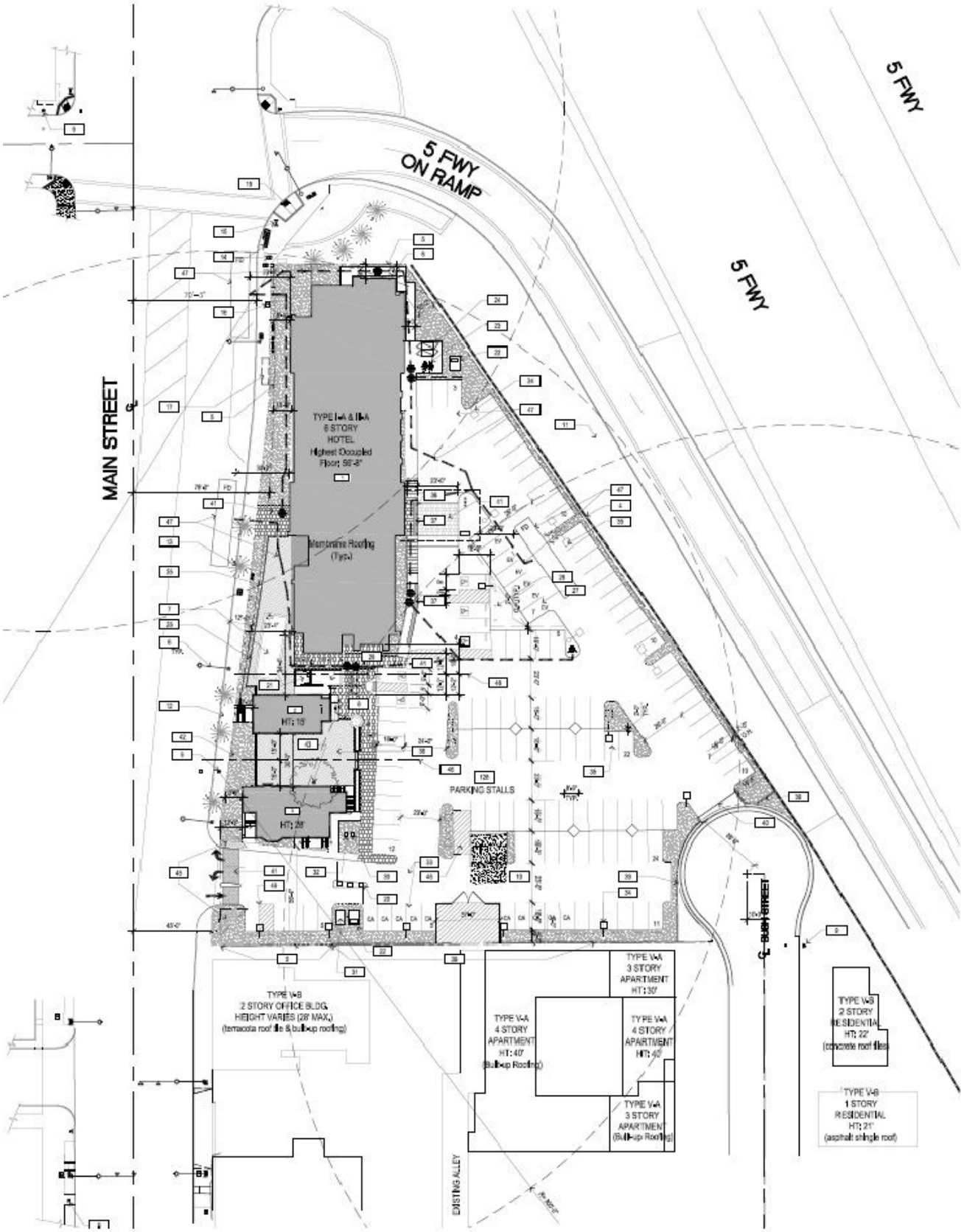
2129 NORTH MAIN STREET HOTEL PROJECT
TRAFFIC IMACT STUDY (Updated 01.16.2018)
City of Santa Ana, California



RK engineering group, inc.

2129 NORTH MAIN STREET HOTEL PROJECT
TRAFFIC IMPACT STUDY
City of Santa Ana, California

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1.0 Introduction

A. Purpose of Report & Study Objectives

The purpose of this traffic impact study is to evaluate the 2129 North Main Street Hotel Project from a traffic circulation standpoint. The proposed project is located within the City of Santa Ana. The proposed project is planned to open in 2018.

Study objectives include: (1) documentation of Existing traffic conditions in the study area; (2) evaluation of Existing Plus Project traffic conditions; (3) evaluation of traffic conditions for the Project Completion (Year 2018) With and Without Project traffic conditions; and (5) determination of on-site and off-site improvements and system management actions needed to accommodate the proposed project.

This traffic study has been prepared in accordance with the scope of work previously reviewed and approved by the City of Santa Ana staff.

B. Site Location & Study Area

The proposed project is located at 2129 North Main Street and is bound by North Main Street on the west, the I-5 Southbound On-Ramp/Buffalo Avenue on the north, and the I-5 Freeway on the east, in the City of Santa Ana. Exhibit 1-1 illustrates the site location and traffic analysis study area.

Vehicular access to the site will be provided via one full access unsignalized driveway on North Main Street and one full access unsignalized driveway for emergency use only at the terminus of the realigned Bush Street cul-de-sac. Both of these access locations currently exist.

The proposed project would improve site access on Main Street by relocating the existing access further south and further away from the Main Street / Buffalo Avenue – I-5 Southbound On-Ramp intersection.

Currently, vehicles utilize the project site as a cut-through between Bush Street and Main Street. Vehicles have been observed traveling through the site to access Main Street from Bush Street.

The proposed project with its emergency only access on Bush Street will eliminate the cut-through traffic traveling on Bush Street to access Main Street via the project site.

The proposed project is planned to open in 2018.

In accordance with the approved scope of work, the study area consists of the following study intersections:

Study Intersection			Jurisdiction
No.	North-South Street	East-West Street	
1	Main Street	Edgewood Road – I-5 HOV Ramps	Santa Ana / Caltrans
2	Main Street	Santa Clara Avenue / I-5 NB Ramps	Santa Ana / Caltrans
3	Main Street	Buffalo Avenue / I-5 SB On-Ramp	Santa Ana / Caltrans
4	Main Street	17th Street	Santa Ana
5	Main Street	Project Access 1	Santa Ana

C. Development Project Description

The proposed site is located at 2129 North Main Street in the City of Santa Ana, as shown in Exhibit 1-1. The project will consist of constructing a 135 room hotel on an existing public parking lot.

Vehicular access to the site will be provided via one full access unsignalized driveway on North Main Street and one full access unsignalized driveway for emergency use only at the terminus of the realigned Bush Street cul-de-sac. Both of these access locations currently exist.

The proposed project would improve site access on Main Street by relocating the existing access further south and further away from the Main Street / Buffalo Avenue – I-5 Southbound On-Ramp intersection.

Currently, vehicles utilize the project site as a cut-through between Bush Street and Main Street. Vehicles have been observed traveling through the site to access Main Street from Bush Street.

The proposed project with its emergency only access on Bush Street will eliminate the cut-through traffic traveling on Bush Street to access Main Street via the project site.

The proposed project is planned to implement gated entry with ticket dispenser at the project site access on Main Street.

The project site plan is shown in Exhibit 1-2.

The project is projected for completion by Year 2018 and has been analyzed in one complete phase.

D. LOS Analysis Methodology

The level of service (LOS) was evaluated utilizing the methodologies listed below:

D.1 ICU Methodology

The methodology used to assess the operation of the signalized study area intersections within the jurisdiction of City of Santa Ana is Intersection Capacity Utilization (ICU). To calculate the ICU, the volume of traffic using the intersection is compared with the capacity of the intersection. ICU is usually expressed as a ratio. This ratio represents that portion of the hour required to provide sufficient capacity to accommodate all intersection traffic if all approaches operate at capacity.

The *ICU* analysis methodology describes the operation of a signalized intersection using a range of LOS from LOS A (free-flow conditions) to LOS F (severely congested conditions), based on the corresponding volume to capacity (V/C) ratios shown in the table below.

ICU Methodology LOS Ranges

LOS	Critical Volume to Capacity Ratio
A	0.000 - 0.600
B	0.601 - 0.700
C	0.701 - 0.800
D	0.801 - 0.900
E	0.901 - 1.000
F	>1.000

D.2 HCM Methodology

Study area intersections that are stop sign controlled have been analyzed using the Highway Capacity Manual methodology.

Additionally, signalized study area intersections that are in shared jurisdiction of the City of Santa Ana and Caltrans have been analyzed using the Highway Capacity Manual methodology as well as the ICU methodology. Using the intersection configuration/capacity and traffic volumes at these locations, the level of service has been calculated. The following thresholds are used in assigning a letter value to the resulting Levels of Service.

Level of service is based on the average stopped delay per vehicle for all movements of signalized intersections and all-way stop-controlled intersections; for one-way or two-way stop-controlled intersections, LOS is based on the worst stop-controlled approach.

HCM Methodology LOS Ranges

LOS	Delay (Seconds Per Vehicle)	
	Signalized	Unsignalized
A	0.00 - 10.00	0.00 - 10.00
B	10.01 - 20.00	10.01 - 15.00
C	20.01 - 35.00	15.01 - 25.00
D	35.01 - 55.00	25.01 - 35.00
E	55.01 - 80.00	35.01 - 50.00
F	>80.00	>50.00

E. LOS Criteria

The City of Santa Ana target for peak hour intersection operation is LOS D or better.

