)	0	3	0	0	73	0	0
Lane Group Flow (vph)	0	221	0	0	521	0	0
Confl. Peds. (#/hr)	17			11			
Confl. Bikes (#/hr)			5			1	1
Turn Type	Perm	NA		Perm	Prot		
Protected Phases		4			6		
Permitted Phases	4			6			
Actuated Green, G (s)		21.4			19.6		
Effective Green, g (s)		21.4			19.6		
Actuated g/C Ratio		0.31			0.28		
Clearance Time (s)		4.6			4.4		
Vehicle Extension (s)		3.0			3.0		
Lane Grp Cap (vph)		330			917		
v/s Ratio Prot							
v/s Ratio Perm		c0.20			c0.16		
v/c Ratio		0.67			0.57		
Uniform Delay, d1		21.2			21.6		
Progression Factor		1.00			1.00		
Incremental Delay, d2		10.3			2.6		
Delay (s)		31.5			24.1		
Level of Service		C			C		
Approach Delay (s)		31.5			24.1		
Approach LOS		C			C		
Intersection Summary							

HCM Signalized Intersection Capacity Analysis
8: Webster St & Santa Clara Ave

Central Avenue Safety Improvement

05/19/2020

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	23	80	22	16	94	100	5	315	18	45	309	19	
Future Volume (vph)	23	80	22	16	94	100	5	315	18	45	309	19	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0			4.0			4.4			4.4		
Lane Util. Factor		1.00			1.00			0.95			0.95		
Frpb, ped/bikes		1.00			0.96			1.00			1.00		
Flpb, ped/bikes		1.00			1.00			1.00			1.00		
Fr t		0.98			0.94			0.99			0.99		
Fl t Protected		0.99			1.00			1.00			0.99		
Satd. Flow (prot)		1752			1604			3496			3473		
Fl t Permitted		0.93			0.97			0.95			0.87		
Satd. Flow (perm)		1639			1563			3322			3055		
Peak-hour factor, PHF	0.69	0.69	0.69	0.89	0.89	0.89	0.89	0.89	0.89	0.79	0.79	0.79	
Adj. Flow (vph)	33	116	32	18	106	112	6	354	20	57	391	24	
RTOR Reduction (vph)	0	14	0	0	61	0	0	4	0	0	5	0	
Lane Group Flow (vph)	0	167	0	0	175	0	0	376	0	0	467	0	
Confl. Peds. (#/hr)	45		13	13		45	24		42	42		24	
Confl. Bikes (#/hr)			2			42			2			3	
Heavy Vehicles (%)	4%	4%	4%	6%	6%	6%	2%	2%	2%	2%	2%	2%	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA		
Protected Phases		4			8			6		5	2		
Permitted Phases	4			8			6			2			
Actuated Green, G (s)		14.6			14.6			37.0			37.0		
Effective Green, g (s)		14.6			14.6			37.0			37.0		
Actuated g/C Ratio		0.24			0.24			0.62			0.62		
Clearance Time (s)		4.0			4.0			4.4			4.4		
Vehicle Extension (s)		1.5			1.5			1.5			1.5		
Lane Grp Cap (vph)		398			380			2048			1883		
v/s Ratio Prot													
v/s Ratio Perm		0.10			0.11			0.11			0.15		
v/c Ratio		0.42			0.46			0.18			0.25		
Uniform Delay, d1		19.1			19.3			5.0			5.2		
Progression Factor		1.00			1.00			0.80			1.19		
Incremental Delay, d2		0.3			0.3			0.1			0.0		
Delay (s)		19.4			19.7			4.1			6.2		
Level of Service		B			B			A			A		
Approach Delay (s)		19.4			19.7			4.1			6.2		
Approach LOS		B			B			A			A		
Intersection Summary													
HCM 2000 Control Delay			10.0									HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.33										
Actuated Cycle Length (s)			60.0									Sum of lost time (s)	12.4
Intersection Capacity Utilization			69.3%									ICU Level of Service	C
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
9: 8th St & Santa Clara Ave

Central Avenue Safety Improvement
05/19/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	153	14	6	192	62	6	442	37	38	237	18
Future Volume (veh/h)	26	153	14	6	192	62	6	442	37	38	237	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.91	0.96		0.87	0.97		0.91	0.99		0.91
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1811	1811	1811	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	36	210	19	9	278	90	6	470	39	44	276	21
Peak Hour Factor	0.73	0.73	0.73	0.69	0.69	0.69	0.94	0.94	0.94	0.86	0.86	0.86
Percent Heavy Veh, %	4	4	4	6	6	6	2	2	2	3	3	3
Cap, veh/h	115	596	50	59	521	165	55	767	63	119	670	48
Arrive On Green	0.42	0.42	0.42	0.42	0.42	0.42	0.46	0.46	0.46	0.46	0.46	0.46
Sat Flow, veh/h	134	1434	121	12	1252	397	6	1681	138	130	1468	105
Grp Volume(v), veh/h	265	0	0	377	0	0	515	0	0	341	0	0
Grp Sat Flow(s),veh/h/ln	1689	0	0	1661	0	0	1825	0	0	1703	0	0
Q Serve(g_s), 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
Cycle Q Clear(g_c), s	6.9	0.0	0.0	11.7	0.0	0.0	14.7	0.0	0.0	8.6	0.0	0.0
Prop In Lane	0.14		0.07	0.02		0.24	0.01		0.08	0.13		0.06
Lane Grp Cap(c), veh/h	762	0	0	744	0	0	886	0	0	836	0	0
V/C Ratio(X)	0.35	0.00	0.00	0.51	0.00	0.00	0.58	0.00	0.00	0.41	0.00	0.00
Avail Cap(c_a), veh/h	762	0	0	744	0	0	886	0	0	836	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	13.8	0.0	0.0	15.2	0.0	0.0	14.1	0.0	0.0	12.5	0.0	0.0
Incr Delay (d2), s/veh	1.3	0.0	0.0	2.5	0.0	0.0	2.8	0.0	0.0	1.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	0.0	4.7	0.0	0.0	6.2	0.0	0.0	3.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.0	0.0	0.0	17.6	0.0	0.0	16.9	0.0	0.0	14.0	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	B	A	A	B	A	A
Approach Vol, veh/h		265			377			515				341
Approach Delay, s/veh		15.0			17.6			16.9				14.0
Approach LOS		B			B			B				B
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		32.8		36.0		32.8		36.0				
Change Period (Y+Rc), s		* 4.2		4.6		* 4.2		4.6				
Max Green Setting (Gmax), s		* 29		31.4		* 29		31.4				
Max Q Clear Time (g_c+I1), s		8.9		16.7		13.7		10.6				
Green Ext Time (p_c), s		1.6		3.1		2.2		2.3				
Intersection Summary												
HCM 6th Ctrl Delay				16.1								
HCM 6th LOS				B								
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

Intersection	
Intersection Delay, s/veh	23
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	32	197	20	7	209	47	27	308	11	27	169	20
Future Vol, veh/h	32	197	20	7	209	47	27	308	11	27	169	20
Peak Hour Factor	0.86	0.86	0.86	0.78	0.78	0.78	0.88	0.88	0.88	0.86	0.86	0.86
Heavy Vehicles, %	3	3	3	5	5	5	1	1	1	3	3	3
Mvmt Flow	37	229	23	9	268	60	31	350	13	31	197	23
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	20	22.9	28.4	17.9
HCM LOS	C	C	D	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	13%	3%	12%
Vol Thru, %	89%	79%	79%	78%
Vol Right, %	3%	8%	18%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	346	249	263	216
LT Vol	27	32	7	27
Through Vol	308	197	209	169
RT Vol	11	20	47	20
Lane Flow Rate	393	290	337	251
Geometry Grp	1	1	1	1
Degree of Util (X)	0.755	0.582	0.66	0.511
Departure Headway (Hd)	6.909	7.231	7.051	7.33
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	523	498	509	490
Service Time	4.973	5.302	5.119	5.406
HCM Lane V/C Ratio	0.751	0.582	0.662	0.512
HCM Control Delay	28.4	20	22.9	17.9
HCM Lane LOS	D	C	C	C
HCM 95th-tile Q	6.5	3.7	4.8	2.9

HCM 6th Signalized Intersection Summary
11: Webster St & Lincoln Ave

Central Avenue Safety Improvement

05/19/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	176	333	66	26	493	169	47	374	28	212	304	83
Future Volume (veh/h)	176	333	66	26	493	169	47	374	28	212	304	83
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	0.99		0.98	0.99		0.97	0.98		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1885	1885	1885	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	229	432	86	32	609	209	51	407	30	252	362	99
Peak Hour Factor	0.77	0.77	0.77	0.81	0.81	0.81	0.92	0.92	0.92	0.84	0.84	0.84
Percent Heavy Veh, %	3	3	3	1	1	1	2	2	2	2	2	2
Cap, veh/h	349	1463	289	485	1303	446	125	945	74	365	510	148
Arrive On Green	0.50	0.50	0.50	0.50	0.50	0.50	0.73	0.73	0.73	0.37	0.37	0.37
Sat Flow, veh/h	660	2925	578	884	2605	893	142	2576	202	701	1392	404
Grp Volume(v), veh/h	229	259	259	32	418	400	241	0	247	317	0	396
Grp Sat Flow(s),veh/h/ln	660	1763	1740	884	1791	1707	1262	0	1658	883	0	1614
Q Serve(g_s), s	20.8	5.2	5.2	1.3	9.1	9.2	2.5	0.0	3.4	18.1	0.0	12.3
Cycle Q Clear(g_c), s	30.0	5.2	5.2	6.6	9.1	9.2	14.8	0.0	3.4	21.5	0.0	12.3
Prop In Lane	1.00		0.33	1.00		0.52	0.21		0.12	0.79		0.25
Lane Grp Cap(c), veh/h	349	881	870	485	895	854	535	0	608	432	0	592
V/C Ratio(X)	0.66	0.29	0.30	0.07	0.47	0.47	0.45	0.00	0.41	0.74	0.00	0.67
Avail Cap(c_a), veh/h	349	881	870	485	895	854	535	0	608	432	0	592
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.40	0.40	0.40	0.99	0.00	0.99	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.6	8.8	8.8	10.7	9.8	9.8	6.2	0.0	5.5	20.5	0.0	15.9
Incr Delay (d2), s/veh	3.5	0.1	0.1	0.0	0.1	0.1	2.7	0.0	2.0	10.6	0.0	5.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	1.7	1.7	0.2	3.1	3.0	1.2	0.0	1.2	5.3	0.0	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.1	8.9	8.9	10.8	9.8	9.9	8.9	0.0	7.5	31.1	0.0	21.8
LnGrp LOS	C	A	A	B	A	A	A	A	A	C	A	C
Approach Vol, veh/h		747			850			488			713	
Approach Delay, s/veh		13.2			9.9			8.2			26.0	
Approach LOS		B			A			A			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		26.0		34.0		26.0		34.0				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		22.0		30.0		22.0		30.0				
Max Q Clear Time (g_c+I1), s		16.8		32.0		23.5		11.2				
Green Ext Time (p_c), s		0.9		0.0		0.0		2.9				
Intersection Summary												
HCM 6th Ctrl Delay				14.6								
HCM 6th LOS				B								
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 6th Signalized Intersection Summary
12: 8th St/Constitution Way & Lincoln Ave

Central Avenue Safety Improvement

05/19/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	375	99	19	515	239	99	516	22	201	192	11
Future Volume (veh/h)	27	375	99	19	515	239	99	516	22	201	192	11
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.95	1.00		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1885	1885	1885	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	35	487	129	24	644	299	105	549	23	254	243	14
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.94	0.94	0.94	0.79	0.79	0.79
Percent Heavy Veh, %	3	3	3	1	1	1	2	2	2	3	3	3
Cap, veh/h	68	705	219	65	784	358	138	759	33	726	367	21
Arrive On Green	0.35	0.35	0.35	0.35	0.35	0.35	0.25	0.25	0.25	0.21	0.21	0.21
Sat Flow, veh/h	37	2036	632	39	2266	1035	545	3004	131	3428	1730	100
Grp Volume(v), veh/h	331	0	320	532	0	435	355	0	322	254	0	257
Grp Sat Flow(s),veh/h/ln	1136	0	1569	1833	0	1507	1843	0	1838	1714	0	1830
Q Serve(g_s), s	2.4	0.0	12.2	6.3	0.0	19.4	13.0	0.0	11.6	4.6	0.0	9.4
Cycle Q Clear(g_c), s	21.8	0.0	12.2	19.2	0.0	19.4	13.0	0.0	11.6	4.6	0.0	9.4
Prop In Lane	0.11		0.40	0.05		0.69	0.30		0.07	1.00		0.05
Lane Grp Cap(c), veh/h	448	0	543	686	0	522	466	0	464	726	0	388
V/C Ratio(X)	0.74	0.00	0.59	0.77	0.00	0.83	0.76	0.00	0.69	0.35	0.00	0.66
Avail Cap(c_a), veh/h	526	0	625	778	0	600	572	0	570	1054	0	562
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.6	0.0	19.6	21.7	0.0	21.9	25.2	0.0	24.7	24.4	0.0	26.3
Incr Delay (d2), s/veh	3.5	0.0	0.5	3.6	0.0	7.8	3.6	0.0	1.7	0.1	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	0.0	4.3	8.5	0.0	7.6	5.9	0.0	5.1	1.8	0.0	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.1	0.0	20.1	25.4	0.0	29.7	28.8	0.0	26.4	24.5	0.0	27.1
LnGrp LOS	C	A	C	C	A	C	C	A	C	C	A	C
Approach Vol, veh/h		651			967			677			511	
Approach Delay, s/veh		21.6			27.3			27.7			25.8	
Approach LOS		C			C			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		23.0		29.8		20.0		29.8				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		22.6		29.0		22.4		29.0				
Max Q Clear Time (g_c+I1), s		15.0		23.8		11.4		21.4				
Green Ext Time (p_c), s		1.5		1.0		0.9		2.0				
Intersection Summary												
HCM 6th Ctrl Delay				25.8								
HCM 6th LOS				C								

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
13: Sherman St & Lincoln Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	472	54	10	545	67	66	306	15	47	161	40
Future Volume (veh/h)	35	472	54	10	545	67	66	306	15	47	161	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	42	562	64	14	757	93	78	360	18	63	215	53
Peak Hour Factor	0.84	0.84	0.84	0.72	0.72	0.72	0.85	0.85	0.85	0.75	0.75	0.75
Percent Heavy Veh, %	0	0	0	0	0	0	2	2	2	2	2	2
Cap, veh/h	270	1306	148	77	1253	152	165	632	30	169	524	117
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.43	0.43	0.43	0.43	0.43	0.43
Sat Flow, veh/h	657	3253	369	19	3120	379	198	1454	68	204	1204	269
Grp Volume(v), veh/h	42	311	315	461	0	403	456	0	0	331	0	0
Grp Sat Flow(s),veh/h/ln	657	1805	1817	1874	0	1644	1720	0	0	1678	0	0
Q Serve(g_s), s	2.9	6.7	6.7	0.0	0.0	10.5	3.3	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	13.4	6.7	6.7	10.3	0.0	10.5	10.4	0.0	0.0	6.8	0.0	0.0
Prop In Lane	1.00		0.20	0.03		0.23	0.17		0.04	0.19		0.16
Lane Grp Cap(c), veh/h	270	725	730	821	0	660	827	0	0	809	0	0
V/C Ratio(X)	0.16	0.43	0.43	0.56	0.00	0.61	0.55	0.00	0.00	0.41	0.00	0.00
Avail Cap(c_a), veh/h	270	725	730	821	0	660	827	0	0	809	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	18.1	11.6	11.7	12.7	0.0	12.8	11.4	0.0	0.0	10.5	0.0	0.0
Incr Delay (d2), s/veh	1.2	1.9	1.9	2.8	0.0	4.2	2.6	0.0	0.0	1.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	2.7	2.8	4.4	0.0	4.1	4.1	0.0	0.0	2.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.3	13.5	13.5	15.5	0.0	16.9	14.1	0.0	0.0	12.0	0.0	0.0
LnGrp LOS	B	B	B	B	A	B	B	A	A	B	A	A
Approach Vol, veh/h		668			864			456			331	
Approach Delay, s/veh		13.9			16.2			14.1			12.0	
Approach LOS		B			B			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		25.8		28.0		25.8		28.0				
Change Period (Y+Rc), s		* 4.2		4.6		* 4.2		4.6				
Max Green Setting (Gmax), s		* 22		23.4		* 22		23.4				
Max Q Clear Time (g_c+I1), s		15.4		12.4		12.5		8.8				
Green Ext Time (p_c), s		2.3		2.4		3.9		1.9				

Intersection Summary

HCM 6th Ctrl Delay	14.5
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM Signalized Intersection Capacity Analysis

Central Avenue Safety Improvement

1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)

05/19/2020

Movement	EBL2	EBT	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL2	SBL	
Lane Configurations													
Traffic Volume (vph)	135	25	5	15	73	6	2	330	0	22	2	116	
Future Volume (vph)	135	25	5	15	73	6	2	330	0	22	2	116	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.6		4.6	4.6			4.6	4.6			5.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00			1.00	
Frpb, ped/bikes		1.00		1.00	1.00			1.00	0.98			1.00	
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00			1.00	
Frt		1.00		1.00	0.85			1.00	0.85			1.00	
Flt Protected		0.96		0.99	1.00			1.00	1.00			0.95	
Satd. Flow (prot)		1823		1837	1583			1880	1575			1803	
Flt Permitted		0.19		0.88	1.00			1.00	1.00			0.15	
Satd. Flow (perm)		352		1645	1583			1874	1575			293	
Peak-hour factor, PHF	0.83	0.83	0.78	0.78	0.78	0.78	0.73	0.73	0.73	0.73	0.78	0.78	
Adj. Flow (vph)	163	30	6	19	94	8	3	452	0	30	3	149	
RTOR Reduction (vph)	0	0	0	0	94	0	0	0	22	0	0	0	
Lane Group Flow (vph)	0	193	0	25	8	0	0	455	8	0	0	152	
Confl. Peds. (#/hr)			5				11			3		3	
Confl. Bikes (#/hr)													
Heavy Vehicles (%)	0%	0%	2%	2%	2%	2%	1%	1%	1%	1%	0%	0%	
Turn Type	Perm	NA	Perm	NA	Perm		Perm	NA	Perm		Perm	Perm	
Protected Phases		2		1				4					
Permitted Phases	2		1		1		4		4		3	3	
Actuated Green, G (s)		19.9		8.0	8.0			24.4	24.4			25.9	
Effective Green, g (s)		19.9		8.0	8.0			24.4	24.4			25.9	
Actuated g/C Ratio		0.21		0.08	0.08			0.25	0.25			0.27	
Clearance Time (s)		4.6		4.6	4.6			4.6	4.6			5.0	
Vehicle Extension (s)		1.5		2.0	2.0			2.0	2.0			2.0	
Lane Grp Cap (vph)		72		135	130			471	396			78	
v/s Ratio Prot													
v/s Ratio Perm		c0.55		c0.02	0.01			c0.24	0.00			c0.52	
v/c Ratio		2.68		0.19	0.06			0.97	0.02			1.95	
Uniform Delay, d1		38.5		41.5	41.0			35.9	27.3			35.5	
Progression Factor		1.00		1.00	1.00			1.00	1.00			1.00	
Incremental Delay, d2		794.2		0.2	0.1			33.8	0.1			470.0	
Delay (s)		832.8		41.7	41.1			69.7	27.4			505.5	
Level of Service		F		D	D			E	C			F	
Approach Delay (s)		832.8		41.2				67.1					
Approach LOS		F		D				E					
Intersection Summary													
HCM 2000 Control Delay			241.5									HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio			1.64										
Actuated Cycle Length (s)			97.0									Sum of lost time (s)	18.8
Intersection Capacity Utilization			93.1%									ICU Level of Service	F
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 1: Central Ave/Main St & W Pacific Ave/Pacific Ave & Main St (Side)



Movement	SBT	SBR
Lane Configurations	↕	↗
Traffic Volume (vph)	426	66
Future Volume (vph)	426	66
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	5.0	
Lane Util. Factor	1.00	
Frpb, ped/bikes	0.99	
Flpb, ped/bikes	1.00	
Frt	0.98	
Flt Protected	1.00	
Satd. Flow (prot)	1850	
Flt Permitted	1.00	
Satd. Flow (perm)	1850	
Peak-hour factor, PHF	0.78	0.78
Adj. Flow (vph)	546	85
RTOR Reduction (vph)	6	0
Lane Group Flow (vph)	625	0
Confl. Peds. (#/hr)		11
Confl. Bikes (#/hr)		4
Heavy Vehicles (%)	0%	0%
Turn Type	NA	
Protected Phases	3	
Permitted Phases		
Actuated Green, G (s)	25.9	
Effective Green, g (s)	25.9	
Actuated g/C Ratio	0.27	
Clearance Time (s)	5.0	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	493	
v/s Ratio Prot	0.34	
v/s Ratio Perm		
v/c Ratio	1.27	
Uniform Delay, d1	35.5	
Progression Factor	1.00	
Incremental Delay, d2	135.9	
Delay (s)	171.5	
Level of Service	F	
Approach Delay (s)	236.3	
Approach LOS	F	
Intersection Summary		

Intersection												
Int Delay, s/veh	48.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	8	461	12	57	330	50	8	23	79	74	20	9
Future Vol, veh/h	8	461	12	57	330	50	8	23	79	74	20	9
Conflicting Peds, #/hr	17	0	23	23	0	17	23	0	0	0	0	23
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	82	82	82	59	59	59	68	68	68
Heavy Vehicles, %	1	1	1	0	0	0	0	0	0	0	0	0
Mvmt Flow	10	599	16	70	402	61	14	39	134	109	29	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	419	0	0	638	0	0	1236	1209	630	1273	1217	442
Stage 1	-	-	-	-	-	-	650	650	-	559	559	-
Stage 2	-	-	-	-	-	-	586	559	-	714	658	-
Critical Hdwy	4.11	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.209	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1145	-	-	956	-	0	154	184	485	146	182	620
Stage 1	-	-	-	-	-	0	461	468	-	517	514	-
Stage 2	-	-	-	-	-	0	500	514	-	425	464	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1126	-	-	935	-	-	113	158	474	~ 77	156	597
Mov Cap-2 Maneuver	-	-	-	-	-	-	113	158	-	~ 77	156	-
Stage 1	-	-	-	-	-	-	444	451	-	501	457	-
Stage 2	-	-	-	-	-	-	404	457	-	275	447	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.3			38.1			\$ 405.1		
HCM LOS							E			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1
Capacity (veh/h)	287	1126	-	-	935	-	93
HCM Lane V/C Ratio	0.65	0.009	-	-	0.074	-	1.629
HCM Control Delay (s)	38.1	8.2	-	-	9.2	-	\$ 405.1
HCM Lane LOS	E	A	-	-	A	-	F
HCM 95th %tile Q(veh)	4.2	0	-	-	0.2	-	12

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th Signalized Intersection Summary
3: Ballena Blvd/4th St & Central Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	608	57	118	423	27	21	11	95	18	16	3
Future Volume (veh/h)	1	608	57	118	423	27	21	11	95	18	16	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.97	0.97		0.95	0.97		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	1	724	68	146	522	33	24	12	108	24	21	0
Peak Hour Factor	0.84	0.84	0.84	0.81	0.81	0.81	0.88	0.88	0.88	0.75	0.75	0.75
Percent Heavy Veh, %	1	1	1	0	0	0	0	0	0	0	0	0
Cap, veh/h	4	1415	133	188	1830	115	268	106	226	219	148	
Arrive On Green	0.00	0.43	0.43	0.10	0.53	0.53	0.15	0.15	0.15	0.15	0.15	0.00
Sat Flow, veh/h	1795	3296	309	1810	3441	217	850	723	1535	592	1006	0
Grp Volume(v), veh/h	1	393	399	146	273	282	36	0	108	45	0	0
Grp Sat Flow(s),veh/h/ln	1795	1791	1815	1810	1805	1853	1572	0	1535	1598	0	0
Q Serve(g_s), s	0.0	6.7	6.7	3.3	3.5	3.5	0.0	0.0	2.7	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	6.7	6.7	3.3	3.5	3.5	0.7	0.0	2.7	0.9	0.0	0.0
Prop In Lane	1.00		0.17	1.00		0.12	0.67		1.00	0.53		0.00
Lane Grp Cap(c), veh/h	4	769	779	188	960	985	374	0	226	367	0	
V/C Ratio(X)	0.23	0.51	0.51	0.78	0.28	0.29	0.10	0.00	0.48	0.12	0.00	
Avail Cap(c_a), veh/h	227	1300	1317	328	1409	1447	517	0	370	507	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	20.9	8.7	8.7	18.3	5.4	5.4	15.5	0.0	16.4	15.6	0.0	0.0
Incr Delay (d2), s/veh	9.9	0.3	0.3	2.6	0.1	0.1	0.1	0.0	0.8	0.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.1	2.1	1.4	0.9	1.0	0.3	0.0	0.9	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.8	9.0	9.0	20.9	5.5	5.5	15.6	0.0	17.2	15.7	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	B	A	B	B	A	
Approach Vol, veh/h		793			701			144			45	A
Approach Delay, s/veh		9.1			8.7			16.8			15.7	
Approach LOS		A			A			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.6	22.6		10.8	4.3	26.9		10.8				
Change Period (Y+Rc), s	* 4.2	4.6		4.6	* 4.2	4.6		4.6				
Max Green Setting (Gmax), s	* 7.6	30.4		10.1	* 5.3	32.7		10.1				
Max Q Clear Time (g_c+I1), s	5.3	8.7		2.9	2.0	5.5		4.7				
Green Ext Time (p_c), s	0.0	3.9		0.1	0.0	2.6		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			9.8									
HCM 6th LOS			A									
Notes												
User approved pedestrian interval to be less than phase max green.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.												

Intersection	
Intersection Delay, s/veh	22.4
Intersection LOS	C

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↔		↕↔	
Traffic Vol, veh/h	43	710	634	60	46	42
Future Vol, veh/h	43	710	634	60	46	42
Peak Hour Factor	0.89	0.89	0.97	0.97	0.74	0.74
Heavy Vehicles, %	1	1	0	0	1	1
Mvmt Flow	48	798	654	62	62	57
Number of Lanes	0	2	2	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	2
HCM Control Delay	26.9	19	11.5
HCM LOS	D	C	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	15%	0%	0%	0%	52%
Vol Thru, %	85%	100%	100%	78%	0%
Vol Right, %	0%	0%	0%	22%	48%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	280	473	423	271	88
LT Vol	43	0	0	0	46
Through Vol	237	473	423	211	0
RT Vol	0	0	0	60	42
Lane Flow Rate	314	532	436	280	119
Geometry Grp	7	7	7	7	2
Degree of Util (X)	0.515	0.86	0.722	0.452	0.218
Departure Headway (Hd)	5.897	5.819	5.969	5.813	6.614
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	613	622	606	618	543
Service Time	3.633	3.555	3.711	3.554	4.652
HCM Lane V/C Ratio	0.512	0.855	0.719	0.453	0.219
HCM Control Delay	14.8	34.1	22.7	13.3	11.5
HCM Lane LOS	B	D	C	B	B
HCM 95th-tile Q	2.9	9.7	6	2.3	0.8

HCM Signalized Intersection Capacity Analysis
5: Central Ave & Webster St

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	767	4	36	659	214	18	39	40	559	30	93
Future Volume (vph)	63	767	4	36	659	214	18	39	40	559	30	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.8			4.8			4.6		4.6	4.6	
Lane Util. Factor		0.95			0.95			1.00		0.95	0.95	
Frpb, ped/bikes		1.00			0.97			0.97		1.00	0.97	
Flpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	
Frt		1.00			0.96			0.94		1.00	0.96	
Flt Protected		1.00			1.00			0.99		0.95	0.97	
Satd. Flow (prot)		3521			3305			1693		1681	1597	
Flt Permitted		0.65			0.79			0.99		0.95	0.97	
Satd. Flow (perm)		2301			2632			1693		1681	1597	
Peak-hour factor, PHF	0.83	0.83	0.83	0.90	0.90	0.90	0.74	0.74	0.74	0.94	0.94	0.94
Adj. Flow (vph)	76	924	5	40	732	238	24	53	54	595	32	99
RTOR Reduction (vph)	0	1	0	0	25	0	0	22	0	0	10	0
Lane Group Flow (vph)	0	1004	0	0	985	0	0	109	0	369	347	0
Confl. Peds. (#/hr)	67		32	32		67	59		36	36		59
Confl. Bikes (#/hr)			10			6			3			6
Turn Type	Perm	NA		Perm	NA		Split	NA		Split	NA	
Protected Phases		4			8		2	2		6	6	
Permitted Phases	4			8								
Actuated Green, G (s)		54.3			54.3			15.6		36.1	36.1	
Effective Green, g (s)		54.3			54.3			15.6		36.1	36.1	
Actuated g/C Ratio		0.45			0.45			0.13		0.30	0.30	
Clearance Time (s)		4.8			4.8			4.6		4.6	4.6	
Vehicle Extension (s)		2.4			2.4			2.5		2.5	2.5	
Lane Grp Cap (vph)		1041			1190			220		505	480	
v/s Ratio Prot								c0.06		c0.22	0.22	
v/s Ratio Perm		c0.44			0.37							
v/c Ratio		0.96			0.83			0.50		0.73	0.72	
Uniform Delay, d1		31.9			28.8			48.5		37.6	37.5	
Progression Factor		1.00			1.00			1.00		0.80	0.79	
Incremental Delay, d2		19.7			4.7			1.3		8.7	8.8	
Delay (s)		51.7			33.5			49.8		38.7	38.2	
Level of Service		D			C			D		D	D	
Approach Delay (s)		51.7			33.5			49.8			38.5	
Approach LOS		D			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			41.9				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			88.6%			ICU Level of Service			E			
Analysis Period (min)			15									

c Critical Lane Group

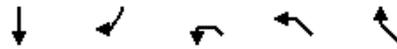
HCM 6th Signalized Intersection Summary
6: 8th St & Central Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	551	853	26	507	92	430	260	14	48	322	10
Future Volume (veh/h)	14	551	853	26	507	92	430	260	14	48	322	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		0.95	1.00		0.93	1.00		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	18	706	1094	29	557	101	506	306	16	50	335	10
Peak Hour Factor	0.78	0.78	0.78	0.91	0.91	0.91	0.85	0.85	0.85	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	55	1168	512	62	860	157	471	464	24	55	369	11
Arrive On Green	0.34	0.34	0.34	0.34	0.34	0.34	0.26	0.26	0.26	0.24	0.24	0.24
Sat Flow, veh/h	37	3398	1490	53	2503	457	1781	1755	92	234	1566	47
Grp Volume(v), veh/h	388	336	1094	336	0	351	506	0	322	395	0	0
Grp Sat Flow(s),veh/h/ln	1818	1617	1490	1422	0	1591	1781	0	1846	1846	0	0
Q Serve(g_s), s	0.0	15.3	30.4	0.8	0.0	16.5	23.4	0.0	13.7	18.4	0.0	0.0
Cycle Q Clear(g_c), s	15.2	15.3	30.4	16.0	0.0	16.5	23.4	0.0	13.7	18.4	0.0	0.0
Prop In Lane	0.05		1.00	0.09		0.29	1.00		0.05	0.13		0.03
Lane Grp Cap(c), veh/h	667	556	512	533	0	547	471	0	488	436	0	0
V/C Ratio(X)	0.58	0.61	2.14	0.63	0.00	0.64	1.07	0.00	0.66	0.91	0.00	0.00
Avail Cap(c_a), veh/h	667	556	512	533	0	547	471	0	488	447	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	24.0	24.1	29.0	23.3	0.0	24.5	32.5	0.0	29.0	32.9	0.0	0.0
Incr Delay (d2), s/veh	0.9	1.4	517.8	1.8	0.0	2.0	62.7	0.0	2.6	21.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.7	5.9	84.2	5.8	0.0	6.4	18.1	0.0	6.4	10.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.9	25.4	546.8	25.1	0.0	26.5	95.3	0.0	31.6	53.9	0.0	0.0
LnGrp LOS	C	C	F	C	A	C	F	A	C	D	A	A
Approach Vol, veh/h		1818			687			828			395	
Approach Delay, s/veh		339.1			25.8			70.5			53.9	
Approach LOS		F			C			E			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		35.0		28.0		35.0		25.5				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		30.4		23.4		30.4		21.4				
Max Q Clear Time (g_c+I1), s		18.5		25.4		32.4		20.4				
Green Ext Time (p_c), s		1.9		0.0		0.0		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			191.5									
HCM 6th LOS			F									
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM Signalized Intersection Capacity Analysis
7: Sherman St & Encinal Ave & Central Ave

												
Movement	EBL	EBT	EBR	EBR2	WBT	WBR	NBL	NBT	NBR	NBR2	SBL2	SBL
Lane Configurations			 		 			 				
Traffic Volume (vph)	7	160	456	14	252	28	33	30	6	5	24	121
Future Volume (vph)	7	160	456	14	252	28	33	30	6	5	24	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9	4.8		4.9			4.6				
Lane Util. Factor		1.00	0.88		1.00			1.00				
Frpb, ped/bikes		1.00	0.94		0.99			0.99				
Flpb, ped/bikes		1.00	1.00		1.00			1.00				
Frt		1.00	0.85		0.99			0.98				
Flt Protected		1.00	1.00		1.00			0.98				
Satd. Flow (prot)		1858	2620		1828			1765				
Flt Permitted		0.98	1.00		1.00			0.82				
Satd. Flow (perm)		1828	2620		1828			1484				
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.85	0.85	0.85	0.85	0.85	0.85	0.90	0.90
Adj. Flow (vph)	7	170	485	15	296	33	39	35	7	6	27	134
RTOR Reduction (vph)	0	0	10	0	6	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	177	490	0	323	0	0	83	0	0	0	0
Confl. Peds. (#/hr)	14			8		14			11	8	11	8
Confl. Bikes (#/hr)				1		2			4	4		
Turn Type	Perm	NA	custom		NA		Perm	NA			Perm	Perm
Protected Phases		5			5			4				
Permitted Phases	5		2				4				4	4
Actuated Green, G (s)		17.1	42.2		17.1			18.4				
Effective Green, g (s)		17.1	42.2		17.1			18.4				
Actuated g/C Ratio		0.24	0.60		0.24			0.26				
Clearance Time (s)		4.9	4.8		4.9			4.6				
Vehicle Extension (s)		0.2	3.0		0.2			3.0				
Lane Grp Cap (vph)		446	1579		446			390				
v/s Ratio Prot					c0.18							
v/s Ratio Perm		0.10	0.19					0.06				
v/c Ratio		0.40	0.31		0.72			0.21				
Uniform Delay, d1		22.1	6.8		24.3			20.1				
Progression Factor		1.00	1.00		1.00			1.00				
Incremental Delay, d2		2.6	0.5		9.8			1.2				
Delay (s)		24.8	7.3		34.1			21.4				
Level of Service		C	A		C			C				
Approach Delay (s)		11.9			34.1			21.4				
Approach LOS		B			C			C				
Intersection Summary												
HCM 2000 Control Delay			22.8									
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			70.0									
Intersection Capacity Utilization			62.5%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: Sherman St & Encinal Ave & Central Ave



Movement	SBT	SBR	NWL2	NWL	NWR
Lane Configurations	↕			↔	
Traffic Volume (vph)	81	12	49	408	43
Future Volume (vph)	81	12	49	408	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	4.6			4.4	
Lane Util. Factor	1.00			0.97	
Frpb, ped/bikes	1.00			1.00	
Flpb, ped/bikes	0.97			0.98	
Frt	0.99			0.99	
Flt Protected	0.97			0.96	
Satd. Flow (prot)	1742			3344	
Flt Permitted	0.79			0.85	
Satd. Flow (perm)	1424			2983	
Peak-hour factor, PHF	0.90	0.90	0.92	0.92	0.92
Adj. Flow (vph)	90	13	53	443	47
RTOR Reduction (vph)	3	0	0	0	0
Lane Group Flow (vph)	261	0	0	543	0
Confl. Peds. (#/hr)			8		
Confl. Bikes (#/hr)		4			1
Turn Type	NA		Perm	Prot	
Protected Phases	4			6	
Permitted Phases			6		
Actuated Green, G (s)	18.4			20.6	
Effective Green, g (s)	18.4			20.6	
Actuated g/C Ratio	0.26			0.29	
Clearance Time (s)	4.6			4.4	
Vehicle Extension (s)	3.0			3.0	
Lane Grp Cap (vph)	374			877	
v/s Ratio Prot					
v/s Ratio Perm	c0.18			c0.18	
v/c Ratio	0.70			0.62	
Uniform Delay, d1	23.3			21.3	
Progression Factor	1.00			1.00	
Incremental Delay, d2	10.3			3.3	
Delay (s)	33.6			24.6	
Level of Service	C			C	
Approach Delay (s)	33.6			24.6	
Approach LOS	C			C	
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
8: Webster St & Santa Clara Ave

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	18	55	13	25	67	62	9	255	27	70	552	43	
Future Volume (vph)	18	55	13	25	67	62	9	255	27	70	552	43	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0			4.0			4.4			4.4		
Lane Util. Factor		1.00			1.00			0.95			0.95		
Frpb, ped/bikes		0.99			0.98			0.99			0.99		
Flpb, ped/bikes		0.99			1.00			1.00			1.00		
Fr t		0.98			0.95			0.99			0.99		
Fl t Protected		0.99			0.99			1.00			0.99		
Satd. Flow (prot)		1731			1657			3453			3452		
Fl t Permitted		0.92			0.94			0.94			0.88		
Satd. Flow (perm)		1612			1576			3241			3057		
Peak-hour factor, PHF	0.77	0.77	0.77	0.88	0.88	0.88	0.87	0.87	0.87	0.96	0.96	0.96	
Adj. Flow (vph)	23	71	17	28	76	70	10	293	31	73	575	45	
RTOR Reduction (vph)	0	12	0	0	47	0	0	8	0	0	7	0	
Lane Group Flow (vph)	0	99	0	0	127	0	0	326	0	0	686	0	
Confl. Peds. (#/hr)	43		40	40		43	60		70	70		60	
Confl. Bikes (#/hr)			9			3			5			3	
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	2%	2%	2%	2%	2%	2%	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA		
Protected Phases		4			8			6		5	2		
Permitted Phases	4			8			6			2			
Actuated Green, G (s)		14.2			14.2			37.4			37.4		
Effective Green, g (s)		14.2			14.2			37.4			37.4		
Actuated g/C Ratio		0.24			0.24			0.62			0.62		
Clearance Time (s)		4.0			4.0			4.4			4.4		
Vehicle Extension (s)		1.8			1.8			2.0			2.0		
Lane Grp Cap (vph)		381			372			2020			1905		
v/s Ratio Prot													
v/s Ratio Perm		0.06			c0.08			0.10			c0.22		
v/c Ratio		0.26			0.34			0.16			0.36		
Uniform Delay, d1		18.6			19.0			4.7			5.5		
Progression Factor		1.00			1.00			0.86			0.83		
Incremental Delay, d2		0.1			0.2			0.1			0.0		
Delay (s)		18.8			19.2			4.2			4.6		
Level of Service		B			B			A			A		
Approach Delay (s)		18.8			19.2			4.2			4.6		
Approach LOS		B			B			A			A		
Intersection Summary													
HCM 2000 Control Delay			7.6									HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.38										
Actuated Cycle Length (s)			60.0									Sum of lost time (s)	12.4
Intersection Capacity Utilization			77.6%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
9: 8th St & Santa Clara Ave

Central Avenue Safety Improvement

05/19/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	157	9	7	127	67	8	321	27	48	386	18
Future Volume (veh/h)	22	157	9	7	127	67	8	321	27	48	386	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.92	0.97		0.93	1.00		0.95	0.99		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826	1900	1900	1900	1885	1885	1885
Adj Flow Rate, veh/h	24	171	10	8	137	72	9	373	31	57	460	21
Peak Hour Factor	0.92	0.92	0.92	0.93	0.93	0.93	0.86	0.86	0.86	0.84	0.84	0.84
Percent Heavy Veh, %	5	5	5	5	5	5	0	0	0	1	1	1
Cap, veh/h	83	511	28	49	364	184	49	965	79	116	885	39
Arrive On Green	0.33	0.33	0.33	0.33	0.33	0.33	0.57	0.57	0.57	0.57	0.57	0.57
Sat Flow, veh/h	112	1533	84	20	1092	552	13	1700	139	125	1559	68
Grp Volume(v), veh/h	205	0	0	217	0	0	413	0	0	538	0	0
Grp Sat Flow(s),veh/h/ln	1729	0	0	1664	0	0	1852	0	0	1753	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Cycle Q Clear(g_c), s	7.6	0.0	0.0	8.8	0.0	0.0	10.9	0.0	0.0	15.6	0.0	0.0
Prop In Lane	0.12		0.05	0.04		0.33	0.02		0.08	0.11		0.04
Lane Grp Cap(c), veh/h	622	0	0	597	0	0	1093	0	0	1040	0	0
V/C Ratio(X)	0.33	0.00	0.00	0.36	0.00	0.00	0.38	0.00	0.00	0.52	0.00	0.00
Avail Cap(c_a), veh/h	622	0	0	597	0	0	1093	0	0	1040	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	22.3	0.0	0.0	22.7	0.0	0.0	10.7	0.0	0.0	11.7	0.0	0.0
Incr Delay (d2), s/veh	1.4	0.0	0.0	1.7	0.0	0.0	1.0	0.0	0.0	1.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	0.0	0.0	3.7	0.0	0.0	4.5	0.0	0.0	6.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.7	0.0	0.0	24.4	0.0	0.0	11.7	0.0	0.0	13.5	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	B	A	A	B	A	A
Approach Vol, veh/h		205			217			413			538	
Approach Delay, s/veh		23.7			24.4			11.7			13.5	
Approach LOS		C			C			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		33.8		55.0		33.8		55.0				
Change Period (Y+Rc), s		* 4.2		4.6		* 4.2		4.6				
Max Green Setting (Gmax), s		* 30		50.4		* 30		50.4				
Max Q Clear Time (g_c+I1), s		9.6		12.9		10.8		17.6				
Green Ext Time (p_c), s		1.2		3.1		1.3		4.4				
Intersection Summary												
HCM 6th Ctrl Delay				16.2								
HCM 6th LOS				B								
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

Intersection	
Intersection Delay, s/veh	19.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	19	254	31	12	217	33	16	130	5	92	260	31
Future Vol, veh/h	19	254	31	12	217	33	16	130	5	92	260	31
Peak Hour Factor	0.84	0.84	0.84	0.90	0.90	0.90	0.91	0.91	0.91	0.98	0.98	0.98
Heavy Vehicles, %	3	3	3	3	3	3	0	0	0	0	0	0
Mvmt Flow	23	302	37	13	241	37	18	143	5	94	265	32
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	21	17.2	13.7	23.4
HCM LOS	C	C	B	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	11%	6%	5%	24%
Vol Thru, %	86%	84%	83%	68%
Vol Right, %	3%	10%	13%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	151	304	262	383
LT Vol	16	19	12	92
Through Vol	130	254	217	260
RT Vol	5	31	33	31
Lane Flow Rate	166	362	291	391
Geometry Grp	1	1	1	1
Degree of Util (X)	0.33	0.651	0.536	0.701
Departure Headway (Hd)	7.168	6.48	6.629	6.458
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	504	554	539	555
Service Time	5.168	4.57	4.725	4.541
HCM Lane V/C Ratio	0.329	0.653	0.54	0.705
HCM Control Delay	13.7	21	17.2	23.4
HCM Lane LOS	B	C	C	C
HCM 95th-tile Q	1.4	4.7	3.1	5.5