For intersections located within areas of the City designated as Major Development Areas (MDA), LOS E or better is considered acceptable.

The following summarizes the City of Santa Ana performance criteria for each of the five (5) study intersections:

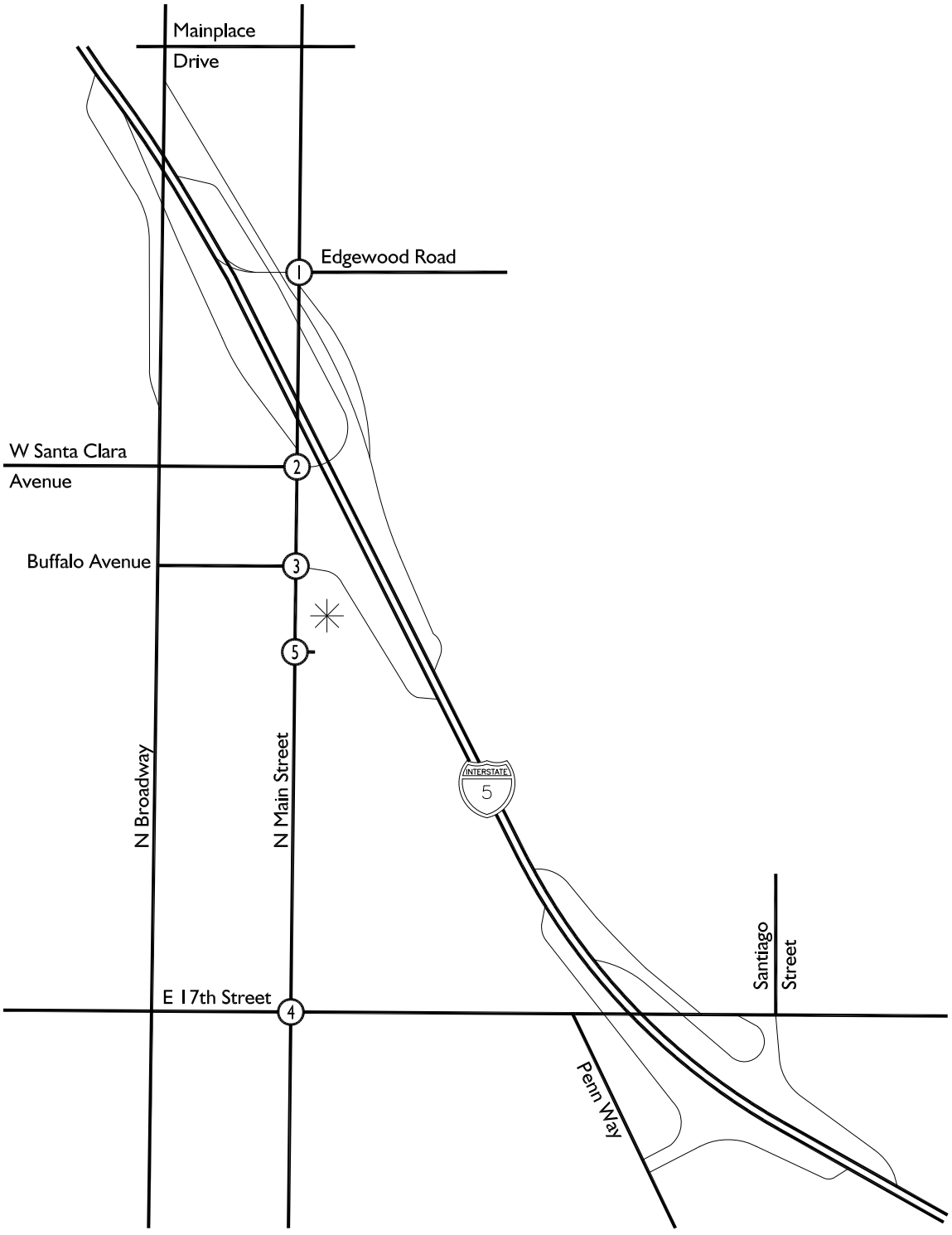
Study Intersection			Performance Criteria
No.	North-South Street	East-West Street	
1	Main Street	Edgewood Road – I-5 HOV Ramps	LOS D or better
2	Main Street	Santa Clara Avenue / I-5 NB Ramps	LOS E or better
3	Main Street	Buffalo Avenue / I-5 SB On-Ramp	LOS E or better
4	Main Street	17th Street	LOS D or better
5	Main Street	Project Access 1	LOS D or better

F. Significant Impact Criteria

The City of Santa Ana has established the following thresholds of significance to determine whether the addition of project-generated trips results in a significant impact, and thus requires mitigation:

- A significant impact occurs at a study intersection if the addition of project generated trips causes the intersection to change from an acceptable LOS to deficient LOS.

Exhibit 1-1
Location Map



Legend:

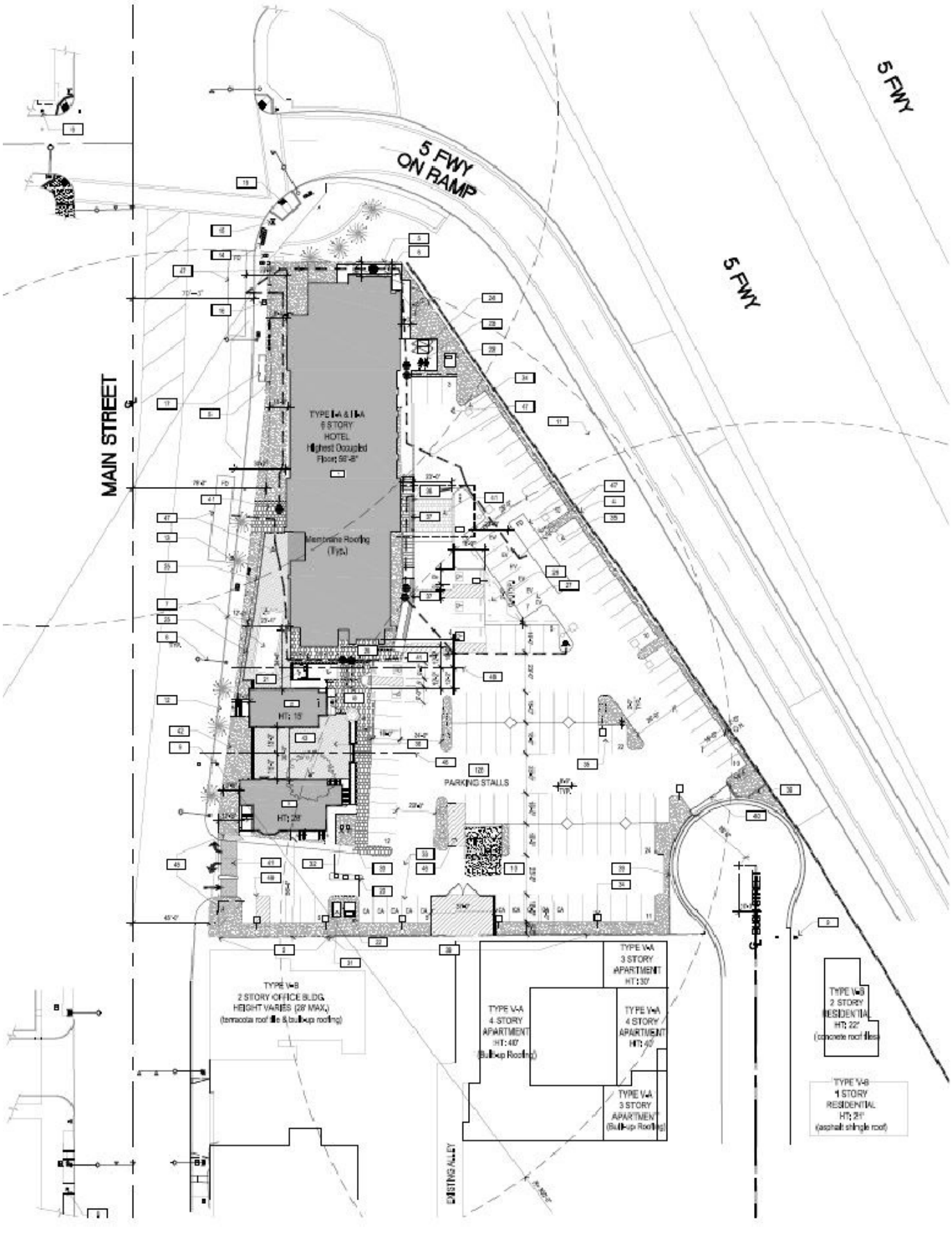
① = Study Area Intersection

✳ = Project Site

N

Exhibit 1-2

Site Plan



2.0 Area Conditions

A. Study Area

In accordance with the approved scope of work, the study area consists of the following study intersections:

Study Intersection			Jurisdiction
No.	North-South Street	East-West Street	
1	Main Street	Edgewood Road – I-5 HOV Ramps	Santa Ana / Caltrans
2	Main Street	Santa Clara Avenue / I-5 NB Ramps	Santa Ana / Caltrans
3	Main Street	Buffalo Avenue / I-5 SB On-Ramp	Santa Ana / Caltrans
4	Main Street	17th Street	Santa Ana
5	Main Street	Project Access 1	Santa Ana

B. Existing Traffic Controls & Intersection Geometrics

Exhibit 2-1 identifies the existing roadway conditions for the study area roadways. The number of through traffic lanes for existing roadways and the existing intersection controls are identified.