HCM 6th Signalized Intersection Summary
11: Webster St & Lincoln Ave

Central Avenue Safety Improvement

05/19/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	87	354	47	60	259	265	6	299	54	249	597	106
Future Volume (veh/h)	87	354	47	60	259	265	6	299	54	249	597	106
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.96	0.99		0.98	0.99		0.97	0.99		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1900	1900	1900	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	93	377	50	69	298	305	6	318	57	265	635	113
Peak Hour Factor	0.94	0.94	0.94	0.87	0.87	0.87	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	0	0	0	2	2	2	2	2	2
Cap, veh/h	271	1085	143	364	619	538	68	1530	267	400	916	174
Arrive On Green	0.34	0.34	0.34	0.34	0.34	0.34	0.17	0.17	0.17	0.52	0.52	0.52
Sat Flow, veh/h	816	3166	416	964	1805	1571	12	2921	510	583	1748	332
Grp Volume(v), veh/h	93	212	215	69	298	305	203	0	178	460	0	553
Grp Sat Flow(s),veh/h/ln	816	1791	1791	964	1805	1571	1851	0	1591	1038	0	1625
Q Serve(g_s), s	6.3	5.3	5.4	3.5	7.8	9.5	0.0	0.0	5.8	19.2	0.0	14.7
Cycle Q Clear(g_c), s	15.8	5.3	5.4	8.8	7.8	9.5	5.6	0.0	5.8	25.0	0.0	14.7
Prop In Lane	1.00		0.23	1.00		1.00	0.03		0.32	0.58		0.20
Lane Grp Cap(c), veh/h	271	614	614	364	619	538	1032	0	834	638	0	851
V/C Ratio(X)	0.34	0.35	0.35	0.19	0.48	0.57	0.20	0.00	0.21	0.72	0.00	0.65
Avail Cap(c_a), veh/h	304	687	687	403	692	602	1032	0	834	638	0	851
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.71	0.71	0.71	0.99	0.00	0.99	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.5	14.7	14.7	18.0	15.5	16.1	14.1	0.0	14.2	14.9	0.0	10.3
Incr Delay (d2), s/veh	0.6	0.2	0.3	0.1	0.3	0.5	0.4	0.0	0.6	6.9	0.0	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	2.0	2.1	0.7	3.0	3.2	2.4	0.0	2.2	6.1	0.0	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.1	14.9	15.0	18.2	15.8	16.6	14.5	0.0	14.8	21.8	0.0	14.1
LnGrp LOS	C	B	B	B	B	B	B	A	B	C	A	B
Approach Vol, veh/h		520			672			381			1013	
Approach Delay, s/veh		16.4			16.4			14.7			17.6	
Approach LOS		B			B			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		35.4		24.6		35.4		24.6				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		29.0		23.0		29.0		23.0				
Max Q Clear Time (g_c+I1), s		7.8		17.8		27.0		11.5				
Green Ext Time (p_c), s		1.9		1.3		1.2		2.9				
Intersection Summary												
HCM 6th Ctrl Delay				16.6								
HCM 6th LOS				B								
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 6th Signalized Intersection Summary
 12: 8th St/Constitution Way & Lincoln Ave

Central Avenue Safety Improvement

05/19/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	492	95	17	394	176	101	352	30	736	442	26
Future Volume (veh/h)	30	492	95	17	394	176	101	352	30	736	442	26
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	0.99		0.99	1.00		0.96	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1900	1900	1900	1900	1900	1900	1885	1885	1885
Adj Flow Rate, veh/h	33	547	106	18	419	187	122	424	36	827	497	29
Peak Hour Factor	0.90	0.90	0.90	0.94	0.94	0.94	0.83	0.83	0.83	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	0	0	0	0	0	0	1	1	1
Cap, veh/h	69	725	150	58	631	289	160	585	52	1122	568	33
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.21	0.21	0.21	0.32	0.32	0.32
Sat Flow, veh/h	67	2510	518	34	2183	1001	743	2725	241	3483	1762	103
Grp Volume(v), veh/h	360	0	326	338	0	286	306	0	276	827	0	526
Grp Sat Flow(s),veh/h/ln	1502	0	1594	1687	0	1531	1863	0	1846	1742	0	1865
Q Serve(g_s), s	5.5	0.0	14.5	0.5	0.0	12.9	12.2	0.0	10.9	16.7	0.0	21.1
Cycle Q Clear(g_c), s	18.4	0.0	14.5	15.0	0.0	12.9	12.2	0.0	10.9	16.7	0.0	21.1
Prop In Lane	0.09		0.32	0.05		0.65	0.40		0.13	1.00		0.06
Lane Grp Cap(c), veh/h	483	0	460	535	0	442	400	0	397	1122	0	601
V/C Ratio(X)	0.74	0.00	0.71	0.63	0.00	0.65	0.76	0.00	0.70	0.74	0.00	0.88
Avail Cap(c_a), veh/h	558	0	531	614	0	511	569	0	564	1381	0	740
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.9	0.0	25.2	24.4	0.0	24.6	29.2	0.0	28.7	23.9	0.0	25.3
Incr Delay (d2), s/veh	3.6	0.0	2.7	1.0	0.0	1.4	2.1	0.0	0.8	1.2	0.0	8.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.7	0.0	5.7	5.5	0.0	4.7	5.6	0.0	4.8	6.8	0.0	10.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.5	0.0	27.9	25.4	0.0	26.0	31.3	0.0	29.5	25.0	0.0	33.9
LnGrp LOS	C	A	C	C	A	C	C	A	C	C	A	C
Approach Vol, veh/h		686			624			582			1353	
Approach Delay, s/veh		28.7			25.7			30.5			28.5	
Approach LOS		C			C			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		21.6		27.5		30.1		27.5				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		24.2		26.4		31.4		26.4				
Max Q Clear Time (g_c+I1), s		14.2		20.4		23.1		17.0				
Green Ext Time (p_c), s		1.5		1.1		2.3		1.3				
Intersection Summary												
HCM 6th Ctrl Delay				28.4								
HCM 6th LOS				C								
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 6th Signalized Intersection Summary
13: Sherman St & Lincoln Ave

Central Avenue Safety Improvement

05/19/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	800	109	10	609	38	26	157	16	166	278	46
Future Volume (veh/h)	50	800	109	10	609	38	26	157	16	166	278	46
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		0.97	0.99		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1885	1885	1885	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	53	842	115	12	734	46	32	191	20	193	323	53
Peak Hour Factor	0.95	0.95	0.95	0.83	0.83	0.83	0.82	0.82	0.82	0.86	0.86	0.86
Percent Heavy Veh, %	0	0	0	1	1	1	0	0	0	0	0	0
Cap, veh/h	243	1101	150	74	1132	71	140	740	72	321	479	73
Arrive On Green	0.35	0.35	0.35	0.35	0.35	0.35	0.49	0.49	0.49	0.49	0.49	0.49
Sat Flow, veh/h	701	3184	435	16	3276	205	131	1507	147	471	977	149
Grp Volume(v), veh/h	53	477	480	416	0	376	243	0	0	569	0	0
Grp Sat Flow(s),veh/h/ln	701	1805	1814	1822	0	1675	1786	0	0	1597	0	0
Q Serve(g_s), s	3.7	12.7	12.7	0.1	0.0	10.2	0.0	0.0	0.0	10.5	0.0	0.0
Cycle Q Clear(g_c), s	13.9	12.7	12.7	12.7	0.0	10.2	4.1	0.0	0.0	14.6	0.0	0.0
Prop In Lane	1.00		0.24	0.03		0.12	0.13		0.08	0.34		0.09
Lane Grp Cap(c), veh/h	243	624	627	699	0	579	952	0	0	873	0	0
V/C Ratio(X)	0.22	0.76	0.76	0.60	0.00	0.65	0.26	0.00	0.00	0.65	0.00	0.00
Avail Cap(c_a), veh/h	243	624	627	699	0	579	952	0	0	873	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	20.7	15.7	15.7	14.8	0.0	14.8	8.0	0.0	0.0	10.5	0.0	0.0
Incr Delay (d2), s/veh	2.0	8.7	8.6	3.7	0.0	5.6	0.6	0.0	0.0	3.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	6.1	6.1	4.5	0.0	4.3	1.5	0.0	0.0	5.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.8	24.3	24.3	18.5	0.0	20.4	8.7	0.0	0.0	14.2	0.0	0.0
LnGrp LOS	C	C	C	B	A	C	A	A	A	B	A	A
Approach Vol, veh/h		1010			792			243			569	
Approach Delay, s/veh		24.2			19.4			8.7			14.2	
Approach LOS		C			B			A			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		22.8		31.0		22.8		31.0				
Change Period (Y+Rc), s		* 4.2		4.6		* 4.2		4.6				
Max Green Setting (Gmax), s		* 19		26.4		* 19		26.4				
Max Q Clear Time (g_c+I1), s		15.9		6.1		14.7		16.6				
Green Ext Time (p_c), s		1.7		1.5		1.8		2.9				
Intersection Summary												
HCM 6th Ctrl Delay				19.1								
HCM 6th LOS				B								
Notes												
User approved pedestrian interval to be less than phase max green.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

Intersection					
Intersection Delay, s/veh	7.2				
Intersection LOS	A				
Approach	EB	WB	NB	SB	
Entry Lanes	1	1	1	2	
Conflicting Circle Lanes	1	1	1	1	
Adj Approach Flow, veh/h	62	379	397	658	
Demand Flow Rate, veh/h	78	394	408	684	
Vehicles Circulating, veh/h	540	436	198	130	
Vehicles Exiting, veh/h	274	170	419	683	
Ped Vol Crossing Leg, #/h	4	19	3	0	
Ped Cap Adj	0.999	0.997	1.000	1.000	
Approach Delay, s/veh	6.8	9.8	6.9	5.8	
Approach LOS	A	A	A	A	
Lane	Left	Left	Left	Left	Right
Designated Moves	LTR	LTR	LTR	LT	R
Assumed Moves	LTR	LTR	LTR	LT	R
RT Channelized					
Lane Util	1.000	1.000	1.000	0.668	0.332
Follow-Up Headway, s	2.609	2.609	2.609	2.535	2.535
Critical Headway, s	4.976	4.976	4.976	4.544	4.544
Entry Flow, veh/h	78	394	408	457	227
Cap Entry Lane, veh/h	796	885	1128	1262	1262
Entry HV Adj Factor	0.800	0.963	0.972	0.962	0.960
Flow Entry, veh/h	62	379	397	440	218
Cap Entry, veh/h	636	849	1096	1214	1212
V/C Ratio	0.098	0.447	0.362	0.362	0.180
Control Delay, s/veh	6.8	9.8	6.9	6.4	4.5
LOS	A	A	A	A	A
95th %tile Queue, veh	0	2	2	2	1

Intersection

Intersection Delay, s/veh

Intersection LOS

Approach	SW
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Entry Lanes	0
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Conflicting Circle Lanes	1
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Adj Approach Flow, veh/h	0
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Demand Flow Rate, veh/h	0
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Vehicles Circulating, veh/h	813
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Vehicles Exiting, veh/h	17
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Ped Vol Crossing Leg, #/h	0
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Ped Cap Adj	1.000
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Approach Delay, s/veh	0.0
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Approach LOS	-
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Lane

Designated Moves

Assumed Moves

RT Channelized

Lane Util

Follow-Up Headway, s

Critical Headway, s

Entry Flow, veh/h

Cap Entry Lane, veh/h

Entry HV Adj Factor

Flow Entry, veh/h

Cap Entry, veh/h

V/C Ratio

Control Delay, s/veh

LOS

95th %tile Queue, veh

Intersection					
Intersection Delay, s/veh	8.1				
Intersection LOS	A				
Approach	EB	WB	NB	SB	
Entry Lanes	1	1	1	1	
Conflicting Circle Lanes	1	1	1	1	
Adj Approach Flow, veh/h	365	667	260	104	
Demand Flow Rate, veh/h	384	673	260	104	
Vehicles Circulating, veh/h	338	95	425	652	
Vehicles Exiting, veh/h	418	590	296	212	
Ped Vol Crossing Leg, #/h	88	0	25	60	
Ped Cap Adj	0.988	1.000	0.997	0.992	
Approach Delay, s/veh	8.5	8.6	7.2	6.7	
Approach LOS	A	A	A	A	
Lane	Left	Left	Bypass	Left	Left
Designated Moves	LTR	LTR	R	LTR	LTR
Assumed Moves	LTR	LTR	R	LTR	LTR
RT Channelized	Free				
Lane Util	1.000	1.000		1.000	1.000
Follow-Up Headway, s	2.609	2.609		2.609	2.609
Critical Headway, s	4.976	4.976	11	4.976	4.976
Entry Flow, veh/h	384	662	1919	260	104
Cap Entry Lane, veh/h	978	1252	0.990	895	710
Entry HV Adj Factor	0.952	0.990	11	1.000	1.000
Flow Entry, veh/h	366	656	1900	260	104
Cap Entry, veh/h	920	1240	0.006	891	704
V/C Ratio	0.398	0.529	0.0	0.292	0.148
Control Delay, s/veh	8.5	8.8	A	7.2	6.7
LOS	A	A	0	A	A
95th %tile Queue, veh	2	3		1	1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	
Approach	SW
Entry Lanes	1
Conflicting Circle Lanes	1
Adj Approach Flow, veh/h	128
Demand Flow Rate, veh/h	128
Vehicles Circulating, veh/h	736
Vehicles Exiting, veh/h	21
Ped Vol Crossing Leg, #/h	28
Ped Cap Adj	0.996
Approach Delay, s/veh	7.9
Approach LOS	A
Lane	Left
Designated Moves	LR
Assumed Moves	LR
RT Channelized	
Lane Util	1.000
Follow-Up Headway, s	2.609
Critical Headway, s	4.976
Entry Flow, veh/h	128
Cap Entry Lane, veh/h	651
Entry HV Adj Factor	1.000
Flow Entry, veh/h	128
Cap Entry, veh/h	649
V/C Ratio	0.197
Control Delay, s/veh	7.9
LOS	A
95th %tile Queue, veh	1

Intersection				
Intersection Delay, s/veh	9.3			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	612	660	164	160
Demand Flow Rate, veh/h	624	667	169	160
Vehicles Circulating, veh/h	183	124	711	676
Vehicles Exiting, veh/h	653	756	96	115
Ped Vol Crossing Leg, #/h	14	27	57	9
Ped Cap Adj	0.998	0.996	0.992	0.999
Approach Delay, s/veh	9.7	9.4	8.8	7.9
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	624	667	169	160
Cap Entry Lane, veh/h	1145	1216	668	692
Entry HV Adj Factor	0.981	0.990	0.973	1.000
Flow Entry, veh/h	612	660	164	160
Cap Entry, veh/h	1121	1199	645	692
V/C Ratio	0.546	0.551	0.255	0.231
Control Delay, s/veh	9.7	9.4	8.8	7.9
LOS	A	A	A	A
95th %tile Queue, veh	3	3	1	1

Intersection	
Intersection Delay, s/veh	50.9
Intersection LOS	F

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗		↖	↗
Traffic Vol, veh/h	141	442	523	52	61	75
Future Vol, veh/h	141	442	523	52	61	75
Peak Hour Factor	0.80	0.80	0.82	0.82	0.76	0.76
Heavy Vehicles, %	1	1	2	2	0	0
Mvmt Flow	176	553	638	63	80	99
Number of Lanes	1	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	2
HCM Control Delay	32	80.1	13.2
HCM LOS	D	F	B

Lane	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	0%	45%
Vol Thru, %	0%	100%	91%	0%
Vol Right, %	0%	0%	9%	55%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	141	442	575	136
LT Vol	141	0	0	61
Through Vol	0	442	523	0
RT Vol	0	0	52	75
Lane Flow Rate	176	552	701	179
Geometry Grp	7	7	5	2
Degree of Util (X)	0.308	0.887	1.076	0.328
Departure Headway (Hd)	6.513	6.004	5.523	6.877
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	555	608	659	526
Service Time	4.213	3.704	3.523	4.877
HCM Lane V/C Ratio	0.317	0.908	1.064	0.34
HCM Control Delay	12.1	38.4	80.1	13.2
HCM Lane LOS	B	E	F	B
HCM 95th-tile Q	1.3	10.5	19.6	1.4

HCM Signalized Intersection Capacity Analysis
5: Central Ave & Webster St

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	78	407	5	18	630	300	22	45	58	327	30	71	
Future Volume (vph)	78	407	5	18	630	300	22	45	58	327	30	71	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	10	11	12	11	11	11	12	12	12	12	12	12	
Total Lost time (s)	4.8	4.8		4.8	4.8			4.6		4.6	4.6		
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00		
Frpb, ped/bikes	1.00	1.00		1.00	0.97			0.95		1.00	0.91		
Flpb, ped/bikes	1.00	1.00		0.98	1.00			0.98		0.97	1.00		
Fr t	1.00	1.00		1.00	0.95			0.94		1.00	0.89		
Fl t Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00		
Satd. Flow (prot)	1652	1796		1681	1664			1625		1722	1509		
Fl t Permitted	0.09	1.00		0.28	1.00			0.93		0.57	1.00		
Satd. Flow (perm)	160	1796		487	1664			1528		1028	1509		
Peak-hour factor, PHF	0.76	0.76	0.76	0.85	0.85	0.85	0.88	0.88	0.88	0.88	0.88	0.88	
Adj. Flow (vph)	103	536	7	21	741	353	25	51	66	372	34	81	
RTOR Reduction (vph)	0	0	0	0	18	0	0	0	0	0	67	0	
Lane Group Flow (vph)	103	543	0	21	1076	0	0	142	0	372	48	0	
Confl. Peds. (#/hr)	50		31	31		50	40		37	37		40	
Confl. Bikes (#/hr)			6			28			5			2	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA		
Protected Phases		4			8			2		5	6		
Permitted Phases	4			8			2			6			
Actuated Green, G (s)	43.5	43.5		47.3	47.3			15.9		28.7	15.9		
Effective Green, g (s)	43.5	43.5		47.3	47.3			15.9		28.7	15.9		
Actuated g/C Ratio	0.48	0.48		0.53	0.53			0.18		0.32	0.18		
Clearance Time (s)	4.8	4.8		4.8	4.8			4.6		4.6	4.6		
Vehicle Extension (s)	2.4	2.4		2.4	2.4			2.5		2.5	2.5		
Lane Grp Cap (vph)	77	868		255	874			269		426	266		
v/s Ratio Prot		0.30			c0.65					c0.12	0.03		
v/s Ratio Perm	c0.64			0.04				0.09		c0.15			
v/c Ratio	1.34	0.63		0.08	1.23			0.53		0.87	0.18		
Uniform Delay, d1	23.2	17.2		10.6	21.4			33.6		30.6	31.5		
Progression Factor	1.00	1.00		0.41	0.46			1.00		1.00	1.00		
Incremental Delay, d2	216.8	3.4		0.1	105.2			1.4		17.5	0.2		
Delay (s)	240.1	20.6		4.4	115.0			35.1		48.1	31.8		
Level of Service	F	C		A	F			D		D	C		
Approach Delay (s)		55.6			112.9			35.1			44.2		
Approach LOS		E			F			D			D		
Intersection Summary													
HCM 2000 Control Delay			78.8									HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			1.14										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	16.0
Intersection Capacity Utilization			93.7%									ICU Level of Service	F
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
6: 8th St & Central Ave

Central Avenue Safety Improvement
09/07/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	296	383	16	589	147	330	329	8	51	313	23
Future Volume (vph)	5	296	383	16	589	147	330	329	8	51	313	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	10	11	12	12	12	12	12	12	12
Total Lost time (s)	4.6	4.6	4.6	4.5	4.6		4.6	4.6		4.6	4.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	1801	1531	1652	1719		1770	1853		1744	1836	
Flt Permitted	0.20	1.00	1.00	0.95	1.00		0.95	1.00		0.27	1.00	
Satd. Flow (perm)	339	1801	1531	1652	1719		1770	1853		491	1836	
Peak-hour factor, PHF	0.88	0.88	0.88	0.84	0.84	0.84	0.91	0.91	0.91	0.79	0.79	0.79
Adj. Flow (vph)	6	336	435	19	701	175	363	362	9	65	396	29
RTOR Reduction (vph)	0	0	0	0	10	0	0	0	0	0	3	0
Lane Group Flow (vph)	6	336	435	19	866	0	363	371	0	65	422	0
Confl. Peds. (#/hr)	22		14	14		22	19		16	16		19
Confl. Bikes (#/hr)			10			42			7			3
Turn Type	custom	NA	custom	Prot	NA		Prot	NA		Perm	NA	
Protected Phases		2 6	7 2	5	1		7	4			8	
Permitted Phases	6									8		
Actuated Green, G (s)	20.5	31.4	29.0	2.8	38.7		18.1	34.5		19.4	19.4	
Effective Green, g (s)	20.5	31.4	29.0	2.8	38.7		18.1	34.5		19.4	19.4	
Actuated g/C Ratio	0.23	0.35	0.32	0.03	0.43		0.20	0.38		0.22	0.22	
Clearance Time (s)	4.6			4.5	4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)	1.0			3.0	1.0		1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	77	628	493	51	739		355	710		105	395	
v/s Ratio Prot		0.19	c0.28	0.01	c0.50		c0.21	0.20			c0.23	
v/s Ratio Perm	0.02									0.13		
v/c Ratio	0.08	0.54	0.88	0.37	1.17		1.02	0.52		0.62	1.07	
Uniform Delay, d1	27.3	23.5	28.9	42.7	25.6		36.0	21.4		32.0	35.3	
Progression Factor	1.01	0.96	0.95	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.3	12.3	4.5	91.2		53.6	0.3		7.4	64.5	
Delay (s)	27.6	22.8	39.9	47.3	116.9		89.6	21.7		39.4	99.8	
Level of Service	C	C	D	D	F		F	C		D	F	
Approach Delay (s)		32.4			115.4			55.3			91.8	
Approach LOS		C			F			E			F	
Intersection Summary												
HCM 2000 Control Delay			73.9				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			1.28									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			22.9		
Intersection Capacity Utilization			88.7%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Intersection				
Intersection Delay, s/veh	9.1			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	0	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	496	245	0	216
Demand Flow Rate, veh/h	505	250	0	220
Vehicles Circulating, veh/h	208	586	652	708
Vehicles Exiting, veh/h	720	212	61	128
Ped Vol Crossing Leg, #/h	0	24	11	14
Ped Cap Adj	1.000	0.997	1.000	0.998
Approach Delay, s/veh	8.2	8.9	0.0	9.8
Approach LOS	A	A	-	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	505	250	220	220
Cap Entry Lane, veh/h	1116	759	670	670
Entry HV Adj Factor	0.981	0.981	0.983	0.983
Flow Entry, veh/h	496	245	216	216
Cap Entry, veh/h	1095	742	657	657
V/C Ratio	0.452	0.330	0.329	0.329
Control Delay, s/veh	8.2	8.9	9.8	9.8
LOS	A	A	A	A
95th %tile Queue, veh	2	1	1	1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	
Approach	NW
Entry Lanes	1
Conflicting Circle Lanes	1
Adj Approach Flow, veh/h	572
Demand Flow Rate, veh/h	583
Vehicles Circulating, veh/h	215
Vehicles Exiting, veh/h	437
Ped Vol Crossing Leg, #/h	17
Ped Cap Adj	0.998
Approach Delay, s/veh	9.6
Approach LOS	A
Lane	Left
Designated Moves	LR
Assumed Moves	LR
RT Channelized	
Lane Util	1.000
Follow-Up Headway, s	2.609
Critical Headway, s	4.976
Entry Flow, veh/h	583
Cap Entry Lane, veh/h	1108
Entry HV Adj Factor	0.981
Flow Entry, veh/h	572
Cap Entry, veh/h	1085
V/C Ratio	0.527
Control Delay, s/veh	9.6
LOS	A
95th %tile Queue, veh	3