C. Existing Traffic Volumes

Existing AM and PM peak hour traffic volumes for the study area intersections are shown on Exhibit 2-2. These volumes are based upon manual AM (7:00 AM to 9:00 AM) and PM (4:00 to 6:00 PM) peak hour turning movement counts compiled for RK in April 2017. The traffic count worksheets are included in Appendix A.

D. General Plan Circulation Element

Exhibit 2-3 shows the City of Santa Ana Master Plan of Streets and Highways.

Exhibit 2-4 shows the City of Santa Ana Typical Roadway Cross Sections.

Exhibit 2-5 shows the City of Santa Ana Bikeway Master Plan.

For the roadway segments adjacent to the site, the General Plan classification is as follows:

- North Main Street: Major Arterial (6-lane divided roadway)

E. Public Transit Service

Public transit services in the study area are provided by Orange County Transportation Authority. Exhibit 2-6 provides the OCTA System Map of North County based on the latest information available for access through OCTA website at time of preparation of this study. The following bus routes are currently operating in the vicinity of the project site:

- Serving the Main Street / Buffalo Avenue stop: Line 53 and Line 83; and

- Other in the area (within half a mile of the site): 53X, 60, 83, 453, 560

A bus stop currently exists on the project site frontage on Main Street and will be continue to be provided after implementation of the proposed project.

If the proposed project and construction is expected to impact the operations and functionality of the existing bus stop(s), OCTA should be contacted and informed of any planned disruptions. It is recommended disruptions be avoided and minimized as feasible.

F. Existing Level of Service

Table 1 summarizes Existing Conditions AM peak hour and PM peak hour LOS of the study intersections. Detailed LOS analysis worksheets for Existing Conditions is contained in Appendix B.

Table 1
Existing Conditions
AM & PM Peak Hour Study Intersection LOS

Study Intersection	Acceptable LOS	Existing Conditions			
		AM Peak Hour		PM Peak Hour	
		V/C – LOS	Delay – LOS	V/C – LOS	Delay – LOS
1. Main St / Edgewood Rd – I-5 HOV Ramps	D	0.640 – B	40.1 – D	0.624 – B	41.1 – D
2. Main St / Santa Clara Ave – I-5 NB Ramps	E	0.706 – C	61.2 – E	0.729 – C	27.9 – C
3. Main St / Buffalo Ave – I-5 SB On-Ramp	E	0.608 – B	20.1 – C	0.717 – C	30.9 – C
4. Main St / 17th St	D	0.759 – C	N/A	0.720 – C	N/A

Notes: V/C = volume-to-capacity ratio utilizing ICU methodology; Delay reported in seconds utilizing HCM methodology; NB = Northbound; SB = Southbound; N/A = Not applicable.

As shown in Table 1, all study intersections are currently operating at an acceptable LOS for Existing Conditions. □

Exhibit 2-1

Existing Lane Geometry & Intersection Controls

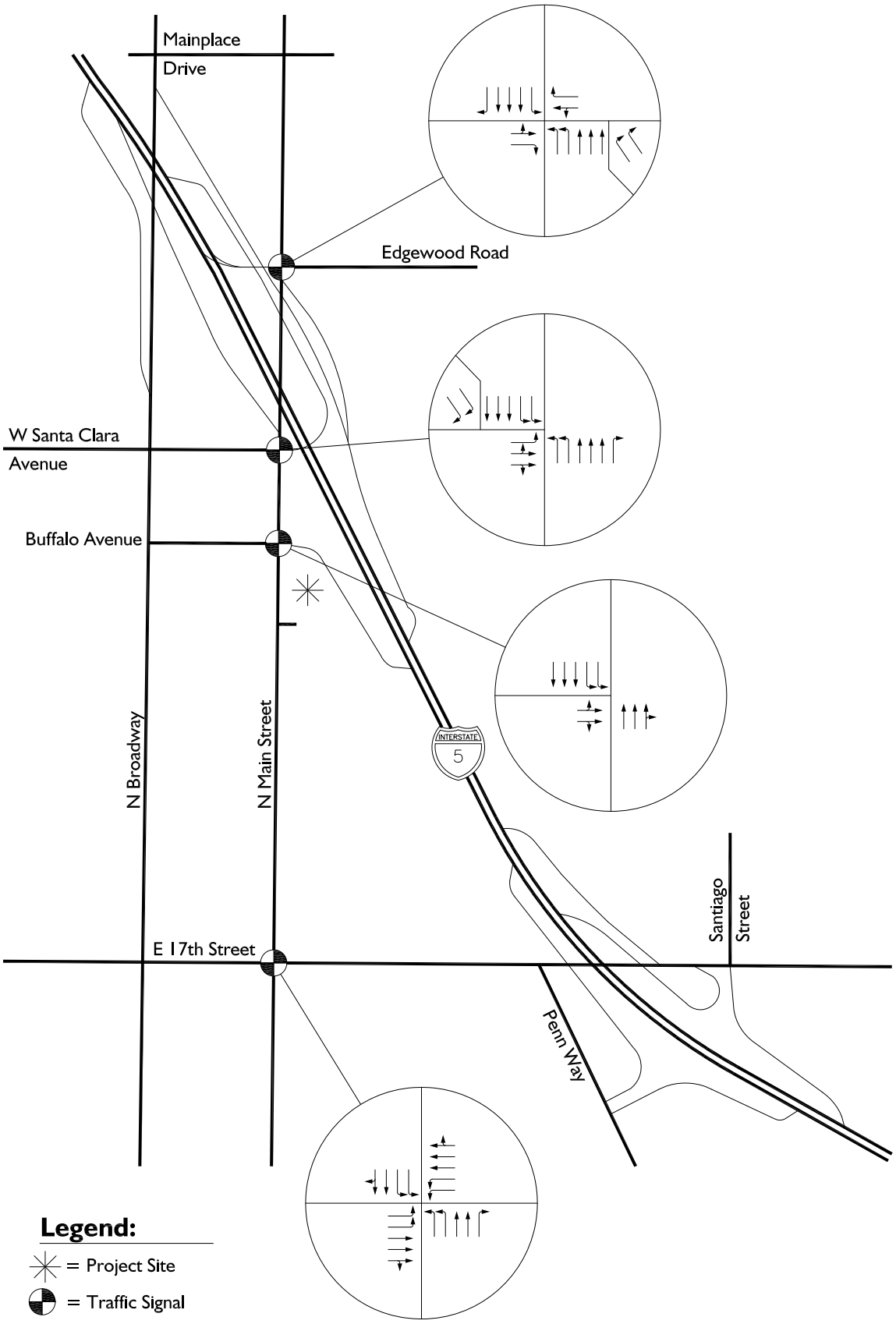
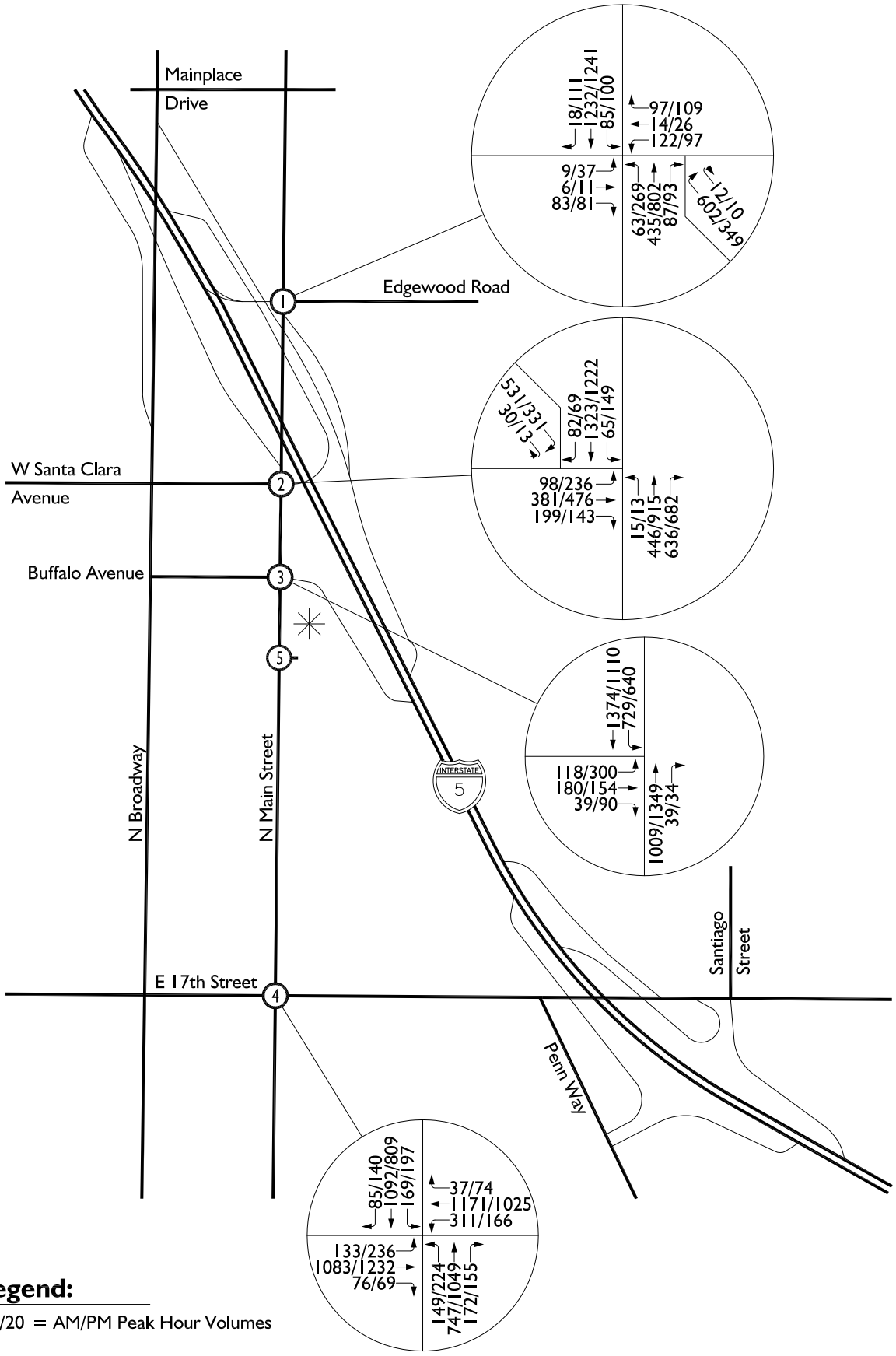