HCM Signalized Intersection Capacity Analysis
8: Webster St & Santa Clara Ave

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	23	83	23	16	94	100	5	360	18	45	319	19	
Future Volume (vph)	23	83	23	16	94	100	5	360	18	45	319	19	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0			4.0			4.4			4.4		
Lane Util. Factor		1.00			1.00			0.95			0.95		
Frpb, ped/bikes		1.00			0.96			1.00			1.00		
Flpb, ped/bikes		1.00			1.00			1.00			1.00		
Frt		0.98			0.94			0.99			0.99		
Flt Protected		0.99			1.00			1.00			0.99		
Satd. Flow (prot)		1753			1604			3501			3475		
Flt Permitted		0.93			0.97			0.95			0.87		
Satd. Flow (perm)		1642			1562			3329			3038		
Peak-hour factor, PHF	0.69	0.69	0.69	0.89	0.89	0.89	0.89	0.89	0.89	0.79	0.79	0.79	
Adj. Flow (vph)	33	120	33	18	106	112	6	404	20	57	404	24	
RTOR Reduction (vph)	0	14	0	0	61	0	0	3	0	0	5	0	
Lane Group Flow (vph)	0	172	0	0	175	0	0	427	0	0	480	0	
Confl. Peds. (#/hr)	45		13	13		45	24		42	42		24	
Confl. Bikes (#/hr)			2			42			2			3	
Heavy Vehicles (%)	4%	4%	4%	6%	6%	6%	2%	2%	2%	2%	2%	2%	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA		
Protected Phases		4			8			6		5	2		
Permitted Phases	4			8			6			2			
Actuated Green, G (s)		14.6			14.6			37.0			37.0		
Effective Green, g (s)		14.6			14.6			37.0			37.0		
Actuated g/C Ratio		0.24			0.24			0.62			0.62		
Clearance Time (s)		4.0			4.0			4.4			4.4		
Vehicle Extension (s)		1.5			1.5			1.5			1.5		
Lane Grp Cap (vph)		399			380			2052			1873		
v/s Ratio Prot													
v/s Ratio Perm		0.10			0.11			0.13			0.16		
v/c Ratio		0.43			0.46			0.21			0.26		
Uniform Delay, d1		19.2			19.3			5.1			5.2		
Progression Factor		1.00			1.00			1.00			0.31		
Incremental Delay, d2		0.3			0.3			0.2			0.0		
Delay (s)		19.5			19.7			5.3			1.6		
Level of Service		B			B			A			A		
Approach Delay (s)		19.5			19.7			5.3			1.6		
Approach LOS		B			B			A			A		
Intersection Summary													
HCM 2000 Control Delay			8.5									HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.34										
Actuated Cycle Length (s)			60.0									Sum of lost time (s)	12.4
Intersection Capacity Utilization			69.6%									ICU Level of Service	C
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
9: 8th St & Santa Clara Ave

Central Avenue Safety Improvement
09/07/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	156	17	6	192	62	9	442	37	38	331	18
Future Volume (veh/h)	26	156	17	6	192	62	9	442	37	38	331	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.91	0.96		0.87	0.98		0.91	0.99		0.91
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1811	1811	1811	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	36	214	23	9	278	90	10	470	39	44	385	21
Peak Hour Factor	0.73	0.73	0.73	0.69	0.69	0.69	0.94	0.94	0.94	0.86	0.86	0.86
Percent Heavy Veh, %	4	4	4	6	6	6	2	2	2	3	3	3
Cap, veh/h	110	571	57	59	502	159	59	787	64	103	732	38
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.47	0.47	0.47	0.47	0.47	0.47
Sat Flow, veh/h	126	1422	142	13	1250	396	11	1672	137	98	1554	81
Grp Volume(v), veh/h	273	0	0	377	0	0	519	0	0	450	0	0
Grp Sat Flow(s),veh/h/ln	1691	0	0	1659	0	0	1820	0	0	1732	0	0
Q Serve(g_s), 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
Cycle Q Clear(g_c), s	7.4	0.0	0.0	12.0	0.0	0.0	14.4	0.0	0.0	11.9	0.0	0.0
Prop In Lane	0.13		0.08	0.02		0.24	0.02		0.08	0.10		0.05
Lane Grp Cap(c), veh/h	738	0	0	719	0	0	910	0	0	873	0	0
V/C Ratio(X)	0.37	0.00	0.00	0.52	0.00	0.00	0.57	0.00	0.00	0.52	0.00	0.00
Avail Cap(c_a), veh/h	738	0	0	719	0	0	910	0	0	873	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	14.5	0.0	0.0	15.9	0.0	0.0	13.4	0.0	0.0	12.8	0.0	0.0
Incr Delay (d2), s/veh	1.4	0.0	0.0	2.7	0.0	0.0	2.6	0.0	0.0	2.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	0.0	0.0	4.8	0.0	0.0	6.0	0.0	0.0	5.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.0	0.0	0.0	18.7	0.0	0.0	16.0	0.0	0.0	14.9	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	B	A	A	B	A	A
Approach Vol, veh/h		273			377			519				450
Approach Delay, s/veh		16.0			18.7			16.0				14.9
Approach LOS		B			B			B				B
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		31.8		37.0		31.8		37.0				
Change Period (Y+Rc), s		* 4.2		4.6		* 4.2		4.6				
Max Green Setting (Gmax), s		* 28		32.4		* 28		32.4				
Max Q Clear Time (g_c+I1), s		9.4		16.4		14.0		13.9				
Green Ext Time (p_c), s		1.6		3.3		2.1		3.0				
Intersection Summary												
HCM 6th Ctrl Delay				16.3								
HCM 6th LOS				B								
Notes												
User approved pedestrian interval to be less than phase max green.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

Intersection	
Intersection Delay, s/veh	22.8
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	32	197	20	7	209	47	27	308	11	27	167	20
Future Vol, veh/h	32	197	20	7	209	47	27	308	11	27	167	20
Peak Hour Factor	0.86	0.86	0.86	0.78	0.78	0.78	0.88	0.88	0.88	0.86	0.86	0.86
Heavy Vehicles, %	3	3	3	5	5	5	1	1	1	3	3	3
Mvmt Flow	37	229	23	9	268	60	31	350	13	31	194	23
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	19.9	22.8	28.2	17.7
HCM LOS	C	C	D	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	13%	3%	13%
Vol Thru, %	89%	79%	79%	78%
Vol Right, %	3%	8%	18%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	346	249	263	214
LT Vol	27	32	7	27
Through Vol	308	197	209	167
RT Vol	11	20	47	20
Lane Flow Rate	393	290	337	249
Geometry Grp	1	1	1	1
Degree of Util (X)	0.753	0.58	0.659	0.506
Departure Headway (Hd)	6.894	7.214	7.033	7.32
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	523	498	513	490
Service Time	4.959	5.285	5.1	5.395
HCM Lane V/C Ratio	0.751	0.582	0.657	0.508
HCM Control Delay	28.2	19.9	22.8	17.7
HCM Lane LOS	D	C	C	C
HCM 95th-tile Q	6.5	3.6	4.8	2.8

HCM 6th Signalized Intersection Summary
11: Webster St & Lincoln Ave

Central Avenue Safety Improvement
09/07/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	339	66	26	503	289	47	418	26	394	313	87
Future Volume (veh/h)	190	339	66	26	503	289	47	418	26	394	313	87
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	0.99		0.98	0.99		0.97	0.99		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1885	1885	1885	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	247	440	86	32	621	357	51	454	28	469	373	104
Peak Hour Factor	0.77	0.77	0.77	0.81	0.81	0.81	0.92	0.92	0.92	0.84	0.84	0.84
Percent Heavy Veh, %	3	3	3	1	1	1	2	2	2	2	2	2
Cap, veh/h	264	1370	266	446	1015	583	117	1025	69	347	509	142
Arrive On Green	0.47	0.47	0.47	0.47	0.47	0.47	0.13	0.13	0.13	0.40	0.40	0.40
Sat Flow, veh/h	569	2935	569	878	2175	1250	114	2563	173	567	1271	355
Grp Volume(v), veh/h	247	263	263	32	511	467	263	0	270	469	0	477
Grp Sat Flow(s),veh/h/ln	569	1763	1741	878	1791	1634	1184	0	1665	567	0	1626
Q Serve(g_s), s	15.2	5.6	5.7	1.4	12.8	12.8	0.4	0.0	8.9	15.1	0.0	14.9
Cycle Q Clear(g_c), s	28.0	5.6	5.7	7.1	12.8	12.8	15.4	0.0	8.9	24.0	0.0	14.9
Prop In Lane	1.00		0.33	1.00		0.77	0.19		0.10	1.00		0.22
Lane Grp Cap(c), veh/h	264	823	813	446	836	763	545	0	666	347	0	650
V/C Ratio(X)	0.93	0.32	0.32	0.07	0.61	0.61	0.48	0.00	0.41	1.35	0.00	0.73
Avail Cap(c_a), veh/h	264	823	813	446	836	763	545	0	666	347	0	650
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.41	0.41	0.41	0.99	0.00	0.99	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.6	10.0	10.1	12.3	11.9	11.9	19.1	0.0	19.5	25.1	0.0	15.3
Incr Delay (d2), s/veh	37.7	0.1	0.1	0.0	0.4	0.4	3.0	0.0	1.8	176.6	0.0	7.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	1.9	1.9	0.3	4.5	4.1	4.0	0.0	4.1	21.9	0.0	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.2	10.1	10.1	12.3	12.3	12.4	22.1	0.0	21.3	201.7	0.0	22.5
LnGrp LOS	E	B	B	B	B	B	C	A	C	F	A	C
Approach Vol, veh/h		773			1010			533				946
Approach Delay, s/veh		27.1			12.4			21.7				111.3
Approach LOS		C			B			C				F
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		28.0		32.0		28.0		32.0				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		24.0		28.0		24.0		28.0				
Max Q Clear Time (g_c+I1), s		17.4		30.0		26.0		14.8				
Green Ext Time (p_c), s		1.1		0.0		0.0		3.3				
Intersection Summary												
HCM 6th Ctrl Delay				46.1								
HCM 6th LOS				D								

HCM 6th Signalized Intersection Summary
 12: 8th St/Constitution Way & Lincoln Ave

Central Avenue Safety Improvement
 09/07/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	388	202	19	546	239	195	516	22	201	192	11
Future Volume (veh/h)	26	388	202	19	546	239	195	516	22	201	192	11
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.95	1.00		0.94
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1885	1885	1885	1870	1870	1870	1856	1856	1856
Adj Flow Rate, veh/h	34	504	262	24	682	299	207	549	23	254	243	14
Peak Hour Factor	0.77	0.77	0.77	0.80	0.80	0.80	0.94	0.94	0.94	0.79	0.79	0.79
Percent Heavy Veh, %	3	3	3	1	1	1	2	2	2	3	3	3
Cap, veh/h	59	566	375	58	772	358	244	688	30	701	354	20
Arrive On Green	0.36	0.36	0.36	0.36	0.36	0.36	0.26	0.26	0.26	0.20	0.20	0.20
Sat Flow, veh/h	30	1570	1039	31	2141	994	930	2623	114	3428	1730	100
Grp Volume(v), veh/h	424	0	376	549	0	456	406	0	373	254	0	257
Grp Sat Flow(s),veh/h/ln	1146	0	1493	1651	0	1516	1824	0	1842	1714	0	1829
Q Serve(g_s), s	6.8	0.0	17.2	8.5	0.0	22.0	16.9	0.0	15.0	5.1	0.0	10.4
Cycle Q Clear(g_c), s	28.8	0.0	17.2	25.8	0.0	22.0	16.9	0.0	15.0	5.1	0.0	10.4
Prop In Lane	0.08		0.70	0.04		0.66	0.51		0.06	1.00		0.05
Lane Grp Cap(c), veh/h	462	0	538	642	0	546	479	0	483	701	0	374
V/C Ratio(X)	0.92	0.00	0.70	0.86	0.00	0.83	0.85	0.00	0.77	0.36	0.00	0.69
Avail Cap(c_a), veh/h	462	0	538	642	0	546	520	0	526	961	0	513
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.9	0.0	21.8	24.0	0.0	23.4	28.0	0.0	27.3	27.3	0.0	29.4
Incr Delay (d2), s/veh	22.8	0.0	3.4	10.5	0.0	10.1	10.8	0.0	5.6	0.1	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.8	0.0	6.3	11.5	0.0	9.0	8.6	0.0	7.2	2.1	0.0	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.6	0.0	25.2	34.5	0.0	33.5	38.8	0.0	32.8	27.4	0.0	30.3
LnGrp LOS	D	A	C	C	A	C	D	A	C	C	A	C
Approach Vol, veh/h		800			1005			779			511	
Approach Delay, s/veh		36.6			34.0			35.9			28.9	
Approach LOS		D			C			D			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		25.6		33.4		20.9		33.4				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		22.8		28.8		22.4		28.8				
Max Q Clear Time (g_c+I1), s		18.9		30.8		12.4		27.8				
Green Ext Time (p_c), s		1.2		0.0		0.9		0.4				
Intersection Summary												
HCM 6th Ctrl Delay				34.3								
HCM 6th LOS				C								
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 6th Signalized Intersection Summary
13: Sherman St & Lincoln Ave

Central Avenue Safety Improvement
09/07/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	478	53	10	557	67	66	304	15	47	159	39
Future Volume (veh/h)	36	478	53	10	557	67	66	304	15	47	159	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.96	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	569	63	14	774	93	78	358	18	63	212	52
Peak Hour Factor	0.84	0.84	0.84	0.72	0.72	0.72	0.85	0.85	0.85	0.75	0.75	0.75
Percent Heavy Veh, %	0	0	0	0	0	0	2	2	2	2	2	2
Cap, veh/h	265	1310	145	76	1257	149	165	632	30	170	523	116
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.43	0.43	0.43	0.43	0.43	0.43
Sat Flow, veh/h	647	3264	360	19	3130	372	199	1453	68	208	1201	267
Grp Volume(v), veh/h	43	314	318	470	0	411	454	0	0	327	0	0
Grp Sat Flow(s),veh/h/ln	647	1805	1819	1875	0	1646	1721	0	0	1676	0	0
Q Serve(g_s), s	3.1	6.8	6.8	0.0	0.0	10.7	3.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	13.8	6.8	6.8	10.6	0.0	10.7	10.3	0.0	0.0	6.7	0.0	0.0
Prop In Lane	1.00		0.20	0.03		0.23	0.17		0.04	0.19		0.16
Lane Grp Cap(c), veh/h	265	725	730	822	0	661	827	0	0	809	0	0
V/C Ratio(X)	0.16	0.43	0.44	0.57	0.00	0.62	0.55	0.00	0.00	0.40	0.00	0.00
Avail Cap(c_a), veh/h	265	725	730	822	0	661	827	0	0	809	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	18.3	11.7	11.7	12.8	0.0	12.8	11.4	0.0	0.0	10.5	0.0	0.0
Incr Delay (d2), s/veh	1.3	1.9	1.9	2.9	0.0	4.4	2.6	0.0	0.0	1.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	2.8	2.8	4.6	0.0	4.2	4.1	0.0	0.0	2.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.7	13.5	13.6	15.7	0.0	17.2	14.0	0.0	0.0	12.0	0.0	0.0
LnGrp LOS	B	B	B	B	A	B	B	A	A	B	A	A
Approach Vol, veh/h		675			881			454			327	
Approach Delay, s/veh		13.9			16.4			14.0			12.0	
Approach LOS		B			B			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		25.8		28.0		25.8		28.0				
Change Period (Y+Rc), s		* 4.2		4.6		* 4.2		4.6				
Max Green Setting (Gmax), s		* 22		23.4		* 22		23.4				
Max Q Clear Time (g_c+I1), s		15.8		12.3		12.7		8.7				
Green Ext Time (p_c), s		2.2		2.3		3.9		1.9				
Intersection Summary												
HCM 6th Ctrl Delay				14.6								
HCM 6th LOS				B								
Notes												
User approved pedestrian interval to be less than phase max green.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

Intersection					
Intersection Delay, s/veh	6.1				
Intersection LOS	A				
Approach	EB	WB	NB	SB	
Entry Lanes	1	1	1	2	
Conflicting Circle Lanes	1	1	1	1	
Adj Approach Flow, veh/h	199	130	269	604	
Demand Flow Rate, veh/h	199	132	271	604	
Vehicles Circulating, veh/h	525	410	351	31	
Vehicles Exiting, veh/h	110	212	373	500	
Ped Vol Crossing Leg, #/h	11	3	5	0	
Ped Cap Adj	0.998	1.000	0.999	1.000	
Approach Delay, s/veh	7.2	5.5	6.6	5.6	
Approach LOS	A	A	A	A	
Lane	Left	Left	Left	Left	Right
Designated Moves	LTR	LTR	LTR	LT	R
Assumed Moves	LTR	LTR	LTR	LT	R
RT Channelized					
Lane Util	1.000	1.000	1.000	0.859	0.141
Follow-Up Headway, s	2.609	2.609	2.609	2.535	2.535
Critical Headway, s	4.976	4.976	4.976	4.544	4.544
Entry Flow, veh/h	199	132	271	519	85
Cap Entry Lane, veh/h	808	908	965	1381	1381
Entry HV Adj Factor	1.000	0.982	0.991	1.000	1.000
Flow Entry, veh/h	199	130	269	519	85
Cap Entry, veh/h	807	891	956	1381	1381
V/C Ratio	0.247	0.145	0.281	0.376	0.062
Control Delay, s/veh	7.2	5.5	6.6	6.0	3.1
LOS	A	A	A	A	A
95th %tile Queue, veh	1	1	1	2	0

Intersection

Intersection Delay, s/veh

Intersection LOS

Approach	SW
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Entry Lanes	0
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Conflicting Circle Lanes	1
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Adj Approach Flow, veh/h	0
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Demand Flow Rate, veh/h	0
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Vehicles Circulating, veh/h	531
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Vehicles Exiting, veh/h	11
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Ped Vol Crossing Leg, #/h	0
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Ped Cap Adj	1.000
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Approach Delay, s/veh	0.0
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Approach LOS	-
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Lane

Designated Moves

Assumed Moves

RT Channelized

Lane Util

Follow-Up Headway, s

Critical Headway, s

Entry Flow, veh/h

Cap Entry Lane, veh/h

Entry HV Adj Factor

Flow Entry, veh/h

Cap Entry, veh/h

V/C Ratio

Control Delay, s/veh

LOS

95th %tile Queue, veh

Intersection					
Intersection Delay, s/veh	6.2				
Intersection LOS	A				
Approach	EB	WB	NB	SB	
Entry Lanes	1	1	1	1	
Conflicting Circle Lanes	1	1	1	1	
Adj Approach Flow, veh/h	431	326	184	160	
Demand Flow Rate, veh/h	435	326	184	160	
Vehicles Circulating, veh/h	205	73	531	297	
Vehicles Exiting, veh/h	252	642	109	108	
Ped Vol Crossing Leg, #/h	23	0	23	13	
Ped Cap Adj	0.997	1.000	0.997	0.998	
Approach Delay, s/veh	7.3	5.0	7.0	5.0	
Approach LOS	A	A	A	A	
Lane	Left	Left	Bypass	Left	Left
Designated Moves	LTR	LTR	R	LTR	LTR
Assumed Moves	LTR	LTR	R	LTR	LTR
RT Channelized	Free				
Lane Util	1.000	1.000		1.000	1.000
Follow-Up Headway, s	2.609	2.609		2.609	2.609
Critical Headway, s	4.976	4.976	2	4.976	4.976
Entry Flow, veh/h	435	324	1900	184	160
Cap Entry Lane, veh/h	1120	1281	1.000	803	1019
Entry HV Adj Factor	0.991	1.000	2	1.000	1.000
Flow Entry, veh/h	431	324	1900	184	160
Cap Entry, veh/h	1105	1281	0.001	800	1017
V/C Ratio	0.390	0.253	0.0	0.230	0.157
Control Delay, s/veh	7.3	5.0	A	7.0	5.0
LOS	A	A	0	A	A
95th %tile Queue, veh	2	1		1	1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	
Approach	SW
Entry Lanes	1
Conflicting Circle Lanes	1
Adj Approach Flow, veh/h	20
Demand Flow Rate, veh/h	20
Vehicles Circulating, veh/h	385
Vehicles Exiting, veh/h	12
Ped Vol Crossing Leg, #/h	4
Ped Cap Adj	0.999
Approach Delay, s/veh	4.1
Approach LOS	A
Lane	Left
Designated Moves	LR
Assumed Moves	LR
RT Channelized	
Lane Util	1.000
Follow-Up Headway, s	2.609
Critical Headway, s	4.976
Entry Flow, veh/h	20
Cap Entry Lane, veh/h	932
Entry HV Adj Factor	1.000
Flow Entry, veh/h	20
Cap Entry, veh/h	931
V/C Ratio	0.021
Control Delay, s/veh	4.1
LOS	A
95th %tile Queue, veh	0

Intersection				
Intersection Delay, s/veh	6.4			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	465	445	144	72
Demand Flow Rate, veh/h	470	445	144	72
Vehicles Circulating, veh/h	194	38	424	443
Vehicles Exiting, veh/h	321	530	240	40
Ped Vol Crossing Leg, #/h	16	7	30	9
Ped Cap Adj	0.998	0.999	0.996	0.999
Approach Delay, s/veh	7.6	5.8	5.6	4.9
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	470	445	144	72
Cap Entry Lane, veh/h	1132	1327	895	878
Entry HV Adj Factor	0.989	1.000	1.000	1.000
Flow Entry, veh/h	465	445	144	72
Cap Entry, veh/h	1118	1326	892	877
V/C Ratio	0.416	0.336	0.161	0.082
Control Delay, s/veh	7.6	5.8	5.6	4.9
LOS	A	A	A	A
95th %tile Queue, veh	2	1	1	0

Intersection	
Intersection Delay, s/veh	19.7
Intersection LOS	C

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗		↖	↗
Traffic Vol, veh/h	43	414	373	70	46	133
Future Vol, veh/h	43	414	373	70	46	133
Peak Hour Factor	0.89	0.89	0.97	0.97	0.74	0.74
Heavy Vehicles, %	1	1	0	0	1	1
Mvmt Flow	48	465	385	72	62	180
Number of Lanes	1	1	1	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	2
HCM Control Delay	23	19.6	12.9
HCM LOS	C	C	B

Lane	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	0%	26%
Vol Thru, %	0%	100%	84%	0%
Vol Right, %	0%	0%	16%	74%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	43	414	443	179
LT Vol	43	0	0	46
Through Vol	0	414	373	0
RT Vol	0	0	70	133
Lane Flow Rate	48	465	457	242
Geometry Grp	7	7	5	2
Degree of Util (X)	0.085	0.754	0.688	0.399
Departure Headway (Hd)	6.339	5.832	5.421	5.936
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	564	619	667	605
Service Time	4.086	3.579	3.471	3.999
HCM Lane V/C Ratio	0.085	0.751	0.685	0.4
HCM Control Delay	9.7	24.4	19.6	12.9
HCM Lane LOS	A	C	C	B
HCM 95th-tile Q	0.3	6.8	5.5	1.9

HCM Signalized Intersection Capacity Analysis
5: Central Ave & Webster St

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	63	474	4	36	401	270	18	47	40	684	30	86	
Future Volume (vph)	63	474	4	36	401	270	18	47	40	684	30	86	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	10	11	12	11	11	11	12	12	12	12	12	12	
Total Lost time (s)	4.8	4.8		4.8	4.8			4.6		4.6	4.6		
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00		
Frpb, ped/bikes	1.00	1.00		1.00	0.96			0.97		1.00	0.86		
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.98		0.97	1.00		
Fr t	1.00	1.00		1.00	0.94			0.95		1.00	0.89		
Fl t Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00		
Satd. Flow (prot)	1652	1797		1711	1622			1652		1722	1420		
Fl t Permitted	0.12	1.00		0.12	1.00			0.94		0.58	1.00		
Satd. Flow (perm)	215	1797		225	1622			1559		1046	1420		
Peak-hour factor, PHF	0.83	0.83	0.83	0.90	0.90	0.90	0.74	0.74	0.74	0.94	0.94	0.94	
Adj. Flow (vph)	76	571	5	40	446	300	24	64	54	728	32	91	
RTOR Reduction (vph)	0	0	0	0	27	0	0	0	0	0	74	0	
Lane Group Flow (vph)	76	576	0	40	719	0	0	142	0	728	49	0	
Confl. Peds. (#/hr)	67		32	32		67	59		36	36		59	
Confl. Bikes (#/hr)			10			6			3			6	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA		
Protected Phases		4			8			2		5	6		
Permitted Phases	4			8			2			6			
Actuated Green, G (s)	32.4	32.4		36.2	36.2			16.9		39.8	16.9		
Effective Green, g (s)	32.4	32.4		36.2	36.2			16.9		39.8	16.9		
Actuated g/C Ratio	0.36	0.36		0.40	0.40			0.19		0.44	0.19		
Clearance Time (s)	4.8	4.8		4.8	4.8			4.6		4.6	4.6		
Vehicle Extension (s)	2.4	2.4		2.4	2.4			2.5		2.5	2.5		
Lane Grp Cap (vph)	77	646		90	652			292		634	266		
v/s Ratio Prot		0.32			c0.44					c0.29	0.03		
v/s Ratio Perm	0.35			0.18				0.09		c0.22			
v/c Ratio	0.99	0.89		0.44	1.10			0.49		1.15	0.18		
Uniform Delay, d1	28.6	27.1		19.6	26.9			32.7		25.9	30.8		
Progression Factor	1.00	1.00		0.56	0.63			1.00		1.00	1.00		
Incremental Delay, d2	99.0	17.0		7.3	57.5			0.9		84.2	0.2		
Delay (s)	127.6	44.1		18.4	74.6			33.6		110.1	31.0		
Level of Service	F	D		B	E			C		F	C		
Approach Delay (s)		53.9			71.7			33.6			98.6		
Approach LOS		D			E			C			F		
Intersection Summary													
HCM 2000 Control Delay			74.1									HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			1.16										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	16.0
Intersection Capacity Utilization			100.1%									ICU Level of Service	G
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
6: 8th St & Central Ave

Central Avenue Safety Improvement

09/07/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	500	694	26	436	97	276	478	14	48	442	10
Future Volume (vph)	14	500	694	26	436	97	276	478	14	48	442	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	11	11	10	11	12	12	12	12	12	12	12
Total Lost time (s)	4.6	4.6	4.6	4.5	4.6		4.6	4.6		4.6	4.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Fr t	1.00	1.00	0.85	1.00	0.97		1.00	1.00		1.00	1.00	
Fl t Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1627	1801	1531	1652	1736		1770	1853		1766	1853	
Fl t Permitted	0.27	1.00	1.00	0.95	1.00		0.95	1.00		0.16	1.00	
Satd. Flow (perm)	466	1801	1531	1652	1736		1770	1853		300	1853	
Peak-hour factor, PHF	0.78	0.78	0.78	0.91	0.91	0.91	0.85	0.85	0.85	0.96	0.96	0.96
Adj. Flow (vph)	18	641	890	29	479	107	325	562	16	50	460	10
RTOR Reduction (vph)	0	0	0	0	11	0	0	0	0	0	1	0
Lane Group Flow (vph)	18	641	890	29	575	0	325	578	0	50	469	0
Confl. Peds. (#/hr)	19		18	18		19	40		4	4		40
Confl. Bikes (#/hr)			12			3			11			5
Turn Type	custom	NA	custom	Prot	NA		Prot	NA		Perm	NA	
Protected Phases		2 6	7 2	5	1		7	4				8
Permitted Phases	6										8	
Actuated Green, G (s)	14.7	26.8	30.2	2.0	33.3		18.1	42.0		24.8	24.8	
Effective Green, g (s)	14.7	26.8	30.2	2.0	33.3		18.1	42.0		24.8	24.8	
Actuated g/C Ratio	0.16	0.30	0.34	0.02	0.37		0.20	0.47		0.28	0.28	
Clearance Time (s)	4.6			4.5	4.6		4.6	4.6		4.6	4.6	
Vehicle Extension (s)	1.0			3.0	1.0		1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	76	536	513	36	642		355	864		82	510	
v/s Ratio Prot		c0.36	c0.58	0.02	c0.33		0.18	0.31			c0.25	
v/s Ratio Perm	0.04									0.17		
v/c Ratio	0.24	1.20	1.73	0.81	0.90		0.92	0.67		0.61	0.92	
Uniform Delay, d1	32.8	31.6	29.9	43.8	26.7		35.2	18.6		28.4	31.6	
Progression Factor	1.02	1.05	0.99	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	96.9	334.5	75.6	17.6		26.9	1.5		8.5	21.7	
Delay (s)	33.7	130.2	364.0	119.4	44.3		62.1	20.1		36.9	53.3	
Level of Service	C	F	F	F	D		E	C		D	D	
Approach Delay (s)		263.4			47.8			35.3			51.8	
Approach LOS		F			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			138.3				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.48									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			22.9		
Intersection Capacity Utilization			84.3%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Intersection				
Intersection Delay, s/veh	11.6			
Intersection LOS	B			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	0	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	660	322	0	262
Demand Flow Rate, veh/h	672	329	0	268
Vehicles Circulating, veh/h	315	554	822	777
Vehicles Exiting, veh/h	730	197	165	106
Ped Vol Crossing Leg, #/h	0	11	8	14
Ped Cap Adj	1.000	0.998	1.000	0.998
Approach Delay, s/veh	14.2	10.1	0.0	12.4
Approach LOS	B	B	-	B
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	672	329	268	268
Cap Entry Lane, veh/h	1001	784	625	625
Entry HV Adj Factor	0.982	0.980	0.980	0.980
Flow Entry, veh/h	660	322	263	263
Cap Entry, veh/h	982	767	611	611
V/C Ratio	0.672	0.420	0.430	0.430
Control Delay, s/veh	14.2	10.1	12.4	12.4
LOS	B	B	B	B
95th %tile Queue, veh	5	2	2	2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	
Approach	NW
Entry Lanes	1
Conflicting Circle Lanes	1
Adj Approach Flow, veh/h	537
Demand Flow Rate, veh/h	547
Vehicles Circulating, veh/h	204
Vehicles Exiting, veh/h	618
Ped Vol Crossing Leg, #/h	8
Ped Cap Adj	0.999
Approach Delay, s/veh	8.8
Approach LOS	A
Lane	Left
Designated Moves	LR
Assumed Moves	LR
RT Channelized	
Lane Util	1.000
Follow-Up Headway, s	2.609
Critical Headway, s	4.976
Entry Flow, veh/h	547
Cap Entry Lane, veh/h	1121
Entry HV Adj Factor	0.981
Flow Entry, veh/h	537
Cap Entry, veh/h	1099
V/C Ratio	0.489
Control Delay, s/veh	8.8
LOS	A
95th %tile Queue, veh	3

HCM Signalized Intersection Capacity Analysis
8: Webster St & Santa Clara Ave

Central Avenue Safety Improvement

09/07/2020

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	18	58	14	25	71	62	14	260	27	73	602	46	
Future Volume (vph)	18	58	14	25	71	62	14	260	27	73	602	46	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0			4.0			4.4			4.4		
Lane Util. Factor		1.00			1.00			0.95			0.95		
Frpb, ped/bikes		0.99			0.98			0.99			0.99		
Flpb, ped/bikes		1.00			1.00			1.00			1.00		
Frt		0.98			0.95			0.99			0.99		
Flt Protected		0.99			0.99			1.00			0.99		
Satd. Flow (prot)		1731			1661			3452			3455		
Flt Permitted		0.93			0.94			0.92			0.88		
Satd. Flow (perm)		1620			1579			3183			3057		
Peak-hour factor, PHF	0.77	0.77	0.77	0.88	0.88	0.88	0.87	0.87	0.87	0.96	0.96	0.96	
Adj. Flow (vph)	23	75	18	28	81	70	16	299	31	76	627	48	
RTOR Reduction (vph)	0	12	0	0	43	0	0	7	0	0	7	0	
Lane Group Flow (vph)	0	104	0	0	136	0	0	339	0	0	744	0	
Confl. Peds. (#/hr)	43		40	40		43	60		70	70		60	
Confl. Bikes (#/hr)			9			3			5			3	
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	2%	2%	2%	2%	2%	2%	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA		
Protected Phases		4			8			6		5	2		
Permitted Phases	4			8			6			2			
Actuated Green, G (s)		13.6			13.6			38.0			38.0		
Effective Green, g (s)		13.6			13.6			38.0			38.0		
Actuated g/C Ratio		0.23			0.23			0.63			0.63		
Clearance Time (s)		4.0			4.0			4.4			4.4		
Vehicle Extension (s)		1.8			1.8			2.0			2.0		
Lane Grp Cap (vph)		367			357			2015			1936		
v/s Ratio Prot													
v/s Ratio Perm		0.06			0.09			0.11			0.24		
v/c Ratio		0.28			0.38			0.17			0.38		
Uniform Delay, d1		19.2			19.6			4.5			5.3		
Progression Factor		1.00			1.00			1.00			0.31		
Incremental Delay, d2		0.2			0.2			0.2			0.0		
Delay (s)		19.3			19.9			4.7			1.7		
Level of Service		B			B			A			A		
Approach Delay (s)		19.3			19.9			4.7			1.7		
Approach LOS		B			B			A			A		
Intersection Summary													
HCM 2000 Control Delay			6.2									HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.42										
Actuated Cycle Length (s)			60.0									Sum of lost time (s)	12.4
Intersection Capacity Utilization			77.6%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

HCM 6th Signalized Intersection Summary
9: 8th St & Santa Clara Ave

Central Avenue Safety Improvement
09/07/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	161	13	7	132	67	11	485	27	48	407	18
Future Volume (veh/h)	22	161	13	7	132	67	11	485	27	48	407	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.91	0.97		0.93	1.00		0.95	1.00		0.95
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1826	1826	1826	1900	1900	1900	1885	1885	1885
Adj Flow Rate, veh/h	24	175	14	8	142	72	13	564	31	57	485	21
Peak Hour Factor	0.92	0.92	0.92	0.93	0.93	0.93	0.86	0.86	0.86	0.84	0.84	0.84
Percent Heavy Veh, %	5	5	5	5	5	5	0	0	0	1	1	1
Cap, veh/h	78	486	37	48	356	174	50	1013	55	113	896	37
Arrive On Green	0.32	0.32	0.32	0.32	0.32	0.32	0.58	0.58	0.58	0.58	0.58	0.58
Sat Flow, veh/h	103	1509	113	20	1106	540	15	1750	95	117	1549	65
Grp Volume(v), veh/h	213	0	0	222	0	0	608	0	0	563	0	0
Grp Sat Flow(s),veh/h/ln	1725	0	0	1666	0	0	1860	0	0	1730	0	0
Q Serve(g_s), 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
Cycle Q Clear(g_c), s	8.1	0.0	0.0	9.2	0.0	0.0	17.9	0.0	0.0	16.1	0.0	0.0
Prop In Lane	0.11		0.07	0.04		0.32	0.02		0.05	0.10		0.04
Lane Grp Cap(c), veh/h	601	0	0	578	0	0	1118	0	0	1046	0	0
V/C Ratio(X)	0.35	0.00	0.00	0.38	0.00	0.00	0.54	0.00	0.00	0.54	0.00	0.00
Avail Cap(c_a), veh/h	601	0	0	578	0	0	1118	0	0	1046	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	23.2	0.0	0.0	23.5	0.0	0.0	11.7	0.0	0.0	11.3	0.0	0.0
Incr Delay (d2), s/veh	1.6	0.0	0.0	1.9	0.0	0.0	1.9	0.0	0.0	2.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	0.0	3.9	0.0	0.0	7.5	0.0	0.0	6.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.8	0.0	0.0	25.4	0.0	0.0	13.6	0.0	0.0	13.3	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	B	A	A	B	A	A
Approach Vol, veh/h		213			222			608				563
Approach Delay, s/veh		24.8			25.4			13.6				13.3
Approach LOS		C			C			B				B
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		32.8		56.0		32.8		56.0				
Change Period (Y+Rc), s		* 4.2		4.6		* 4.2		4.6				
Max Green Setting (Gmax), s		* 29		51.4		* 29		51.4				
Max Q Clear Time (g_c+I1), s		10.1		19.9		11.2		18.1				
Green Ext Time (p_c), s		1.2		5.0		1.2		4.8				
Intersection Summary												
HCM 6th Ctrl Delay				16.6								
HCM 6th LOS				B								
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

Intersection	
Intersection Delay, s/veh	20.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	19	254	31	10	213	33	16	144	5	92	260	31
Future Vol, veh/h	19	254	31	10	213	33	16	144	5	92	260	31
Peak Hour Factor	0.84	0.84	0.84	0.90	0.90	0.90	0.91	0.91	0.91	0.98	0.98	0.98
Heavy Vehicles, %	3	3	3	3	3	3	0	0	0	0	0	0
Mvmt Flow	23	302	37	11	237	37	18	158	5	94	265	32
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	21.5	17.5	14.2	23.9
HCM LOS	C	C	B	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	10%	6%	4%	24%
Vol Thru, %	87%	84%	83%	68%
Vol Right, %	3%	10%	13%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	165	304	256	383
LT Vol	16	19	10	92
Through Vol	144	254	213	260
RT Vol	5	31	33	31
Lane Flow Rate	181	362	284	391
Geometry Grp	1	1	1	1
Degree of Util (X)	0.361	0.657	0.538	0.706
Departure Headway (Hd)	7.176	6.648	6.81	6.609
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	502	546	532	551
Service Time	5.194	4.648	4.81	4.609
HCM Lane V/C Ratio	0.361	0.663	0.534	0.71
HCM Control Delay	14.2	21.5	17.5	23.9
HCM Lane LOS	B	C	C	C
HCM 95th-tile Q	1.6	4.8	3.2	5.6

HCM 6th Signalized Intersection Summary
11: Webster St & Lincoln Ave

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	87	351	47	56	288	502	6	299	63	434	646	198
Future Volume (veh/h)	87	351	47	56	288	502	6	299	63	434	646	198
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.97	0.99		0.98	1.00		0.97	0.98		0.96
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1900	1900	1900	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	93	373	50	64	331	577	6	318	67	462	687	211
Peak Hour Factor	0.94	0.94	0.94	0.87	0.87	0.87	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	0	0	0	2	2	2	2	2	2
Cap, veh/h	137	1212	161	411	692	604	63	1236	272	424	657	217
Arrive On Green	0.38	0.38	0.38	0.38	0.38	0.38	0.16	0.16	0.16	0.48	0.48	0.48
Sat Flow, veh/h	617	3163	420	969	1805	1575	3	2557	562	660	1359	449
Grp Volume(v), veh/h	93	210	213	64	331	577	203	0	188	610	0	750
Grp Sat Flow(s),veh/h/ln	617	1791	1792	969	1805	1575	1544	0	1578	871	0	1596
Q Serve(g_s), s	1.6	4.9	5.0	3.0	8.3	21.4	0.2	0.0	6.3	22.7	0.0	27.5
Cycle Q Clear(g_c), s	23.0	4.9	5.0	8.0	8.3	21.4	27.7	0.0	6.3	29.0	0.0	27.5
Prop In Lane	1.00		0.23	1.00		1.00	0.03		0.36	0.76		0.28
Lane Grp Cap(c), veh/h	137	687	687	411	692	604	808	0	763	527	0	772
V/C Ratio(X)	0.68	0.31	0.31	0.16	0.48	0.96	0.25	0.00	0.25	1.16	0.00	0.97
Avail Cap(c_a), veh/h	137	687	687	411	692	604	808	0	763	527	0	772
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.68	0.68	0.68	0.99	0.00	0.99	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.9	12.9	12.9	15.7	14.0	18.0	15.5	0.0	15.7	20.9	0.0	15.1
Incr Delay (d2), s/veh	12.1	0.2	0.2	0.1	0.3	20.2	0.7	0.0	0.8	91.0	0.0	26.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	1.8	1.9	0.6	3.1	10.3	2.6	0.0	2.4	20.7	0.0	14.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.9	13.1	13.1	15.8	14.2	38.2	16.2	0.0	16.4	111.9	0.0	41.3
LnGrp LOS	D	B	B	B	B	D	B	A	B	F	A	D
Approach Vol, veh/h		516			972			391			1360	
Approach Delay, s/veh		18.3			28.5			16.3			73.0	
Approach LOS		B			C			B			E	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		33.0		27.0		33.0		27.0				
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0				
Max Green Setting (Gmax), s		29.0		23.0		29.0		23.0				
Max Q Clear Time (g_c+I1), s		29.7		25.0		31.0		23.4				
Green Ext Time (p_c), s		0.0		0.0		0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				44.1								
HCM 6th LOS				D								
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 6th Signalized Intersection Summary
12: 8th St/Constitution Way & Lincoln Ave

Central Avenue Safety Improvement

09/07/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	533	218	17	421	176	255	352	30	736	442	29
Future Volume (veh/h)	33	533	218	17	421	176	255	352	30	736	442	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.99	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1900	1900	1900	1900	1900	1900	1885	1885	1885
Adj Flow Rate, veh/h	37	592	242	18	448	187	307	424	36	827	497	33
Peak Hour Factor	0.90	0.90	0.90	0.94	0.94	0.94	0.83	0.83	0.83	0.89	0.89	0.89
Percent Heavy Veh, %	1	1	1	0	0	0	0	0	0	1	1	1
Cap, veh/h	60	614	283	46	600	295	342	510	44	1045	524	35
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	0.24	0.24	0.24	0.30	0.30	0.30
Sat Flow, veh/h	61	1974	910	18	1927	947	1409	2099	182	3483	1746	116
Grp Volume(v), veh/h	471	0	400	348	0	305	399	0	368	827	0	530
Grp Sat Flow(s),veh/h/ln	1441	0	1503	1349	0	1543	1830	0	1860	1742	0	1862
Q Serve(g_s), s	13.4	0.0	23.6	2.0	0.0	16.0	19.9	0.0	17.7	20.6	0.0	26.3
Cycle Q Clear(g_c), s	29.4	0.0	23.6	25.6	0.0	16.0	19.9	0.0	17.7	20.6	0.0	26.3
Prop In Lane	0.08		0.61	0.05		0.61	0.77		0.10	1.00		0.06
Lane Grp Cap(c), veh/h	489	0	468	460	0	480	444	0	452	1045	0	559
V/C Ratio(X)	0.96	0.00	0.85	0.76	0.00	0.63	0.90	0.00	0.82	0.79	0.00	0.95
Avail Cap(c_a), veh/h	489	0	468	460	0	480	468	0	476	1047	0	560
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.2	0.0	30.5	27.9	0.0	27.9	34.6	0.0	33.8	30.4	0.0	32.4
Incr Delay (d2), s/veh	31.1	0.0	13.7	6.4	0.0	2.1	18.4	0.0	9.3	3.8	0.0	25.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.1	0.0	10.2	7.4	0.0	6.1	11.0	0.0	9.1	9.1	0.0	15.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.3	0.0	44.3	34.3	0.0	30.1	53.0	0.0	43.0	34.2	0.0	57.8
LnGrp LOS	E	A	D	C	A	C	D	A	D	C	A	E
Approach Vol, veh/h		871			653			767			1357	
Approach Delay, s/veh		55.1			32.3			48.2			43.4	
Approach LOS		E			C			D			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		27.5		34.0		33.0		34.0				
Change Period (Y+Rc), s		4.6		4.6		4.6		4.6				
Max Green Setting (Gmax), s		24.2		29.4		28.4		29.4				
Max Q Clear Time (g_c+I1), s		21.9		31.4		28.3		27.6				
Green Ext Time (p_c), s		0.7		0.0		0.0		0.4				
Intersection Summary												
HCM 6th Ctrl Delay				45.2								
HCM 6th LOS				D								
Notes												
User approved pedestrian interval to be less than phase max green.												