Exhibit 2-2

Existing Traffic Volumes



Legend:

10/20 = AM/PM Peak Hour Volumes

N

Exhibit 2-3

City of Santa Ana Master Plan of Streets and Highways

N

Exhibit 2-4

City of Santa Ana Typical Roadway Cross Street Section

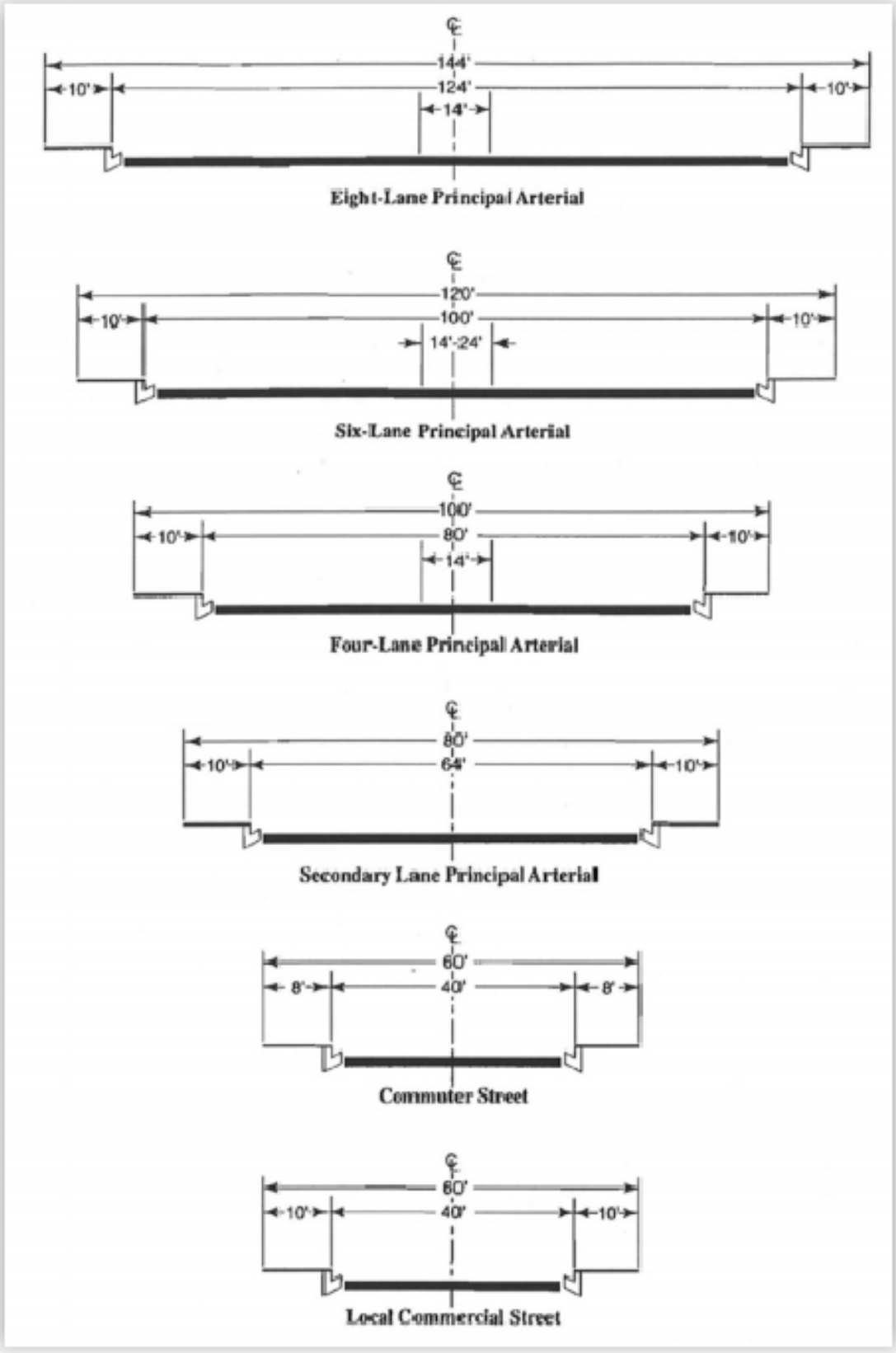


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Exhibit 2-5

City of Santa Ana Bikeway Master Plan

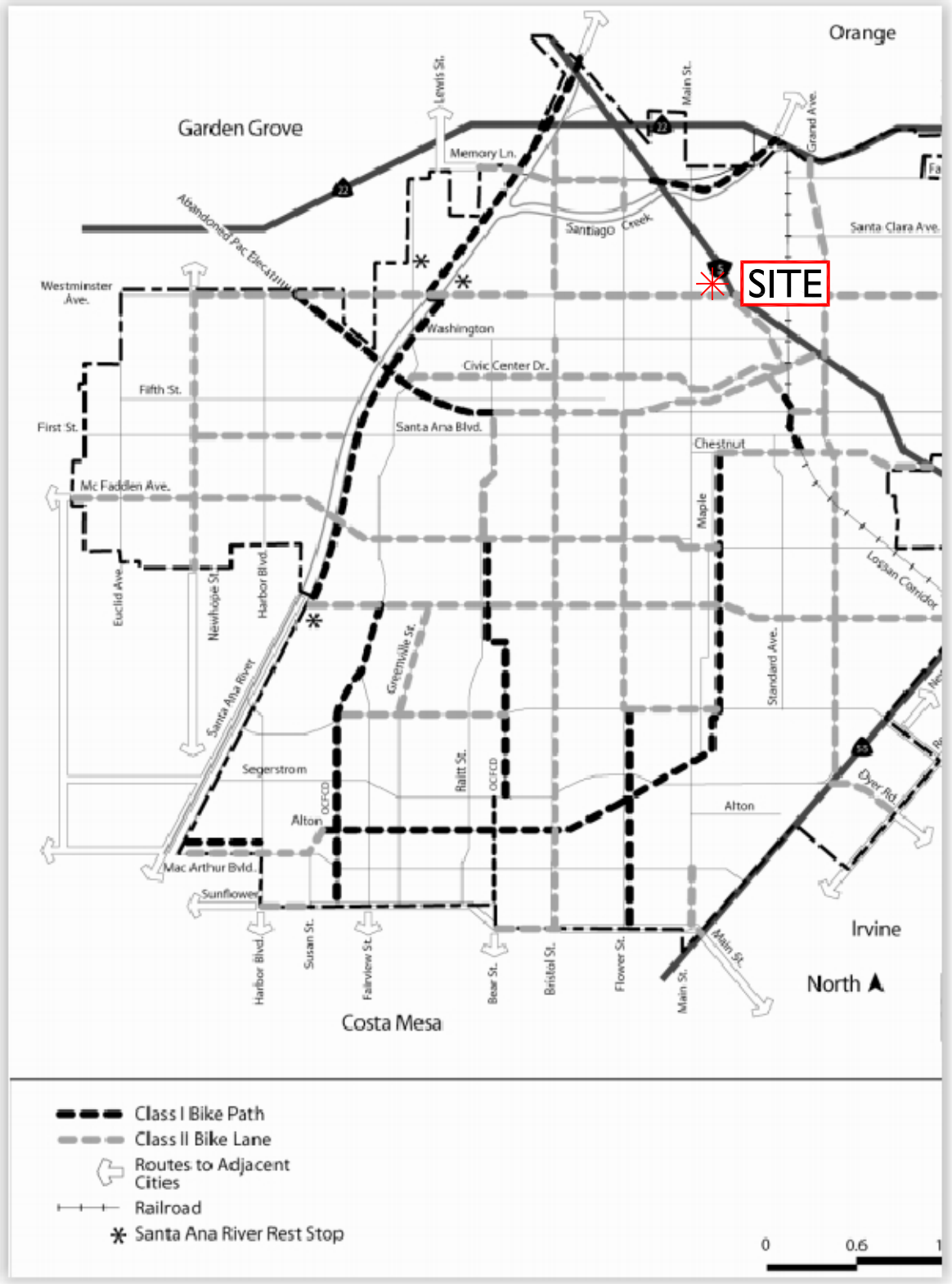

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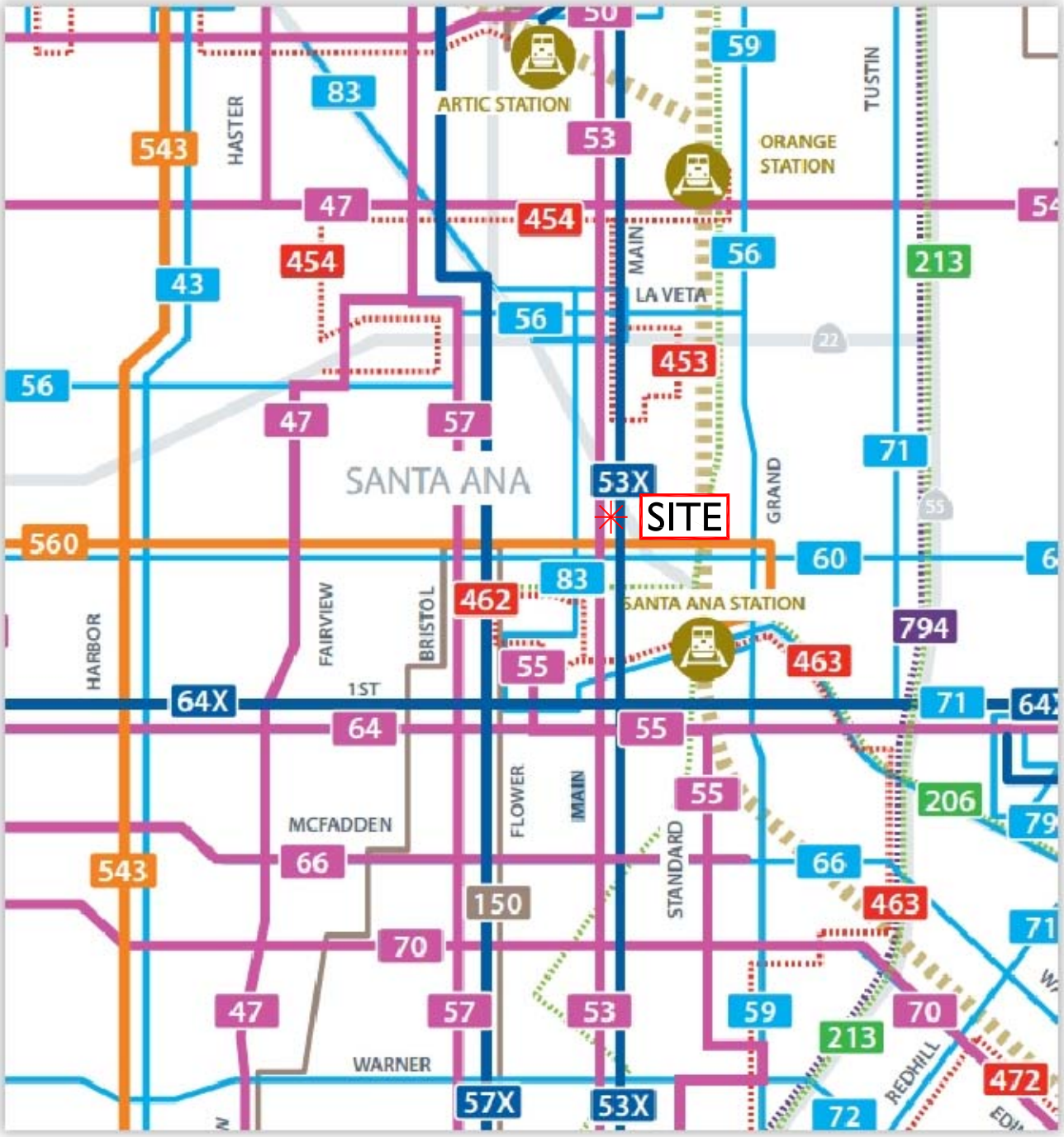
Exhibit 2-6

OCTA System Map - North County



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3.0 Projected Traffic

A. Project Traffic Conditions

A.1 Project Trip Generation

Trip generation represents the amount of traffic that is attracted and produced by a development. The trip generation for the project is based upon the specific land uses that have been planned for the development. The project will consist of constructing a 135-room hotel.

Trip generation rates for the proposed project are shown below in Table 2 and are based on the *Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition, 2012*. This publication provides a comprehensive evaluation of trip generation rates for a variety of land uses.

Table 2
ITE Trip Generation Rates for Proposed Project

Land Use	Units	ITE Code	AM			PM			Daily
			In	Out	Total	In	Out	Total	
Hotel	Rooms	310	0.31	0.22	0.53	0.31	0.29	0.60	8.17

Source: Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition, 2012.

Utilizing the ITE trip generation rates shown in Table 2, Table 3 summarizes the daily and peak hour trip generation for the proposed project.

Table 3
Daily & Peak Hour Trip Generation Summary of Proposed Project

Land Use	AM Peak Hour Trips			PM Peak Hour Trips			Daily Trips
	In	Out	Total	In	Out	Total	
135-room Hotel	42	29	71	41	40	81	1,103

As shown in Table 3, based on ITE trip generation rates, the proposed project is forecast to generate approximately 1,103 daily trips which include approximately 71 AM peak hour trips and approximately 81 PM peak hour trips.

A.2 Project Trip Distribution & Assignment

Trip distribution represents the directional orientation of traffic to and from the project site. Trip distribution is heavily influenced by the geographical location of the site, the location of residential, employment, and recreational opportunities, and the proximity to the regional freeway system. The directional orientation of traffic was determined by evaluating existing and proposed land uses, and highways within the community.

Trip distribution patterns for this study have been based upon near-term conditions, based upon those highway facilities that are either in place or will be contemplated over the next few years, which represents the completion and occupancy for the proposed development.

The project trip distribution assumptions have been provided to the City of Santa Ana staff for review and approval prior to preparation of this traffic study.

The outbound and inbound trip distribution patterns for the project are graphically depicted on Exhibit 3-1 and 3-2, respectively.

The assignment of traffic from the site to the adjoining roadway system has been based upon the site's trip generation, trip distribution, and proposed arterial highway and local street systems that would be in place by the time of initial occupancy of the site.

A.3 Project Peak Hour Traffic Volumes

Project peak hour traffic volumes have been calculated throughout the study area. The project's AM and PM Peak hour intersection turning movement volumes assignment are shown on Exhibit 3-3.

A.4 Existing Plus Project Traffic Volumes

Existing Plus Project peak hour intersection turning movement volumes were obtained by adding project trip assignment to existing traffic volumes. Existing Plus Project AM and PM peak hour intersection turning movement volumes are shown on Exhibit 3-4.

It should be noted, this analysis conservatively assumes even though the proposed project will displace the existing parking lot, all the vehicles utilizing the existing parking lot will continue to park in this area.

Hence, the analysis assumes the vehicle trips associated with the existing parking lot will still be in the surrounding circulation system and the project trips are added on top of the existing traffic volumes, without taking any trip credit associated with the displaced parking lot.

B. Background Traffic

B.1 Method of Projection

To assess Project Completion (Year 2018) traffic conditions, traffic associated with cumulative projects identified by City staff is added to existing traffic volumes after applying an area wide growth rate to account for background traffic.

B.2 Cumulative Projects Traffic

Appendix C lists the proposed land uses for the nearby cumulative projects, for Project Completion (Year 2018) conditions, known to the City of Santa Ana, the City of Orange, and RK Engineering at the time this study was prepared. Development that has been approved or is being processed concurrently in the study area includes the projects illustrated on the map in Exhibit 3-5.

The Cumulative Developments' AM and PM peak hour intersection turning movement volumes are shown on Exhibit 3-6. Appendix C contains the information of the Cumulative Development traffic including forecast trip generation associated with each cumulative project included in this analysis.

B.3 Background Traffic Growth Rate

To account for area wide growth on roadways for Project Completion (Year 2018), existing traffic volumes have been adjusted upwards utilizing an annual growth rate of one percent (1%) over a one year period.

C. Project Completion (Year 2018) Without Project Conditions Traffic Volumes

Project Completion (Year 2018) Without Project Conditions traffic volumes include existing traffic volumes on surrounding roadways, traffic associated with cumulative projects, and area-wide growth. Project Completion (Year 2018) Without Project Conditions AM and PM peak hour intersection turning movement volumes are shown on Exhibit 3-7.