HCM 6th Signalized Intersection Summary
13: Sherman St & Lincoln Ave

Central Avenue Safety Improvement
09/07/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	820	109	10	632	36	28	164	16	166	285	47
Future Volume (veh/h)	52	820	109	10	632	36	28	164	16	166	285	47
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		0.97	0.99		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1885	1885	1885	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	55	863	115	12	761	43	34	200	20	193	331	55
Peak Hour Factor	0.95	0.95	0.95	0.83	0.83	0.83	0.82	0.82	0.82	0.86	0.86	0.86
Percent Heavy Veh, %	0	0	0	1	1	1	0	0	0	0	0	0
Cap, veh/h	249	1152	154	75	1199	67	139	720	67	311	468	72
Arrive On Green	0.36	0.36	0.36	0.36	0.36	0.36	0.48	0.48	0.48	0.48	0.48	0.48
Sat Flow, veh/h	686	3195	426	16	3325	186	133	1514	141	466	983	152
Grp Volume(v), veh/h	55	487	491	428	0	388	254	0	0	579	0	0
Grp Sat Flow(s),veh/h/ln	686	1805	1816	1848	0	1679	1788	0	0	1601	0	0
Q Serve(g_s), s	3.9	12.7	12.7	0.0	0.0	10.3	0.0	0.0	0.0	11.0	0.0	0.0
Cycle Q Clear(g_c), s	14.2	12.7	12.7	10.1	0.0	10.3	4.4	0.0	0.0	15.4	0.0	0.0
Prop In Lane	1.00		0.23	0.03		0.11	0.13		0.08	0.33		0.09
Lane Grp Cap(c), veh/h	249	651	655	735	0	605	926	0	0	851	0	0
V/C Ratio(X)	0.22	0.75	0.75	0.58	0.00	0.64	0.27	0.00	0.00	0.68	0.00	0.00
Avail Cap(c_a), veh/h	249	651	655	735	0	605	926	0	0	851	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	20.2	15.1	15.1	14.2	0.0	14.3	8.6	0.0	0.0	11.2	0.0	0.0
Incr Delay (d2), s/veh	2.0	7.7	7.7	3.4	0.0	5.1	0.7	0.0	0.0	4.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	6.0	6.0	4.5	0.0	4.3	1.7	0.0	0.0	5.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.2	22.8	22.7	17.6	0.0	19.4	9.3	0.0	0.0	15.6	0.0	0.0
LnGrp LOS	C	C	C	B	A	B	A	A	A	B	A	A
Approach Vol, veh/h		1033			816			254			579	
Approach Delay, s/veh		22.7			18.5			9.3			15.6	
Approach LOS		C			B			A			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		23.6		30.2		23.6		30.2				
Change Period (Y+Rc), s		* 4.2		4.6		* 4.2		4.6				
Max Green Setting (Gmax), s		* 19		25.6		* 19		25.6				
Max Q Clear Time (g_c+I1), s		16.2		6.4		12.3		17.4				
Green Ext Time (p_c), s		2.0		1.5		3.1		2.7				
Intersection Summary												
HCM 6th Ctrl Delay				18.6								
HCM 6th LOS				B								
Notes												
User approved pedestrian interval to be less than phase max green.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

OTM22130

Table B - Selective Accident Rate Calculation

Policy controlling the use of Traffic Accident Surveillance and Analysis System (TASAS) - Transportation Systems Network (TSN) Reports

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2. Reports from TSN are to be used and interpreted by the California Department of Transportation (Caltrans) officials or authorized representative.
3. Electronic versions of these reports may be emailed between Caltrans' employees only using the State computer system.
4. The contents of these reports shall be considered confidential and may be privileged pursuant to 23 U.S.C. Section 409, and are for the sole use of the intended recipient(s). Any unauthorized review, use, disclosure or distribution is prohibited. If you are not the intended recipient, please contact the sender by reply e-mail and destroy all copies of the original message. Do not print, copy or forward.

OTM22130

Table B - Selective Accident Rate Calculation

Report Parameters-

Event ID: 4199054

Request Name: ALA 61 21.267/21.966

Ref Date: 02/27/2020

Request- & Line	L O C	D I R	L S C	Route/Location	Begin Date	End Date	Rate Type	Out Seq	Override Rates			Override ADT		Req. Type	Com- bine?	Excl Ramp?
									Rate	Inj%	Fat%	Main	Cross			
1 1	H	T	I	04 ALA 061 021.267 - 04 ALA 061 021.967	01-JAN-14	31-DEC-18	N	L						N	N	N

Event Log:

Job id is : 141000 Accidents Table B Request ALA 61 21.267/21.966 Submitted by T4YKALEE
04 ALA 061 21.267 - 04 ALA 061 21.967 01/01/2014 TO 12/31/2018

Location Description	Rate Group (RUS)	No. of Accidents / Significance									ADT Main X-St	Total MV+ or MVM	Accident Rates					
		Tot	Fat	Inj	F+I	Multi Veh	Wet	Dark	Pers Kld Inj	Actual			Average					
												Fat	F+I	Tot	Fat	F+I	Tot	
04 ALA 061 021.267 - 04 ALA 061 021.966 0001-0001 2014-01-01 2018-12-31	.700 MI H 25 U 60 mo.	47 H97	0	13	13	36	3	12	0	12.6	16.11	0.000	.81	2.92	0.014	.85	1.98	

Accident Rates expressed as: # of accidents / Million vehicle miles

+ denotes that Million Vehicles (MV) used in accident rates instead (for intersections and ramps).

For Ramps RUS only considers R(Rural) U(Urban)

California Department of Transportation

OTM22215

TSAR - ACCIDENT SUMMARY

Policy controlling the use of Traffic Accident Surveillance and Analysis System (TASAS) - Transportation Systems Network (TSN) Reports

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California Department of Transportation

OTM22215

TSAR - ACCIDENT SUMMARY

REPORT PARAMETERS:

REPORT DATE : 02/27/2020
REFERENCE DATE : 02/27/2020
SUBMITTOR : T4YKALEE
REPORT TITLE : ' ALA 61 21.267/21.966 '
EVENT ID : 4199069

LOCATION CRITERIA:

FROM: 04-ALA-061 021.267 TO: 04-ALA-061 021.967

SELECTION CRITERIA:

1 1 AND 515 - INTRSRAMP ACC LOC NOT IN 6

Accidents Date Range:

From -- 01/01/2014 To -- 12/31/2018

TASAS SELECTIVE RECORD RETRIEVAL
TSAR - ACCIDENT SUMMARY
' ALA 61 21.267/21.966 '

Table with columns: TOTAL ACCIDENTS, FATAL, INJURY, PDO, PERSONS KILLED, INJURED, MOTOR VEHICLES INVOLVED (NUMBER, PCT, CODE), and <---LINES CODED---> (NUMBER, PCT, CODE).

Table with columns: <---- HOUR OF DAY ----> (NUMBER, PCT, CODE) and rows for hours 00-25.

Table with columns: <--- ACCESS CONTROL ---> (NUMBER, PCT, CODE) and rows for access types like C-CONVENTIONAL, E-EXPRESSWAY, etc.

Table with columns: <--- SIDE OF HIGHWAY ----> (NUMBER, PCT, CODE) and rows for directions like N-NORTHBOUND, S-SOUTHBOUND, etc.

Table with columns: <----- YEAR -----> (NUMBER, PCT, CODE) and rows for years 2010-2020.

Table with columns: <----- MONTH -----> (NUMBER, PCT, CODE) and rows for months 01-JANUARY to 12-DECEMBER.

Table with columns: <----- DAY OF WEEK -----> (NUMBER, PCT, CODE) and rows for days 1-SUNDAY to 7-SATURDAY.

TASAS SELECTIVE RECORD RETRIEVAL
TSAR - ACCIDENT SUMMARY
' ALA 61 21.267/21.966 '

Table with 3 columns: NUMBER, PCT, CODE. Title: <-- PRIMARY COLLISION FACTOR -->. Rows include categories like 1-INFLUENCE ALCOHOL, 2-FOLLOW TOO CLOSE, etc.

Table with 3 columns: NUMBER, PCT, CODE. Title: <--- TYPE OF COLLISION --->. Rows include categories like A-HEAD-ON, B-SIDESWIPE, C-REAR END, etc.

Table with 3 columns: NUMBER, PCT, CODE. Title: <--- ROADWAY CONDITION --->. Rows include categories like A-HOLES, RUTS, B-LOOSE MATERIAL, etc.

Table with 3 columns: NUMBER, PCT, CODE. Title: <----- WEATHER ----->. Rows include categories like A-CLEAR, B-CLOUDY, C-RAINING, etc.

Table with 3 columns: NUMBER, PCT, CODE. Title: <----- LIGHTING ----->. Rows include categories like A-DAY LIGHT, B-DUSK/DAWN, C-DARK-STREET LIGHT, etc.

Table with 3 columns: NUMBER, PCT, CODE. Title: <----- ROAD SURFACE ----->. Rows include categories like A-DRY, B-WET, C-SNOWY, ICY, etc.

Table with 3 columns: NUMBER, PCT, CODE. Title: <----- RIGHT OF WAY CONTROL ----->. Rows include categories like A-CONTROL FUNCTIONING, B-CONTROL NOT FUNCTIONING, etc.

Table with 3 columns: NUMBER, PCT, CODE. Title: <----- HIGHWAY GROUP ----->. Rows include categories like R-IND. ALIGN RIGHT, L-IND. ALIGN LEFT, etc.

Table with 3 columns: NUMBER, PCT, CODE. Title: <- INTERSECTION/RAMP ACCIDENT LOCATION ->. Rows include categories like 1-RAMP INTERSECTION (EXIT), 2-RAMP, etc.

TASAS SELECTIVE RECORD RETRIEVAL
TSAR - PARTY SUMMARY
' ALA 61 21.267/21.966 '

Table with columns: PARTY TYPE, MOVEMENT PRECEDING COLLISION, OTHER ASSOCIATED FACTORS. Includes sub-headers for NUMBER, PCT, CODE and #1, #2. Lists various vehicle types and movement codes with associated percentages.

Table with columns: DIRECTION OF TRAVEL, SPECIAL INFORMATION. Includes sub-headers for NUMBER, PCT, CODE. Lists directions (N-N, S-S, E-EASTBOUND, etc.) and special information codes (A-HAZARDOUS MATERIALS, B-CELL PHONE IN USE*, etc.).

** INCLUDES EQUIPMENT ENGAGED IN CONST/MAINT ACTIVITIES AS OF 00-02-22

* SPECIAL INFORMATION CODES EFF. 04-01-01

* INATTENTION CODES EFF. 01-01-01

TASAS SELECTIVE RECORD RETRIEVAL
TSAR - PARTY SUMMARY
' ALA 61 21.267/21.966 '

Table with columns: PRIMARY NUMBER, PCT, OTHERS NUMBER, PCT, CODE, PRIMARY NUMBER, PCT, OTHERS NUMBER, PCT, CODE. Includes sections for OBJECT STRUCK and LOCATION OF COLLISION, and DRUG/PHYSICAL.

California Department of Transportation

OTM22200

TSAR - ACCIDENT DETAIL

Policy controlling the use of Traffic Accident Surveillance and Analysis System (TASAS) - Transportation Systems Network (TSN) Reports

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California Department of Transportation

OTM22200

TSAR - ACCIDENT DETAIL

REPORT PARAMETERS:

REPORT DATE : 02/27/2020
REFERENCE DATE : 02/27/2020
SUBMITTOR : T4YKALEE
REPORT TITLE : ' ALA 61 21.267/21.966 '
EVENT ID : 4199069

Total Accidents Retrieved:

47

LOCATION CRITERIA:

FROM: 04-ALA-061 021.267 TO: 04-ALA-061 021.967

SELECTION CRITERIA:

1 1 AND 515 - INTRSRAMP ACC LOC NOT IN 6

Accidents Date Range:

From -- 01/01/2014 To -- 12/31/2018

index	case_id	party_nur	victim_nur	victim_rol	victim_sex	victim_age	victim_degree	victim_sea	victim_saf	victim_eje	county	city	accident_yr	crash_id	collision_date	collision_time	cat	day_of_wk	primary_rd	secondary_rd	distance	intersec	pcf_viol_c	pcf_violat	weather_1	weather_2	location	collision_s	hit_and_r	type_of_c	lighting	alcohol_in	functional	speed_lim	traffic_sigr	flashing_b	loc_type	legs	social_vul	school_qtrmi
572	4984681	1	1	Passenger	F	2	No Injury	4	Air Bag	No Q	0	ALAMEDA	ALAMEDA	2011	347	1/4/2011	8:10 6:00-8:59	Tuesday	6TH ST	CENTRAL AV	0	Y	Pedestrian	21950	Clear	-	-	-	Complaint Not Hit and Vehicle/Pe	Daylight	Arterial	Intersection	3	0	1					
573	4984681	1	2	Passenger	F	0	No Injury	6	Air Bag	No Q	0	ALAMEDA	ALAMEDA	2011	347	1/4/2011	8:10 6:00-8:59	Tuesday	6TH ST	CENTRAL AV	0	Y	Pedestrian	21950	Clear	-	-	-	Complaint Not Hit and Vehicle/Pe	Daylight	Arterial	Intersection	3	0	1					
574	4984681	2	1	Pedestrian	M	46	Complaint of P	9	-	-	3	ALAMEDA	ALAMEDA	2011	347	1/4/2011	8:10 6:00-8:59	Tuesday	6TH ST	CENTRAL AV	0	Y	Pedestrian	21950	Clear	-	-	-	Complaint Not Hit and Vehicle/Pe	Daylight	Arterial	Intersection	3	0	1					
575	4984681	3	1	Pedestrian	F	75	Complaint of P	9	-	-	3	ALAMEDA	ALAMEDA	2011	347	1/4/2011	8:10 6:00-8:59	Tuesday	6TH ST	CENTRAL AV	0	Y	Pedestrian	21950	Clear	-	-	-	Complaint Not Hit and Vehicle/Pe	Daylight	Arterial	Intersection	3	0	1					
627	5416587	2	1	Pedestrian	M	88	Other Visible Ii	9	-	-	3	ALAMEDA	ALAMEDA	2011	524	11/30/2011	17:27 3:00-5:59	Wednesday	6TH ST	CENTRAL AV	0	Y	Pedestrian	21950	Clear	-	-	-	Other Visit Not Hit and Broadside	Dusk - Dawn	Arterial	Intersection	3	0	1					
62	4147737	1	1	Pedestrian	M	6	Complaint of P	9	-	-	3	ALAMEDA	ALAMEDA	2009	29	3/7/2009	1837 6:00-8:59	Saturday	8TH ST	CENTRAL AV	34	N	Pedestrian	21954	Clear	-	-	-	Complaint Not Hit and Broadside	Dark - Street Lights	Arterial	Intersection	0	0	1					
181	4344154	1	1	Bicyclist	M	18	Other Visible Ii	9	Driver, Mo-	-	3	ALAMEDA	ALAMEDA	2009	106	8/5/2009	12:31 12:00-2:59	Wednesday	8TH ST	CENTRAL AV	15	N	Automobil	21801	Clear	-	-	-	Other Visit Not Hit and Sideswipe	Daylight	Arterial	Intersection	0	0	1					
639	5126720	1	1	Passenger	M	36	No Injury	3	Air Bag	No Q	0	ALAMEDA	ALAMEDA	2011	394	3/12/2011	2054 6:00-8:59	Saturday	8TH ST	CENTRAL AV	0	Y	Driving or	23152	Clear	-	-	-	Other Visit Misdemeanor Broadside	Dark - Stre Y	Arterial	Intersection	0	0	1					
640	5126720	1	2	Driver	M	31	Other Visible Ii	1	Driver, Mo-	-	1	ALAMEDA	ALAMEDA	2011	394	3/12/2011	2054 6:00-8:59	Saturday	8TH ST	CENTRAL AV	0	Y	Driving or	23152	Clear	-	-	-	Other Visit Misdemeanor Broadside	Dark - Stre Y	Arterial	Intersection	0	0	1					
697	5224204	1	1	Pedestrian	F	6	Complaint of P	9	-	-	3	ALAMEDA	ALAMEDA	2011	431	6/11/2011	1532 3:00-5:59	Saturday	8TH ST	CENTRAL AV	280	N	Pedestrian	21954	Clear	-	-	-	Complaint Not Hit and Vehicle/Pe	Daylight	Arterial	Segment	0	0	1					
705	5229490	1	1	Pedestrian	M	7	Other Visible Ii	9	-	-	3	ALAMEDA	ALAMEDA	2011	437	6/29/2011	12:22 12:00-2:59	Wednesday	8TH ST	CENTRAL AV	227	N	Pedestrian	21954	Cloudy	-	-	-	Other Visit Not Hit and Vehicle/Pe	Daylight	Arterial	Intersection	0	0	1					
1034	5792630	2	1	Driver	F	57	Complaint of P	1	Not Requir W	-	1	ALAMEDA	ALAMEDA	2012	659	8/28/2012	633 6:00-8:59	Tuesday	8TH ST	CENTRAL AV	53	N	Unsafe Spr	22350	Clear	-	-	-	Complaint Not Hit and Rear End	Daylight	Arterial	Intersection	0	0	1					
1864	6960137	2	1	Driver	F	27	Other Visible Ii	1	Air Bag	De G	0	ALAMEDA	ALAMEDA	2015	1188	6/5/2015	1314 12:00-2:59	Friday	8TH ST	CENTRAL AV	421	N	Wrong Sid	21460	Clear	-	-	-	Other Visit Not Hit and Head-On	Daylight	Arterial	Segment	0	0	1					
1865	6960137	1	1	Driver	F	18	Complaint of P	1	Air Bag	De G	0	ALAMEDA	ALAMEDA	2015	1188	6/5/2015	1314 12:00-2:59	Friday	8TH ST	CENTRAL AV	421	N	Wrong Sid	21460	Clear	-	-	-	Other Visit Not Hit and Head-On	Daylight	Arterial	Segment	0	0	1					
2713	8439573	1	2	Passenger	F	998	No Injury	3	Air Bag	No G	0	ALAMEDA	ALAMEDA	2017	1742	8/13/2017	1417 12:00-2:59	Sunday	8TH ST	CENTRAL AV	400	N	Unsafe Spr	22350	Clear	-	-	-	Complaint Not Hit and Rear End	Daylight	Arterial	Segment	0	0	1					
2714	8439573	1	1	Driver	F	48	Complaint of P	1	Air Bag	No G	0	ALAMEDA	ALAMEDA	2017	1742	8/13/2017	1417 12:00-2:59	Sunday	8TH ST	CENTRAL AV	400	N	Unsafe Spr	22350	Clear	-	-	-	Complaint Not Hit and Rear End	Daylight	Arterial	Segment	0	0	1					
1071	5832517	1	1	Pedestrian	M	15	Complaint of P	9	-	-	3	ALAMEDA	ALAMEDA	2012	685	9/7/2012	730 6:00-8:59	Friday	BALLENA BL	CENTRAL AV	0	Y	Automobil	21453	Clear	-	-	-	Complaint Misdemeanor Vehicle/Pe	Daylight	Collector	Intersection	4	0	1					
614	5065735	1	1	Driver	-	45	Complaint of P	1	Driver, Mo-	-	1	ALAMEDA	ALAMEDA	2011	374	1/24/2011	1000 9:00-11:59	Monday	BROADWAY	CENTRAL AV	0	Y	Automobil	21801	Clear	-	-	-	Complaint Not Hit and Broadside	Daylight	Collector	Intersection	1	1	1					
664	5153300	2	1	Driver	-	61	Complaint of P	1	Lap/Shoul-	-	0	ALAMEDA	ALAMEDA	2011	411	5/12/2011	1020 9:00-11:59	Thursday	BROADWAY	CENTRAL AV	0	Y	Traffic Sigr	21453	Clear	-	-	-	Complaint Not Hit and Broadside	Daylight	Collector	Intersection	1	1	1					
665	5153300	2	2	Passenger	-	998	Complaint of P	4	Lap/Shoul-	-	0	ALAMEDA	ALAMEDA	2011	411	5/12/2011	1020 9:00-11:59	Thursday	BROADWAY	CENTRAL AV	0	Y	Traffic Sigr	21453	Clear	-	-	-	Complaint Not Hit and Broadside	Daylight	Collector	Intersection	1	1	1					
666	5153300	2	3	Passenger	-	998	Complaint of P	6	Child Restr-	-	0	ALAMEDA	ALAMEDA	2011	411	5/12/2011	1020 9:00-11:59	Thursday	BROADWAY	CENTRAL AV	0	Y	Traffic Sigr	21453	Clear	-	-	-	Complaint Not Hit and Broadside	Daylight	Collector	Intersection	1	1	1					
878	5495570	1	1	Driver	F	22	Complaint of P	1	Lap/Shoul-	-	0	ALAMEDA	ALAMEDA	2012	559	1/9/2012	1820 6:00-8:59	Monday	BROADWAY	CENTRAL AV	29	N	Unsafe Spr	22350	Clear	-	-	-	Complaint Not Hit and Rear End	Dark - Street Lights	Arterial	Intersection	0	0	1					
879	5495570	2	1	Driver	F	65	Complaint of P	1	Lap/Shoul-	-	0	ALAMEDA	ALAMEDA	2012	559	1/9/2012	1820 6:00-8:59	Monday	BROADWAY	CENTRAL AV	29	N	Unsafe Spr	22350	Clear	-	-	-	Complaint Not Hit and Rear End	Dark - Street Lights	Arterial	Intersection	0	0	1					
897	5508234	2	1	Driver	F	66	Complaint of P	1	Air Bag	De G	0	ALAMEDA	ALAMEDA	2012	572	2/26/2012	1135 9:00-11:59	Sunday	BROADWAY	CENTRAL AV	0	Y	Traffic Sigr	21453	Clear	-	-	-	Complaint Not Hit and Broadside	Daylight	Collector	Intersection	1	1	1					
926	5580236	1	1	Passenger	F	9	No Injury	6	Air Bag	No G	0	ALAMEDA	ALAMEDA	2012	595	3/31/2012	1557 3:00-5:59	Saturday	BROADWAY	CENTRAL AV	0	Y	Traffic Sigr	21453	Cloudy	-	-	-	Complaint Not Hit and Broadside	Daylight	Collector	Intersection	1	1	1					
927	5580236	2	1	Passenger	F	6	Complaint of P	3	Air Bag	No G	0	ALAMEDA	ALAMEDA	2012	595	3/31/2012	1557 3:00-5:59	Saturday	BROADWAY	CENTRAL AV	0	Y	Traffic Sigr	21453	Cloudy	-	-	-	Complaint Not Hit and Broadside	Daylight	Collector	Intersection	1	1	1					
1892	6929883	2	1	Pedestrian	M	53	Complaint of P	9	-	-	3	ALAMEDA	ALAMEDA	2015	1169	5/12/2015	2221 9:00-11:59	Tuesday	BROADWAY	CENTRAL AV	0	Y	Pedestrian	21950	Clear	-	-	-	Complaint Not Hit and Vehicle/Pe	Dark - Street Lights	Arterial	Intersection	4	1	1					
2373	8140293	2	2	Passenger	F	5	Complaint of P	4	Air Bag	No Q	0	ALAMEDA	ALAMEDA	2016	1430	9/25/2016	1038 9:00-11:59	Sunday	BROADWAY	CENTRAL AV	150	N	Unsafe Spr	22350	Clear	-	-	-	Complaint Not Hit and Rear End	Daylight	Arterial	Intersection	1	1	1					
2374	8140293	2	1	Driver	M	47	Complaint of P	1	Air Bag	No G	0	ALAMEDA	ALAMEDA	2016	1430	9/25/2016	1038 9:00-11:59	Sunday	BROADWAY	CENTRAL AV	150	N	Unsafe Spr	22350	Clear	-	-	-	Complaint Not Hit and Rear End	Daylight	Arterial	Intersection	1	1	1					
2375	8140293	1	2	Passenger	F	3	No Injury	6	Air Bag	No Q	0	ALAMEDA	ALAMEDA	2016	1430	9/25/2016	1038 9:00-11:59	Sunday	BROADWAY	CENTRAL AV	150	N	Unsafe Spr	22350	Clear	-	-	-	Complaint Not Hit and Rear End	Daylight	Arterial	Intersection	1	1	1					
2376	8140293	1	1	Passenger	F	21	No Injury	3	Air Bag	No Q	0	ALAMEDA	ALAMEDA	2016	1430	9/25/2016	1038 9:00-11:59	Sunday	BROADWAY	CENTRAL AV	150	N	Unsafe Spr	22350	Clear	-	-	-	Complaint Not Hit and Rear End	Daylight	Arterial	Intersection	1	1	1					
2311	8185982	1	1	Pedestrian	M	57	Complaint of P	9	-	-	3	ALAMEDA	ALAMEDA	2016	1474	12/10/2016	1935 6:00-8:59	Saturday	BROADWAY	CENTRAL AV	30	N	Pedestrian	21955	Clear	-	-	-	Complaint Not Hit and Vehicle/Pe	Dusk - Dawn	Arterial	Intersection	1	1	1					
23	4078932	1	1	Bicyclist	-	17	Complaint of P	9	Not Requir W	-	1	ALAMEDA	ALAMEDA	2009	6	1/5/2009	758 6:00-8:59	Monday	CENTRAL AV	3RD ST	0	Y	Automobil	21802	Cloudy	-	-	-	Complaint Not Hit and Broadside	Daylight	Arterial	Intersection	5	0	1					
935	5597162	1	1	Bicyclist	F	13	Complaint of P	9	-	-	3	ALAMEDA	ALAMEDA	2012	599	4/17/2012	844 6:00-8:59	Tuesday	CENTRAL AV	3RD ST	0	Y	Wrong Sid	21650	Cloudy	-	-	-	Complaint Misdemeanor Broadside	Daylight	Arterial	Intersection	5	0	1					
1070	5832516	1	1	Bicyclist	F	16	Other Visible Ii	1	Not Requir W	-	1	ALAMEDA	ALAMEDA	2012	684	9/20/2012	750 6:00-8:59	Thursday	CENTRAL AV	3RD ST	53	N	Automobil	21802	Other	-	-	-	Other Visit Not Hit and Other	Daylight	Arterial	Intersection	0	0	1					
1088	5862737	1	1	Bicyclist	F	45	Other Visible Ii	1	Not Requir W	-	0	ALAMEDA	ALAMEDA	2012	697	11/4/2012	1610 3:00-5:59	Sunday	CENTRAL AV	3RD ST	334	N	Improper	22107	Clear	-	-	-	Other Visit Not Hit and Other	Dusk - Dawn	Arterial	Segment	0	0	1					
1110	5899360	1	1	Bicyclist	M	15	Complaint of P	1	Not Requir W	-	1	ALAMEDA	ALAMEDA	2012	711	12/12/2012	911 9:00-11:59	Wednesday	CENTRAL AV	3RD ST	62	N	Automobil	21804	Clear	-	-	-	Complaint Not Hit and Broadside	Daylight	Arterial	Intersection	0	0	1					
1194	6033718	2	1	Bicyclist	M	48	Other Visible Ii	1	Not Requir W	-	0	ALAMEDA	ALAMEDA	2013	773	4/5/2013																								

1921	6880044	1	1	Passenger F	7	No Injury	4	Air Bag No G	0	ALAMEDA ALAMEDA	2015	1148	3/21/2015	1327 12:00-2:55 Saturday	CENTRAL AV	FERNSIDE BL	384	N	Driving or	23152	Clear	-	-	Other Visit Not Hit anHead-On	Daylight	Y	Collector	Segment	0	0	1
1741	6537835	2	1	Driver M	45	Complaint of P	1	Air Bag No G	0	ALAMEDA ALAMEDA	2014	1012	5/3/2014	1742 3:00-5:59 Saturday	CENTRAL AV	FOUNTAIN ST	0	Y	Automobil	21802	Clear	-	-	Complaint Not Hit anBroadside	Daylight		Local Street	Intersectio	4	0	1
1742	6537835	1	1	Driver F	64	Complaint of P	1	Air Bag De G	0	ALAMEDA ALAMEDA	2014	1012	5/3/2014	1742 3:00-5:59 Saturday	CENTRAL AV	FOUNTAIN ST	0	Y	Automobil	21802	Clear	-	-	Complaint Not Hit anBroadside	Daylight		Local Street	Intersectio	4	0	1
2665	8484019	2	1	Bicyclist F	28	Severe Injury	9	Not Requir V	1	ALAMEDA ALAMEDA	2017	1707	10/25/2017	839 6:00-8:59 Wednesday	CENTRAL AV	GIBBONS DR	0	Y	Automobil	21801	Clear	-	-	Severe	Not Hit anBroadside	Daylight	Local Street	Intersectio	5	0	1
1249	6132639	2	1	Pedestrian F	17	Complaint of P	9	-	3	ALAMEDA ALAMEDA	2013	812	6/19/2013	744 6:00-8:59 Wednesday	CENTRAL AV	HIGH ST	0	Y	Pedestrian	21950	Clear	-	-	Complaint Not Hit anVehicle/Pe	Daylight		Collector	Intersectio	4	0	1
1505	7080073	1	1	Driver M	24	Complaint of P	1	Not Requir W	2	ALAMEDA ALAMEDA	2015	1229	9/11/2015	2230 9:00-11:55 Friday	CENTRAL AV	HIGH ST	0	Y	Improper I	21750	Clear	-	-	Complaint Not Hit anBroadside	Dark - Street Lights		Arterial	Intersectio	4	0	1
2381	8135388	2	1	Pedestrian M	84	Complaint of P	9	-	3	ALAMEDA ALAMEDA	2016	1426	9/9/2016	1100 9:00-11:55 Friday	CENTRAL AV	HIGH ST	63	N	Unsafe Sta	22106	Clear	-	-	Complaint Not Hit anVehicle/Pe	Daylight		Collector	Intersectio	4	0	1
2268	8527513	2	1	Pedestrian M	67	Other Visible I	9	-	3	ALAMEDA ALAMEDA	2017	1676	12/31/2017	1807 6:00-8:59 Sunday	CENTRAL AV	HIGH ST	0	Y	Pedestrian	21950	Clear	-	-	Other Visit Not Hit anVehicle/Pe	Dark - Street Lights		Arterial	Intersectio	4	0	1
2269	8527513	1	1	Passenger M	38	No Injury	3	Air Bag No G	0	ALAMEDA ALAMEDA	2017	1676	12/31/2017	1807 6:00-8:59 Sunday	CENTRAL AV	HIGH ST	0	Y	Pedestrian	21950	Clear	-	-	Other Visit Not Hit anVehicle/Pe	Dark - Street Lights		Arterial	Intersectio	4	0	1
2078	8646665	1	1	Driver F	25	Complaint of P	1	Air Bag No G	0	ALAMEDA ALAMEDA	2018	1568	8/22/2018	1410 12:00-2:55 Wednesday	CENTRAL AV	HIGH ST	0	Y	Automobil	21801	Clear	-	-	Complaint Not Hit anBroadside	Daylight		Arterial	Intersectio	4	0	1
1172	5997278	1	1	Bicyclist M	1	Other Visible I	1	Not Requir V	1	ALAMEDA ALAMEDA	2013	754	1/9/2013	712 6:00-8:59 Wednesday	CENTRAL AV	HOOVER CT	86	N	Unsafe Sp	22350	Cloudy	-	-	Other Visit Not Hit anOverturne	Daylight		Arterial	Intersectio	4	0	1
54	4138565	1	1	Driver F	51	Complaint of P	1	Air Bag No -	0	ALAMEDA ALAMEDA	2009	25	3/2/2009	1607 3:00-5:59 Monday	CENTRAL AV	LAFAYETTE ST	23110	N	Automobil	21804	Cloudy	-	-	Severe	Not Hit anHead-On	Daylight	Collector	Intersectio	4	0	1
55	4138565	2	1	Driver F	74	Severe Injury	1	Air Bag No -	0	ALAMEDA ALAMEDA	2009	25	3/2/2009	1607 3:00-5:59 Monday	CENTRAL AV	LAFAYETTE ST	23110	N	Automobil	21804	Cloudy	-	-	Severe	Not Hit anHead-On	Daylight	Collector	Intersectio	4	0	1
1066	5832512	2	1	Bicyclist M	22	Complaint of P	0	Not Requir V	1	ALAMEDA ALAMEDA	2012	680	7/26/2012	1220 12:00-2:58 Thursday	CENTRAL AV	LAFAYETTE ST	12	N	Automobil	21801	Clear	-	-	Complaint Not Hit anOther	Daylight		Collector	Intersectio	4	0	1
1971	6777483	2	1	Pedestrian F	33	Other Visible I	9	-	3	ALAMEDA ALAMEDA	2015	1114	1/15/2015	1753 3:00-5:59 Thursday	CENTRAL AV	LAFAYETTE ST	0	Y	Pedestrian	21950	Cloudy	-	-	Complaint Not Hit anHead-On	Dark - Street Lights		Local Street	Intersectio	4	0	1
1515	7079856	2	1	Bicyclist F	43	Complaint of P	1	Not Requir W	0	ALAMEDA ALAMEDA	2015	1223	8/30/2015	1001 9:00-11:55 Sunday	CENTRAL AV	LAFAYETTE ST	307	N	Improper I	22107	Clear	-	-	Complaint Not Hit anBroadside	Daylight		Collector	Intersectio	0	0	1
1300	6199741	1	1	Driver M	43	Other Visible I	1	Air Bag De B	0	ALAMEDA ALAMEDA	2013	847	8/24/2013	49 12:00-2:55 Saturday	CENTRAL AV	LINCOLN AV	71	N	Driving or	23152	Clear	-	-	Other Visit Not Hit anHit Object	Dark - Stre Y		Arterial	Intersectio	0	0	1
365	4651736	1	1	Driver F	19	Complaint of P	1	Lap/Shoul-	0	ALAMEDA ALAMEDA	2010	222	4/6/2010	1712 3:00-5:59 Tuesday	CENTRAL AV	MCKAY AV	36	N	Other Haz	22517	Clear	-	-	Complaint Not Hit anSideswipe	Daylight		Arterial	Intersectio	0	0	1
366	4651736	2	1	Passenger M	5	No Injury	6	Child Restr	0	ALAMEDA ALAMEDA	2010	222	4/6/2010	1712 3:00-5:59 Tuesday	CENTRAL AV	MCKAY AV	36	N	Other Haz	22517	Clear	-	-	Complaint Not Hit anSideswipe	Daylight		Arterial	Intersectio	0	0	1
824	5407915	2	1	Driver F	38	Complaint of P	1	Lap/Shoul-	0	ALAMEDA ALAMEDA	2011	521	10/4/2011	2130 9:00-11:55 Tuesday	CENTRAL AV	MORTON ST	0	Y	Traffic Sigr	22450	Cloudy	C	-	Complaint Misdemea Broadside	Dark - Street Lights		Collector	Intersectio	4	1	1
25	4078997	2	1	Driver -	26	Complaint of P	1	Air Bag No G	0	ALAMEDA ALAMEDA	2009	8	1/20/2009	2135 9:00-11:55 Tuesday	CENTRAL AV	OAK ST	26	N	Unsafe Sp	22350	Clear	-	-	Complaint Not Hit anRear End	Dark - Street Lights		Collector	Intersectio	4	1	1
26	4078997	2	2	Passenger F	0	No Injury	5	Air Bag No Q	0	ALAMEDA ALAMEDA	2009	8	1/20/2009	2135 9:00-11:55 Tuesday	CENTRAL AV	OAK ST	26	N	Unsafe Sp	22350	Clear	-	-	Complaint Not Hit anRear End	Dark - Street Lights		Collector	Intersectio	4	1	1
27	4078997	2	3	Passenger M	21	No Injury	3	Air Bag No G	0	ALAMEDA ALAMEDA	2009	8	1/20/2009	2135 9:00-11:55 Tuesday	CENTRAL AV	OAK ST	26	N	Unsafe Sp	22350	Clear	-	-	Complaint Not Hit anRear End	Dark - Street Lights		Collector	Intersectio	4	1	1
133	4268407	1	1	Bicyclist M	45	Other Visible I	9	-	0	ALAMEDA ALAMEDA	2009	76	6/10/2009	930 9:00-11:55 Wednesday	CENTRAL AV	OAK ST	0	Y	Unsafe Sp	22350	Cloudy	-	-	Other Visit Not Hit anOther	Daylight		Collector	Intersectio	4	1	1
210	4406357	1	1	Driver F	53	Complaint of P	1	Lap/Shoul-	0	ALAMEDA ALAMEDA	2009	123	9/22/2009	952 9:00-11:55 Tuesday	CENTRAL AV	OAK ST	0	Y	Traffic Sigr	21453	Cloudy	-	-	Complaint Not Hit anBroadside	Daylight		Collector	Intersectio	4	1	1
211	4406357	1	2	Passenger F	32	Complaint of P	3	Lap/Shoul-	0	ALAMEDA ALAMEDA	2009	123	9/22/2009	952 9:00-11:55 Tuesday	CENTRAL AV	OAK ST	0	Y	Traffic Sigr	21453	Cloudy	-	-	Complaint Not Hit anBroadside	Daylight		Collector	Intersectio	4	1	1
212	4406357	2	1	Driver F	34	Complaint of P	1	Lap/Shoul-	0	ALAMEDA ALAMEDA	2009	123	9/22/2009	952 9:00-11:55 Tuesday	CENTRAL AV	OAK ST	0	Y	Traffic Sigr	21453	Cloudy	-	-	Complaint Not Hit anBroadside	Daylight		Collector	Intersectio	4	1	1
213	4410407	1	1	Bicyclist F	19	Complaint of P	1	Driver, Mo-	1	ALAMEDA ALAMEDA	2009	124	9/25/2009	2126 9:00-11:55 Friday	CENTRAL AV	OAK ST	0	Y	Unknown	Clear	-	-	Complaint Not Hit anBroadside	Dark - Street Lights		Collector	Intersectio	4	1	1	
389	4757425	1	1	Passenger F	34	No Injury	3	Lap/Shoul-	0	ALAMEDA ALAMEDA	2011	235	4/30/2011	1933 6:00-8:59 Saturday	CENTRAL AV	OAK ST	0	Y	Improper I	22107	Clear	-	-	Other Visit Not Hit anBroadside	Dark - Dawn		Collector	Intersectio	4	1	1
390	4757425	2	1	Bicyclist F	56	Other Visible I	1	Driver, Mo-	0	ALAMEDA ALAMEDA	2011	235	4/30/2011	1933 6:00-8:59 Saturday	CENTRAL AV	OAK ST	0	Y	Improper I	22107	Clear	-	-	Other Visit Not Hit anBroadside	Dusk - Dawn		Collector	Intersectio	4	1	1
395	4757629	1	1	Driver F	19	Complaint of P	1	Lap Belt Ni-	0	ALAMEDA ALAMEDA	2011	239	5/7/2011	1217 12:00-2:55 Saturday	CENTRAL AV	OAK ST	194	N	Unsafe Sp	22350	Cloudy	-	-	Complaint Not Hit anRear End	Daylight		Collector	Intersectio	1	1	1
396	4757629	3	1	Passenger F	9	No Injury	4	Lap/Shoul-	0	ALAMEDA ALAMEDA	2011	239	5/7/2011	1217 12:00-2:55 Saturday	CENTRAL AV	OAK ST	194	N	Unsafe Sp	22350	Cloudy	-	-	Complaint Not Hit anRear End	Daylight		Collector	Intersectio	1	1	1
2831	8344395	2	1	Pedestrian F	73	Other Visible I	9	-	0	ALAMEDA ALAMEDA	2017	1814	4/6/2017	2015 6:00-8:59 Thursday	CENTRAL AV	OAK ST	0	Y	Pedestrian	21950	Raining	G	-	Other Visit Not Hit anVehicle/Pe	Dark - Street Lights		Collector	Intersectio	4	1	1
2154	8627068	1	1	Driver M	70	Other Visible I	1	Air Bag No G	0	ALAMEDA ALAMEDA	2018	1606	5/16/2018	1221 12:00-2:55 Wednesday	CENTRAL AV	PAGE ST	62	N	Other Than Driver (or Clear		-	-	-	Other Visit Not Hit anHead-On	Daylight		Collector	Intersectio	1	1	1
515	4936357	2	1	Bicyclist M	17	Other Visible I	1	Driver, Mo-	1	ALAMEDA ALAMEDA	2010	319	10/26/2010	1837 6:00-8:59 Tuesday	CENTRAL AV	PAGE ST	97	N	Unsafe Sta	22106	Clear	-	-	Other Visit Not Hit anSideswipe	Dark - Street Lights		Arterial	Intersectio	0	0	1
850	5458600	1	1	Bicyclist M	15	Complaint of P	1	Not Requir C	0	ALAMEDA ALAMEDA	2012	540	2/6/2012	1517 3:00-5:59 Monday	CENTRAL AV	PARK AV	60	N	Unsafe Sp	22350	Clear	-	-	Complaint Not Hit anRear End	Daylight		Collector	Intersectio	1	1	1
851	5458600	2	1	Passenger M	13	No Injury	0	Air Bag No C	0	ALAMEDA ALAMEDA	2012	540	2/6/2012	1517 3:00-5:59 Monday	CENTRAL AV	PARK AV	60	N	Unsafe Sp	22350	Clear	-	-	Complaint Not Hit anRear End	Daylight		Collector	Intersectio	1	1	1
852	5458600	2	2	Passenger F	14	No Injury	0	Air Bag No C	0	ALAMEDA ALAMEDA	2012	540	2/6/2012	1517 3:00-5:59 Monday	CENTRAL AV	PARK AV	60	N	Unsafe Sp	22350	Clear	-	-	Complaint Not Hit anRear End	Daylight		Collector	Intersectio	1	1	1
853	5458600	2	3	Passenger M	16	No Injury	0	Air Bag No C	0	ALAMEDA ALAMEDA	2012	540	2/6/2012	1517 3:00-5:59 Monday	CENTRAL AV	PARK AV	60	N	Unsafe Sp	22350	Clear	-	-	Complaint Not Hit anRear End	Daylight		Collector	Intersectio	1	1	1
854	5458600	2	4	Passenger M	14	No Injury	0	Air Bag No C	0	ALAMEDA ALAMEDA	2012	540	2/6/2012	1517 3:00-5:59 Monday	CENTRAL AV	PARK AV	60	N	Unsafe Sp	22350	Clear	-	-	Complaint Not Hit anRear End	Daylight		Collector	Intersectio	1	1	1
855	5458600	2	5	Passenger M	11	No Injury	0	Air Bag No C	0	ALAMEDA ALAMEDA	2012	540	2/6/2012	1517 3:00-5:59 Monday	CENTRAL AV	PARK AV	60	N	Unsafe Sp	22350	Clear	-	-	Complaint Not Hit anRear End	Daylight		Collector	Intersectio	1	1	1
1035	5792634	2	1	Bicyclist M	15	Other Visible I	1	Not Requir V	1	ALAMEDA ALAMEDA	2012	660	8/30/2012	740 6:00-8:59 Thursday	CENTRAL AV	PARK AV	0	Y	Automobil	21801	Clear	-	-	Other Visit Not Hit anOther	Daylight		Collector	Intersectio	3	1	1
1234	6107928	1	1	Bicyclist M	26	Other Visible I	1	Not Requir V	1	ALAMEDA ALAMEDA	2013	801	6/5/2013	1836 6:00-8:59 Wednesday	CENTRAL AV	PARK AV	0	Y	Automobil	21801	Clear	-	-	Other Visit Not Hit anBroadside	Daylight		Collector	Intersectio	3	1	1
1235	6107928	2	1	Passenger M	3	Air Bag No G	3	Air Bag No G	0	ALAMEDA ALAMEDA	2013	801	6/5/2013	1836 6:00-8:59 Wednesday	CENTRAL AV	PARK AV	0	Y	Automobil	21801	Clear	-	-	Other Visit Not Hit anBroadside	Daylight		Collector	Intersectio	3	1	1
1536	7014522	2	1	Driver F	42	Complaint of P	1	Air Bag No G	0	ALAMEDA ALAMEDA	2015	1207	7/27/2015	1036 9:00-11:55 Monday	CENTRAL AV	PARK AV	28	N	Unsafe Sp	22350	Clear	-	-	Complaint Felony	Rear End	Daylight	Collector	Intersectio	1	1	1
2105	8661330	2	1	Bicyclist M	1	Not Requir W	2	ALAMEDA ALAMEDA	2018	1582	6/29/2018	1816 6:00-8:59 Friday	CENTRAL AV	PARK AV	16	N	Automobil	21802	Clear	-	-	Other Visit Not Hit anBroadside	Daylight		Collector	Intersectio	1	1	1		
2106	8661330	1	1	Bicyclist M	16	Other Visible I	1	Not Requir W	1	ALAMEDA ALAMEDA	2018	1582	6/29/2018	1816 6:00-8:59 Friday	CENTRAL AV	PARK AV	16	N	Automobil	21802	Clear	-	-	Other Visit Not Hit anBroadside	Daylight		Collector	Intersectio	1	1	1
141	42																														

1645	6667511	2	1 Driver	F	59	Complaint of P	1 Air Bag No G	0	ALAMEDA	ALAMEDA	2014	1074	9/22/2014	1945 6:00-8:59 Monday	CENTRAL AV	WALNUT ST	17 N	Traffic Sigr	22450	Clear	-	Complaint Not Hit an/Broadside	Dark - Street Lights	Collector	Intersectio	4	1	1	
2312	8185493	1	1 Driver	M	25	Other Visible li	1 Air Bag De/G	0	ALAMEDA	ALAMEDA	2016	1473	11/25/2016	2314 9:00-11:55 Friday	CENTRAL AV	WALNUT ST	283 N	Driving or	23152	Clear	-	Other Visit Not Hit an/Head-On	Dark - Street Lights	Collector	Segment	1	1	1	
2762	8413081	1	1 Driver	M	69	Complaint of P	1 Air Bag De/G	0	ALAMEDA	ALAMEDA	2017	1773	6/27/2017	1712 3:00-5:59 Tuesday	CENTRAL AV	WALNUT ST	0 Y	Traffic Sigr	22450	Clear	-	Complaint Not Hit an/Broadside	Daylight	Local Street	Intersectio	4	1	1	
2667	8483876	2	1 Driver	F	24	Complaint of P	1 Air Bag No G	0	ALAMEDA	ALAMEDA	2017	1709	10/24/2017	804 6:00-8:59 Tuesday	CENTRAL AV	WALNUT ST	0 Y	Traffic Sigr	22450	Clear	-	Complaint Misdemea Broadside	Daylight	Local Street	Intersectio	4	1	1	
1884	6953176	2	1 Driver	F	46	Complaint of P	1 Air Bag No G	0	ALAMEDA	ALAMEDA	2015	1176	5/28/2015	1703 3:00-5:59 Thursday	CENTRAL AV	WEBER ST	95 N	Automobil	21804	Clear	-	Complaint Not Hit an/Broadside	Daylight	Arterial	Intersectio	4	0	1	
279	4511016	1	1 Pedestrian	F	60	Severe Injury	9 -	-	3	ALAMEDA	ALAMEDA	2009	166	12/1/2009	1847 6:00-8:59 Tuesday	CENTRAL AV	WEBSTER ST	101 N	Pedestrian	21954	Clear	-	Severe Not Hit an/Vehicle/Pe	Dark - Street Lights	Arterial	Intersectio	4	0	1
2203	8601810	1	1 Driver	F	19	Other Visible li	1 Air Bag No G	0	ALAMEDA	ALAMEDA	2018	1633	4/6/2018	1957 6:00-8:59 Friday	CENTRAL AV	WEBSTER ST	135 N	Automobil	21804	Raining	-	Other Visit Not Hit an/Broadside	Dark - Street Lights	Arterial	Intersectio	4	0	1	
2607	7166496	2	3 Passenger	-	998	No Injury	6 Not Requir G	0	ALAMEDA	ALAMEDA	2016	1282	1/5/2016	2310 9:00-11:55 Tuesday	CENTRAL AV	WILLOW	5 N	Driving or	23153	Cloudy	-	Complaint Felony Rear End	Dark - Stre Y	Collector	Intersectio	4	0	1	
2608	7166496	2	2 Passenger	M	33	Complaint of P	3 Air Bag No G	0	ALAMEDA	ALAMEDA	2016	1282	1/5/2016	2310 9:00-11:55 Tuesday	CENTRAL AV	WILLOW	5 N	Driving or	23153	Cloudy	-	Complaint Felony Rear End	Dark - Stre Y	Collector	Intersectio	4	0	1	
2609	7166496	2	1 Driver	M	33	Complaint of P	1 Air Bag No G	0	ALAMEDA	ALAMEDA	2016	1282	1/5/2016	2310 9:00-11:55 Tuesday	CENTRAL AV	WILLOW	5 N	Driving or	23153	Cloudy	-	Complaint Felony Rear End	Dark - Stre Y	Collector	Intersectio	4	0	1	
443	4844213	2	1 Pedestrian	M	17	Complaint of P	9 Driver, Mo-	0	ALAMEDA	ALAMEDA	2010	273	8/18/2010	1630 3:00-5:59 Wednesday	CENTRAL AV	WILLOW ST	6 N	Pedestrian	21950	Clear	-	Complaint Not Hit an/Vehicle/Pe	Daylight	Collector	Intersectio	4	0	1	
968	5640930	2	1 Pedestrian	M	76	Other Visible li	9 -	-	3	ALAMEDA	ALAMEDA	2012	620	4/30/2012	954 9:00-11:55 Monday	CENTRAL AV	WILLOW ST	0 Y	Pedestrian	21950	Clear	-	Other Visit Not Hit an/Vehicle/Pe	Daylight	Collector	Intersectio	4	0	1
1165	5990969	2	1 Pedestrian	F	33	Other Visible li	9 -	-	3	ALAMEDA	ALAMEDA	2013	747	2/13/2013	1935 6:00-8:59 Wednesday	CENTRAL AV	WILLOW ST	0 Y	Pedestrian	21950	Clear	-	Complaint Not Hit an/Broadside	Pe Dark - Street Lights	Collector	Intersectio	4	0	1
2196	8607033	2	1 Driver	M	38	Complaint of P	1 Air Bag De/G	0	ALAMEDA	ALAMEDA	2018	1630	4/17/2018	1315 12:00-2:55 Tuesday	CENTRAL AV	WILLOW ST	0 Y	Traffic Sigr	22450	Clear	-	Complaint Felony Broadside	Daylight	Collector	Intersectio	4	0	1	
2019	8743220	2	1 Bicyclist	M	32	Complaint of P	1 Not Requir W	1	ALAMEDA	ALAMEDA	2018	1527	10/23/2018	1438 12:00-2:55 Tuesday	CENTRAL AV	WILLOW ST	0 Y	Traffic Sigr	22450	Clear	-	Complaint Misdemea Broadside	Daylight	Collector	Intersectio	4	0	1	
625	5080871	2	1 Pedestrian	F	39	Complaint of P	9 -	-	3	ALAMEDA	ALAMEDA	2011	381	2/20/2011	2254 9:00-11:55 Sunday	EVERETT ST	CENTRAL AV	0 Y	Driving or	23152	Cloudy	-	Complaint Not Hit an/Vehicle/Pe	Dark - Stre Y	Collector	Intersectio	3	1	1
1455	7140057	2	1 Pedestrian	M	60	Complaint of P	9 -	-	3	ALAMEDA	ALAMEDA	2015	1265	12/6/2015	1556 3:00-5:59 Sunday	EVERETT ST	CENTRAL AV	5 N	Pedestrian	21950	Clear	-	Complaint Not Hit an/Broadside	Daylight	Collector	Intersectio	3	1	1
219	4410459	1	1 Bicyclist	M	12	Other Visible li	9 Driver, Mo-	1	ALAMEDA	ALAMEDA	2009	127	9/27/2009	1228 12:00-2:55 Sunday	FERNSIDE BL	CENTRAL AV	11 N	Unknown	Clear	-	Other Visit Not Hit an/Broadside	Daylight	Collector	Intersectio	0	1	1		
1405	6329813	1	1 Bicyclist	M	55	Severe Injury	1 -	-	1	ALAMEDA	ALAMEDA	2013	924	12/24/2013	1318 12:00-2:55 Tuesday	FERNSIDE BL	CENTRAL AV	114 N	Other Than Driver (or Clear	-	-	Severe Not Hit an/Hit Object	Daylight	Arterial	Intersectio	0	1	1	
2751	8422251	2	1 Driver	M	47	Complaint of P	1 Air Bag No G	0	ALAMEDA	ALAMEDA	2017	1765	7/14/2017	2100 9:00-11:55 Friday	FERNSIDE BL	CENTRAL AV	30 N	Unsafe Sp	22350	Clear	-	Complaint Not Hit an/Rear End	Dark - Street Lights	Arterial	Intersectio	0	1	1	
2348	8164939	1	1 Driver	F	18	Complaint of P	1 Air Bag No G	0	ALAMEDA	ALAMEDA	2016	1449	10/25/2016	2137 9:00-11:55 Tuesday	FOUNTAIN ST	CENTRAL AV	126 N	Improper	22107	Clear	-	Complaint Not Hit an/Sideswipe	Dark - Street Lights	Local Street	Intersectio	0	1	1	
2380	8140281	1	1 Pedestrian	F	81	Other Visible li	9 -	-	3	ALAMEDA	ALAMEDA	2016	1427	9/27/2016	1110 9:00-11:55 Tuesday	GRAND ST	CENTRAL AV	139 N	Pedestrian	21955	Clear	-	Other Visit Not Hit an/Vehicle/Pe	Daylight	Arterial	Intersectio	0	1	1
2344	8171326	1	1 Driver	F	58	Complaint of P	1 Air Bag No G	0	ALAMEDA	ALAMEDA	2016	1451	11/1/2016	1519 3:00-5:59 Tuesday	GRAND ST	CENTRAL AV	197 N	Unsafe Sp	22350	Clear	-	Complaint Not Hit an/Sideswipe	Daylight	Arterial	Intersectio	0	1	1	
2773	8378711	1	1 Bicyclist	M	17	Complaint of P	1 -	-	0	ALAMEDA	ALAMEDA	2017	1781	5/28/2017	1743 3:00-5:59 Sunday	MCKAY AV	CENTRAL AV	1234 N	Wrong Sid	21650	Clear	-	Complaint Not Hit an/Broadside	Daylight	Local Street	Segment	1	1	1
368	4673181	1	1 Bicyclist	M	66	Other Visible li	1 Other -	-	3	ALAMEDA	ALAMEDA	2010	224	4/12/2010	1929 6:00-8:59 Monday	OAK ST	CENTRAL AV	101 N	Improper	22107	Clear	-	Other Visit Not Hit an/Overtur	Dusk - Daw Y	Collector	Intersectio	1	1	1
1915	6882401	2	1 Driver	F	41	Complaint of P	1 Air Bag De/G	0	ALAMEDA	ALAMEDA	2015	1152	4/1/2015	1000 9:00-11:55 Wednesday	OAK ST	CENTRAL AV	0 Y	Traffic Sigr	21453	Clear	-	Complaint Not Hit an/Broadside	Daylight	Collector	Intersectio	4	1	1	
1886	6944813	2	1 Pedestrian	M	60	Other Visible li	9 -	-	3	ALAMEDA	ALAMEDA	2015	1174	4/29/2015	2316 9:00-11:55 Wednesday	OAK ST	CENTRAL AV	0 Y	Pedestrian	21950	Clear	-	Other Visit Felony Vehicle/Pe	Dark - Street Lights	Collector	Intersectio	4	1	1
1474	7121987	2	1 Driver	F	76	Complaint of P	1 Air Bag No G	0	ALAMEDA	ALAMEDA	2015	1249	11/17/2015	1715 3:00-5:59 Tuesday	OAK ST	CENTRAL AV	42 N	Following	21703	Clear	-	Complaint Not Hit an/Rear End	Dusk - Dawn	Collector	Intersectio	4	1	1	
1465	7129502	1	2 Passenger	M	63	No Injury	3 Air Bag No G	0	ALAMEDA	ALAMEDA	2015	1256	11/29/2015	1225 12:00-2:55 Sunday	OAK ST	CENTRAL AV	147 N	Unsafe Sp	22350	Clear	-	Complaint Not Hit an/Rear End	Daylight	Collector	Intersectio	1	1	1	
1466	7129502	1	1 Driver	F	44	Complaint of P	1 Air Bag No G	0	ALAMEDA	ALAMEDA	2015	1256	11/29/2015	1225 12:00-2:55 Sunday	OAK ST	CENTRAL AV	147 N	Unsafe Sp	22350	Clear	-	Complaint Not Hit an/Rear End	Daylight	Collector	Intersectio	1	1	1	
2212	8583964	2	1 Bicyclist	M	14	Other Visible li	1 Not Requir W	0	ALAMEDA	ALAMEDA	2018	1641	3/18/2018	1330 12:00-2:55 Sunday	OAK ST	CENTRAL AV	0 Y	Automobil	21801	Clear	-	Other Visit Not Hit an/Broadside	Daylight	Collector	Intersectio	4	1	1	
81	4208678	2	1 Bicyclist	M	57	Complaint of P	1 Driver, Mo-	1	ALAMEDA	ALAMEDA	2009	43	4/17/2009	740 6:00-8:59 Friday	PARK ST	CENTRAL AV	96 N	Other Haz	22517	Clear	-	Complaint Not Hit an/Broadside	Daylight	Arterial	Intersectio	1	1	1	
120	4247942	2	1 Driver	F	44	Complaint of P	1 Passenger, G	0	ALAMEDA	ALAMEDA	2009	64	5/20/2009	1054 9:00-11:55 Wednesday	PARK ST	CENTRAL AV	54 N	Unsafe Sp	22350	Clear	-	Complaint Not Hit an/Rear End	Daylight	Arterial	Intersectio	1	1	1	
236	4449475	2	1 Driver	M	24	Complaint of P	1 Not Requir W	1	ALAMEDA	ALAMEDA	2009	138	10/16/2009	2135 9:00-11:55 Friday	PARK ST	CENTRAL AV	0 Y	Automobil	21801	Clear	-	Complaint Not Hit an/Broadside	Dark - Street Lights	Collector	Intersectio	4	1	1	
347	4616619	1	1 Driver	M	22	Other Visible li	1 Other H	-	1	ALAMEDA	ALAMEDA	2010	212	2/20/2010	131 12:00-2:55 Saturday	PARK ST	CENTRAL AV	17 N	Driving or	23152	Clear	-	Other Visit Not Hit an/Hit Object	Dark - Stre Y	Arterial	Intersectio	4	1	1
462	4876685	1	1 Passenger	F	9	Complaint of P	3 Lap/Shoulc-	0	ALAMEDA	ALAMEDA	2010	285	9/4/2010	1720 3:00-5:59 Saturday	PARK ST	CENTRAL AV	15 N	Unknown	Clear	-	Complaint Not Hit an/Rear End	Daylight	Arterial	Intersectio	4	1	1		
463	4876685	1	2 Passenger	M	50	Complaint of P	4 Lap/Shoulc-	0	ALAMEDA	ALAMEDA	2010	285	9/4/2010	1720 3:00-5:59 Saturday	PARK ST	CENTRAL AV	15 N	Unknown	Clear	-	Complaint Not Hit an/Rear End	Daylight	Arterial	Intersectio	4	1	1		
464	4876685	1	3 Driver	F	50	Complaint of P	1 Lap/Shoulc-	0	ALAMEDA	ALAMEDA	2010	285	9/4/2010	1720 3:00-5:59 Saturday	PARK ST	CENTRAL AV	15 N	Unknown	Clear	-	Complaint Not Hit an/Rear End	Daylight	Arterial	Intersectio	4	1	1		
465	4876685	2	1 Driver	F	60	Complaint of P	1 Lap/Shoulc-	0	ALAMEDA	ALAMEDA	2010	285	9/4/2010	1720 3:00-5:59 Saturday	PARK ST	CENTRAL AV	15 N	Unknown	Clear	-	Complaint Not Hit an/Rear End	Daylight	Arterial	Intersectio	4	1	1		
494	4919157	2	1 Pedestrian	F	63	Severe Injury	9 -	-	3	ALAMEDA	ALAMEDA	2010	304	9/24/2010	732 6:00-8:59 Friday	PARK ST	CENTRAL AV	0 -	Pedestrian	21950	Clear	-	Severe Not Hit an/Vehicle/Pe	Daylight	Collector	Intersectio	4	1	1
779	5370239	2	1 Driver	F	23	Complaint of P	1 Lap/Shoulc-	0	ALAMEDA	ALAMEDA	2011	490	10/17/2011	926 9:00-11:55 Monday	PARK ST	CENTRAL AV	94 N	Unsafe Lar	21658	Clear	-	Complaint Not Hit an/Sideswipe	Daylight	Arterial	Intersectio	1	1	1	
1244	6132575	1	1 Other (sing	F	0	Not Requir-	0 Not Requir-	0	ALAMEDA	ALAMEDA	2013	809	6/27/2013	1700 3:00-5:59 Thursday	PARK ST	CENTRAL AV	57 N	Other Haz	22517	Clear	-	Complaint Not Hit an/Sideswipe	Daylight	Arterial	Intersectio	1	1	1	
1245	6132575	2	1 Passenger	M	55	No Injury	3 Air Bag No G	0	ALAMEDA	ALAMEDA	2013	809	6/27/2013	1700 3:00-5:59 Thursday	PARK ST	CENTRAL AV	57 N	Other Haz	22517	Clear	-	Complaint Not Hit an/Sideswipe	Daylight	Arterial	Intersectio	1	1	1	
1275	6153810	1	1 Driver	M	54	Complaint of P	1 Air Bag No G	0	ALAMEDA	ALAMEDA	2013	829	7/22/2013	1416 12:00-2:55 Monday	PARK ST	CENTRAL AV	77 N	Unsafe Lar	21658	Clear	-	Complaint Not Hit an/Sideswipe	Daylight	Arterial	Intersectio	1	1	1	
1638	6680607	2	1 Driver	F	50	Complaint of P	1 Lap/ShoulcM	0	ALAMEDA	ALAMEDA	2014	1076	9/23/2014	1830 6:00-8:59 Tuesday	PARK ST	CENTRAL AV	15 N	Unsafe Sp	22350	Clear	-	Complaint Felony Rear End	Daylight	Arterial	Intersectio	4	1	1	
1551	6777768	2	1 Passenger	F	17	Complaint of P	3 Air Bag No G	0	ALAMEDA	ALAMEDA	2014	1117	12/17/2014	855 6:00-8:59 Wednesday	PARK ST	CENTRAL AV	50 N	Improper	22107	Cloudy	-	Complaint Felony Sideswipe	Daylight	Arterial	Intersectio	1	1	1	
1933	6856142	2	1 Pedestrian	F	54	Complaint of P	9 -	-	3	ALAMEDA	ALAMEDA	2015	1139	3/4/2015	1542 3:00-5:59 Wednesday	PARK ST	CENTRAL AV	0 Y	Pedestrian	21950	Clear	-	Complaint Not Hit an/Vehicle/Pe	Daylight	Collector	Intersectio	4	1	1
1934	6856142	1	1 Passenger	F	50	No Injury	3 Air Bag No G	0	ALAMEDA	ALAMEDA	2015	1139	3/4/2015	1542 3:00-5:59 Wednesday	PARK ST	CENTRAL AV	0 Y	Pedestrian	21950	Clear	-	Complaint Not Hit an/Vehicle/Pe	Daylight	Collector	Intersectio	4	1	1	
1619	7002044	2	1 Driver	F	45	Complaint of P	1 Air Bag No G	0	ALAMEDA	ALAMEDA	2015	1200	7/9/2015	1719 3:00-5:59 Thursday	PARK ST	CENTRAL AV	134 N	Unsafe Sp	22350	Cloudy	-	Complaint Not Hit an/Rear End	Daylight	Arterial	Intersectio				