D. Project Completion (Year 2018) With Project Conditions Traffic Volumes

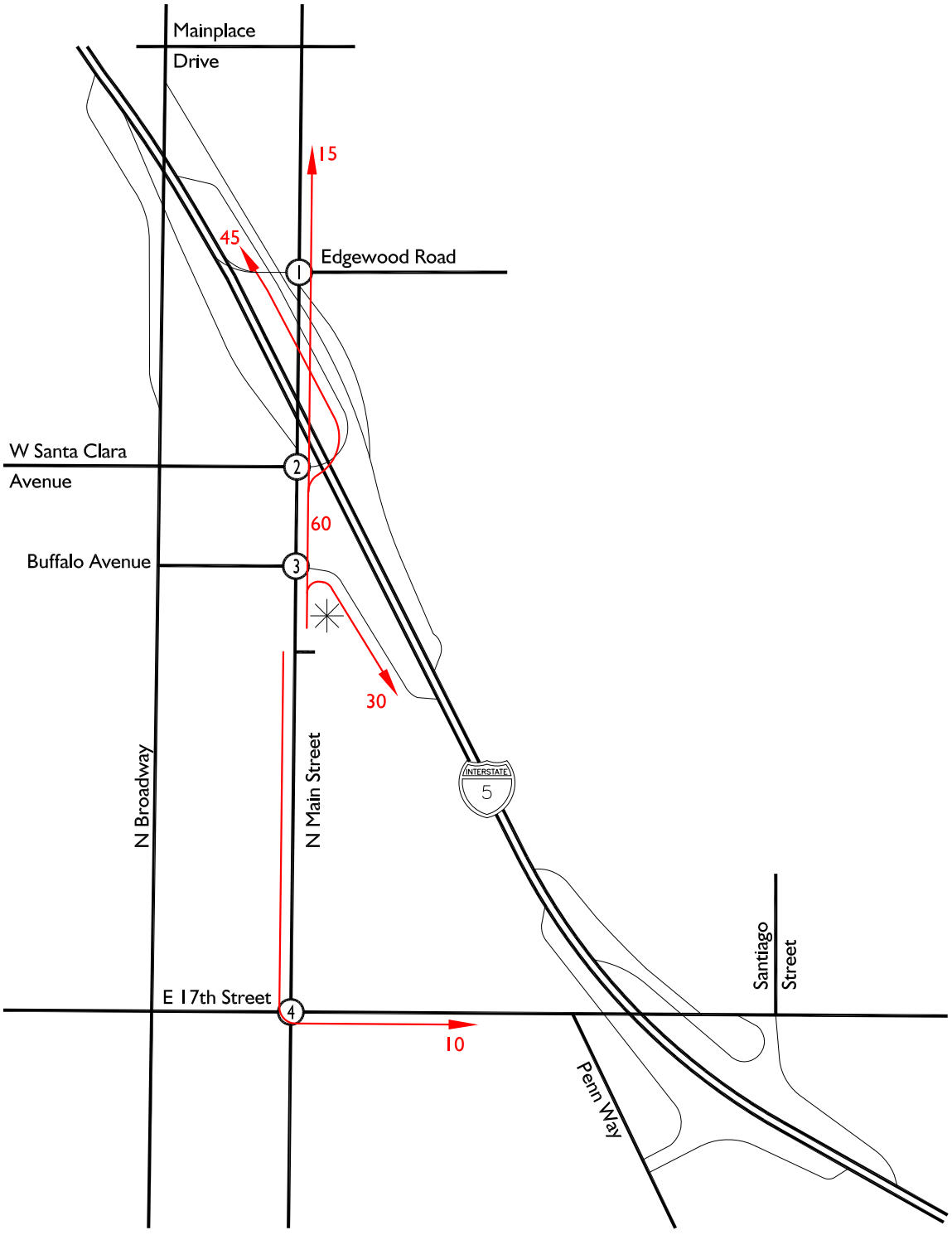
Project traffic has been added to background traffic volumes on surrounding roadways, traffic from cumulative projects, and area-wide growth to derive Project Completion (Year 2018) With Project Conditions traffic volumes. Project Completion (Year 2018) With Project Conditions AM and PM peak hour intersection turning movement volumes are shown on Exhibit 3-8.

It should be noted, this analysis conservatively assumes even though the proposed project will displace the existing parking lot, all the vehicles utilizing the existing parking lot will continue to park in this area.

Hence, the analysis assumes the vehicle trips associated with the existing parking lot will still be in the surrounding circulation system and the project trips are added on top of the existing traffic volumes, without taking any trip credit associated with the displaced parking lot.

Exhibit 3-1

Outbound Project Trip Distribution



Legend:

1 = Study Area Intersection

= Project Site

10 = Percent to/from Project

N

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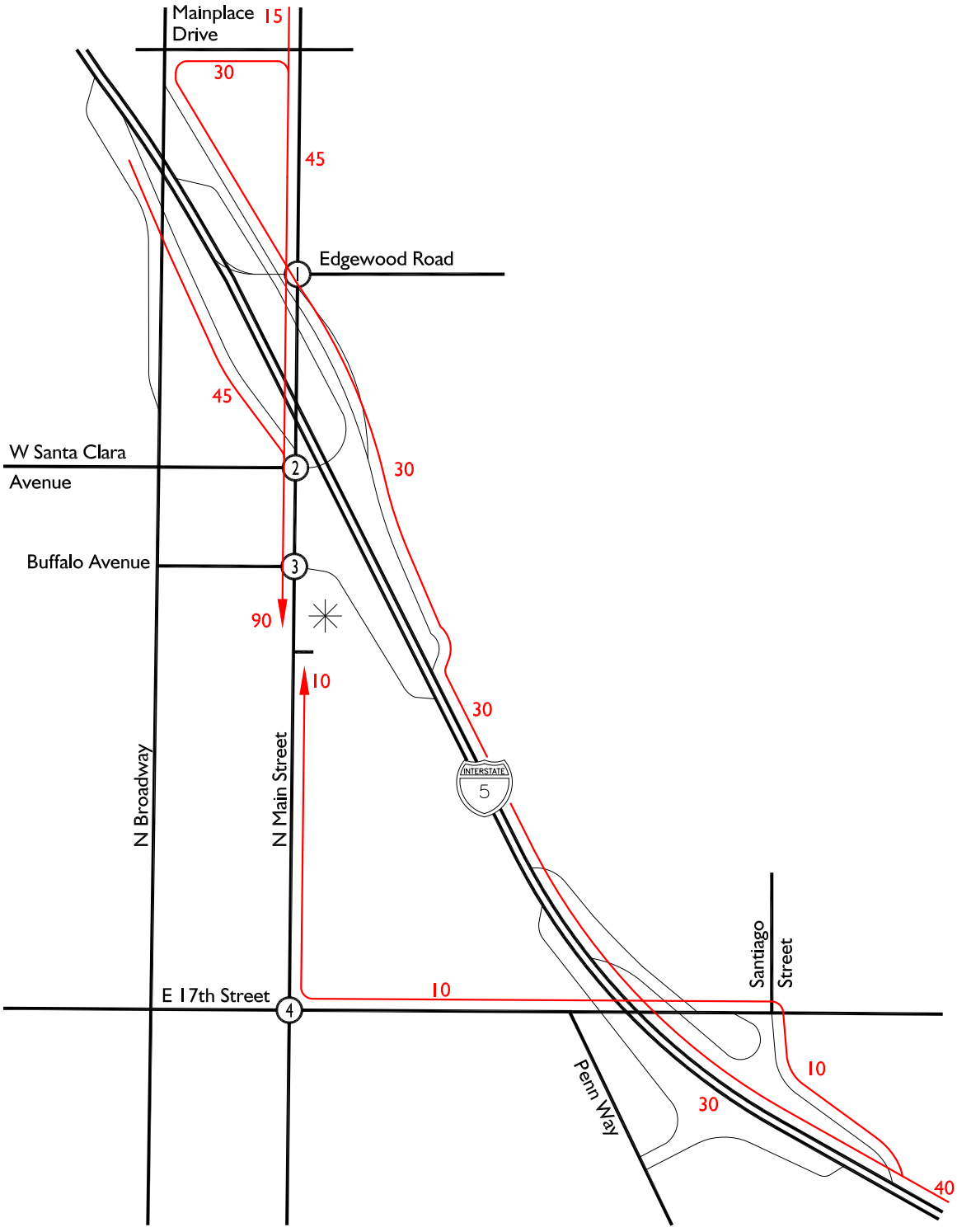
Exhibit 3-2

Inbound Project Trip Distribution



Legend:

① = Study Area Intersection

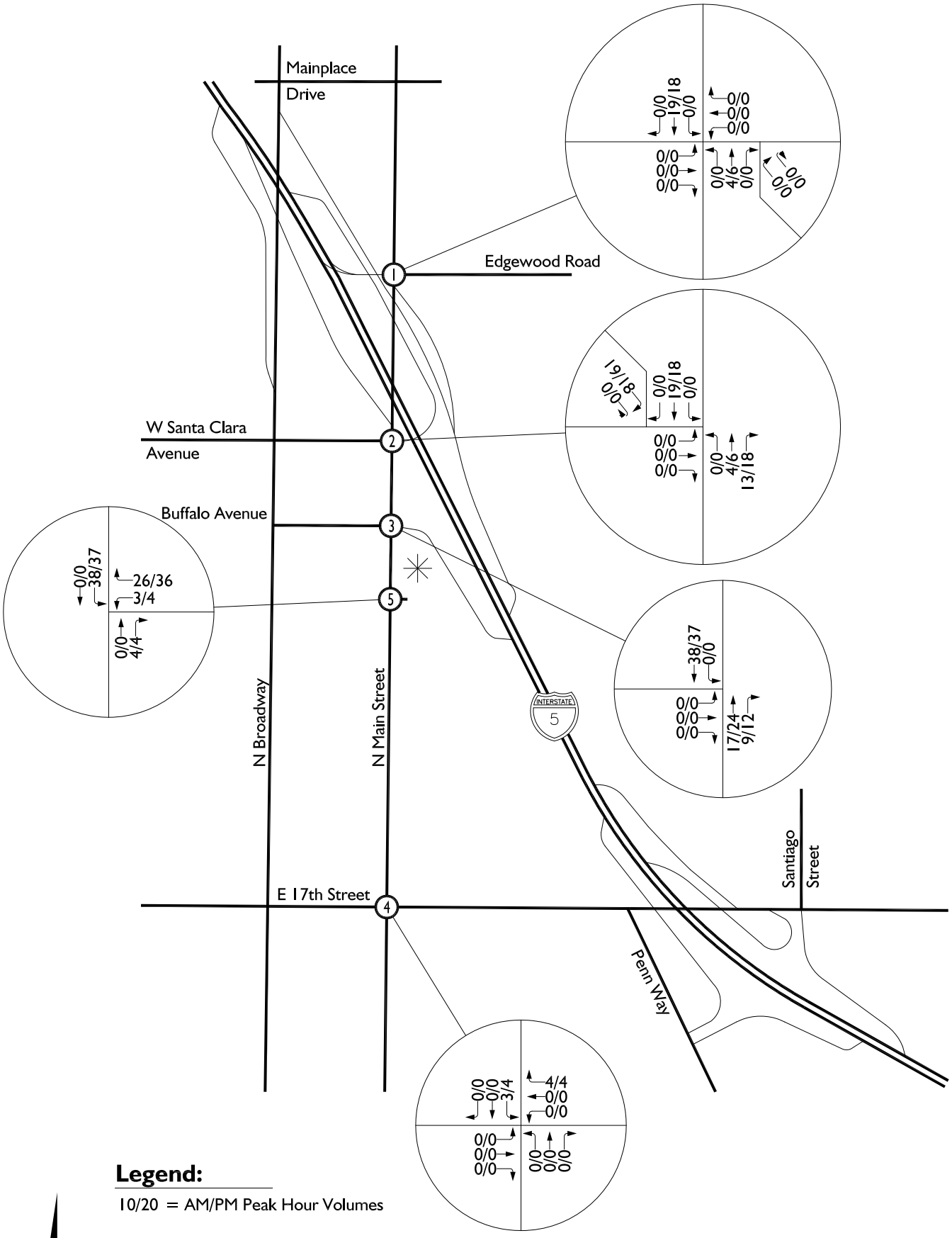
✳ = Project Site

10 = Percent to/from Project

N

Exhibit 3-3

Project Traffic Volumes



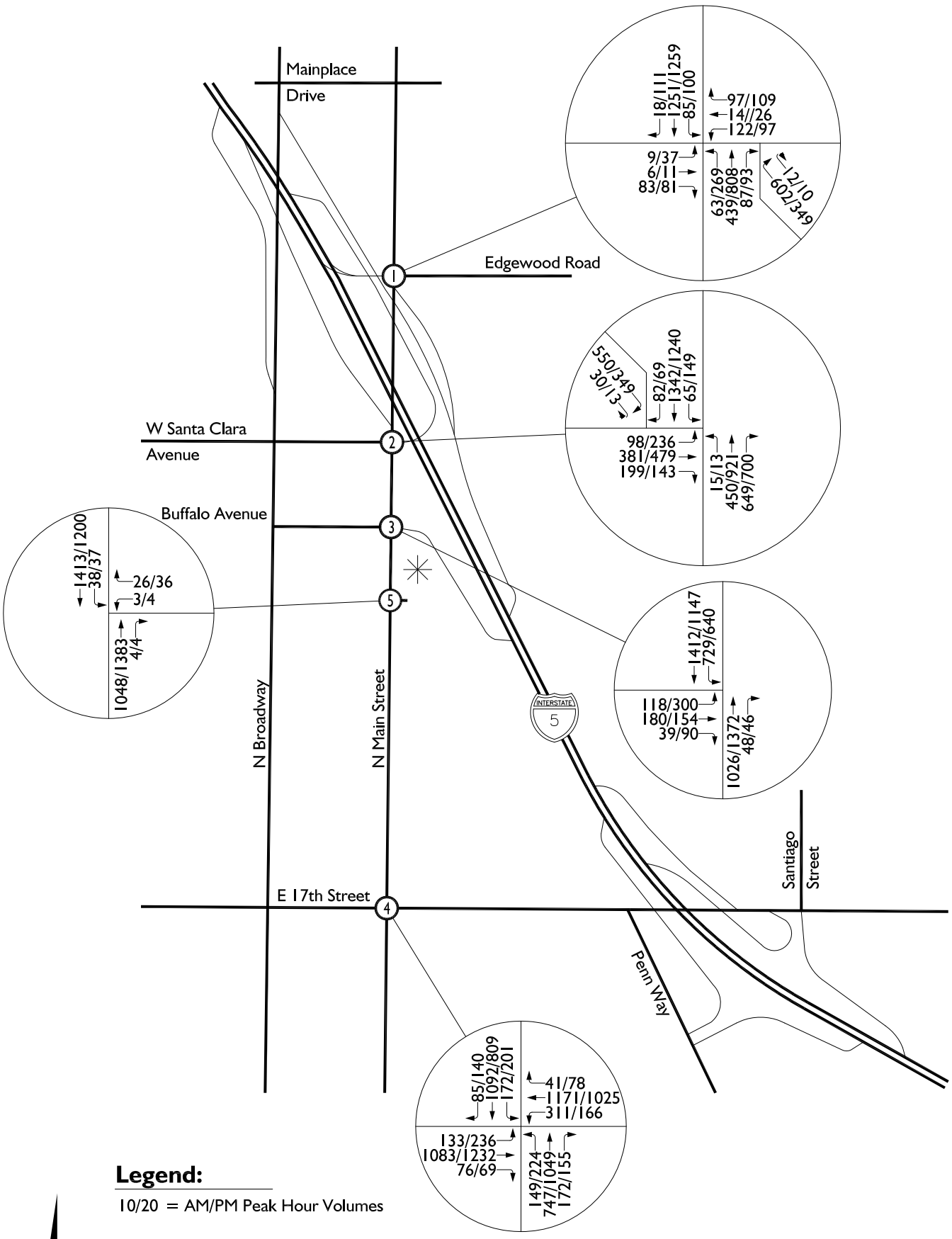
Legend:

10/20 = AM/PM Peak Hour Volumes

N

Exhibit 3-4

Existing Plus Project Traffic Volumes



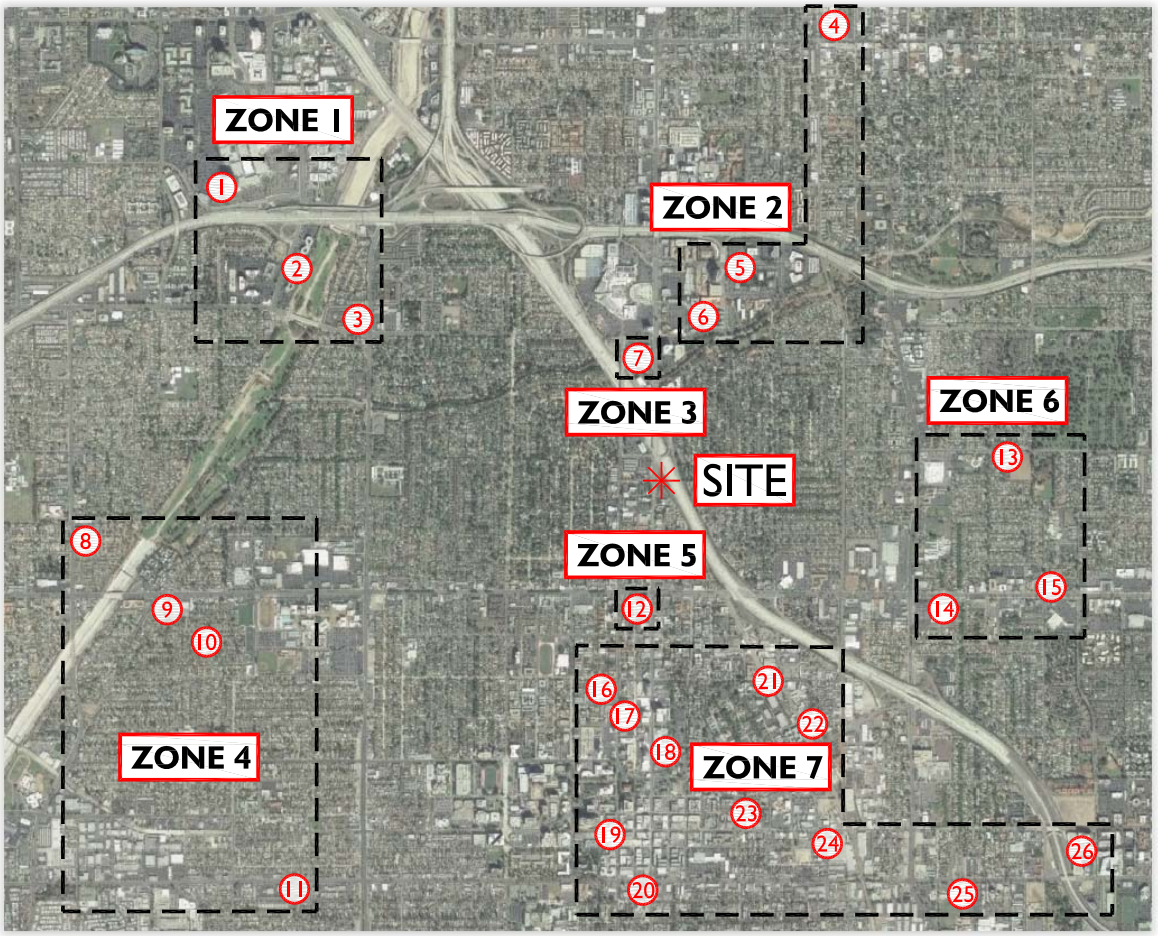
Legend:

10/20 = AM/PM Peak Hour Volumes

N

Exhibit 3-5

Cumulative Developments Location Map



Zone 1:

1 = Orange Collection
2 = Oakmon Senior Living
3 = Bristol-Memory Commercial Building

Zone 2:

4 = Old Town Gateway
5 = Town and Country Apartments and Townhouses
6 = The 301

Zone 3:

7 = Discovery Science Center

Zone 4:

8 = The Academy Charter High School
9 = New Convenience Store
10 = Lam Residential
11 = Olson Residential

Zone 5:

12 = Meta Housing Adaptive Reuse Residential

Zone 6:

13 = Sexlinger Homes
14 = Target Shopping Center Commercial Pads
15 = Rocket Express Car Wash

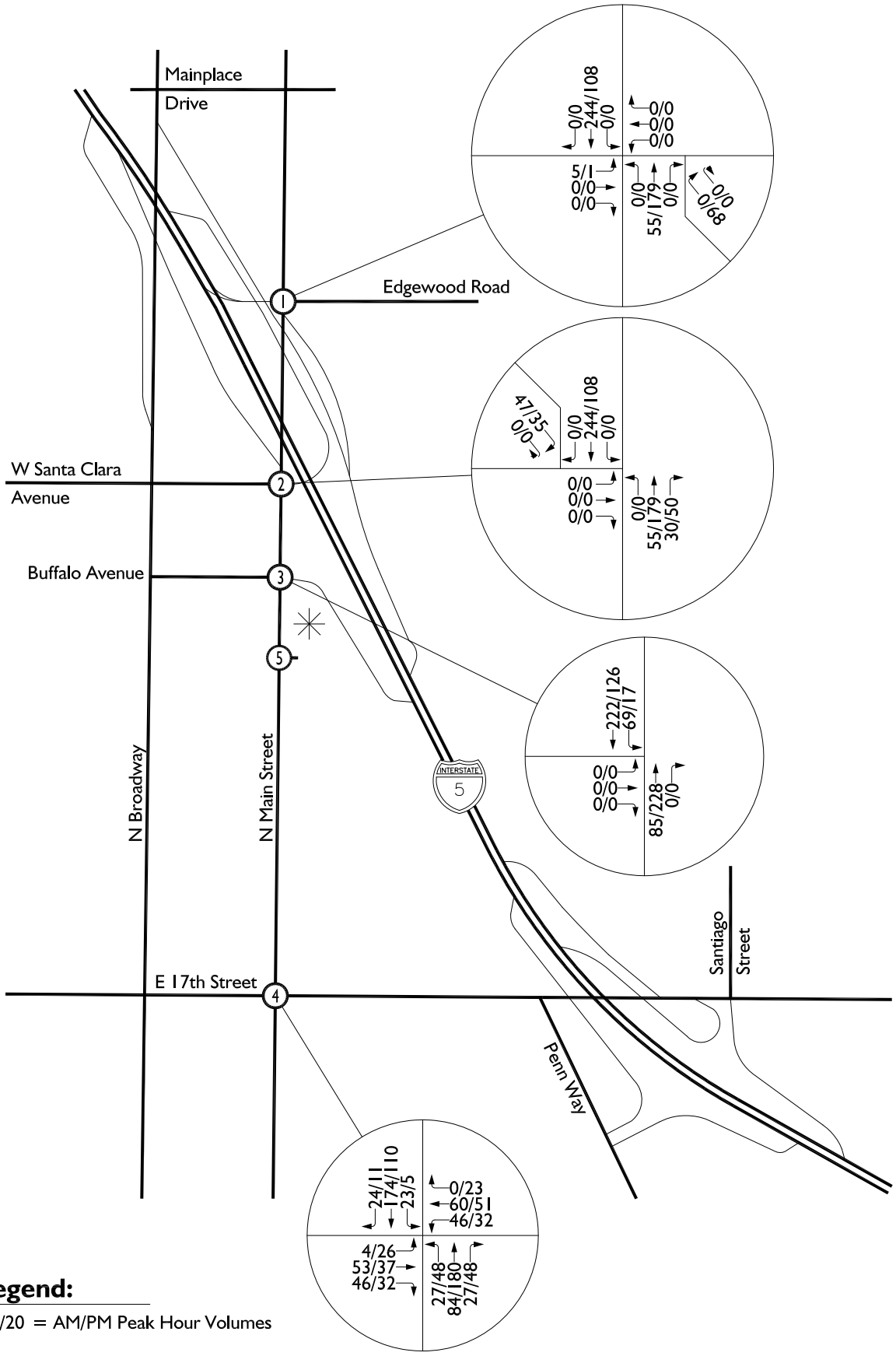
Zone 7:

16 = Orleans Adaptive Reuse Apartments
17 = One Broadway Plaza
18 = Eight Eight 8 - Adaptive Reuse
19 = West Ends Loft II
20 = Artist Gateway
21 = Lotus Townhomes
22 = Depot at Santiago
23 = City Venture
24 = Tom's Trucks Residential Development
25 = AMCAL First Street Family Apartments
26 = Madison Mixed-Use Commercial

N

Exhibit 3-6

Cumulative Developments Traffic Volumes



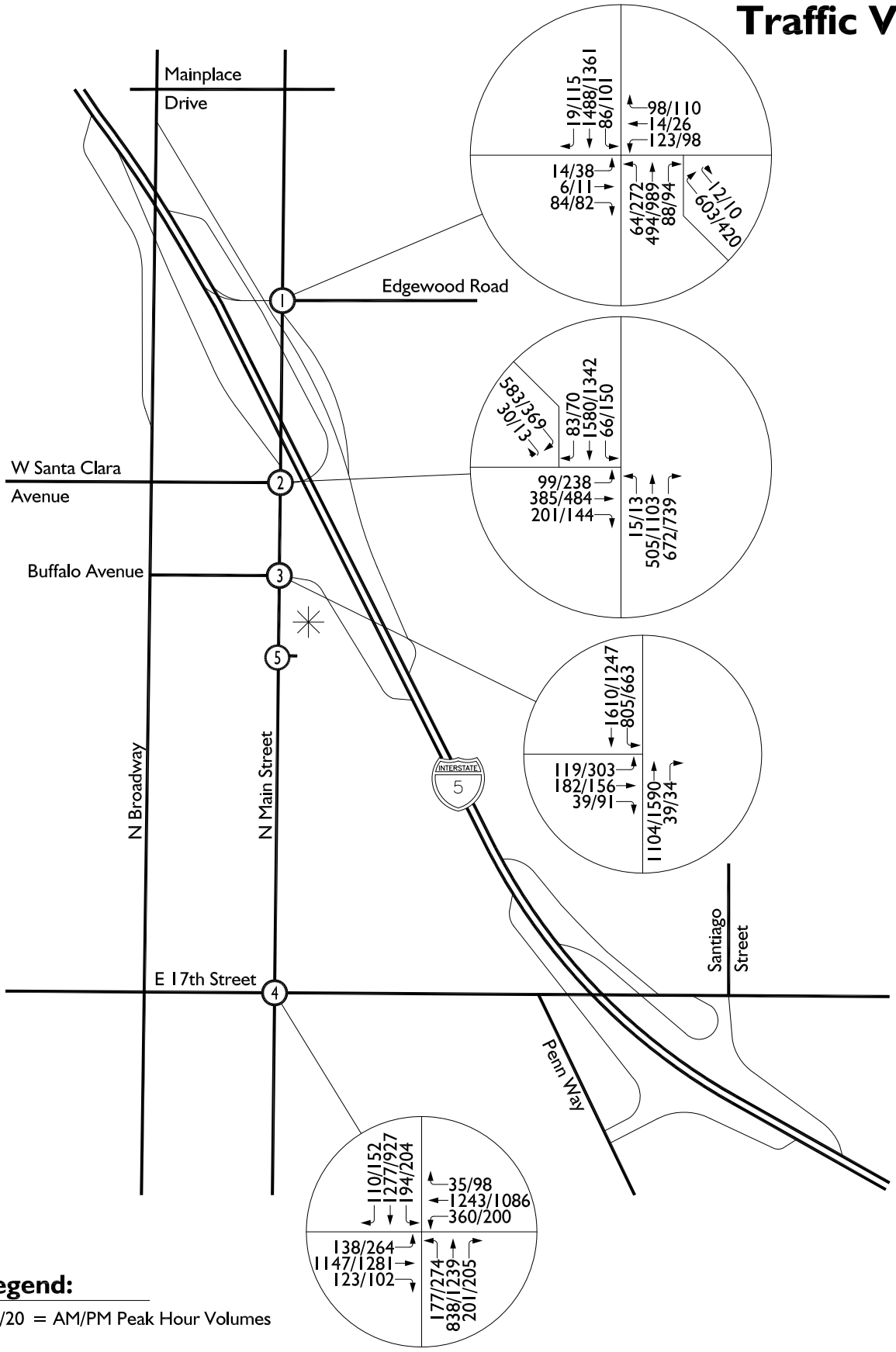
Legend:

10/20 = AM/PM Peak Hour Volumes

N

Exhibit 3-7

Project Completion (Year 2018) Without Project Traffic Volumes



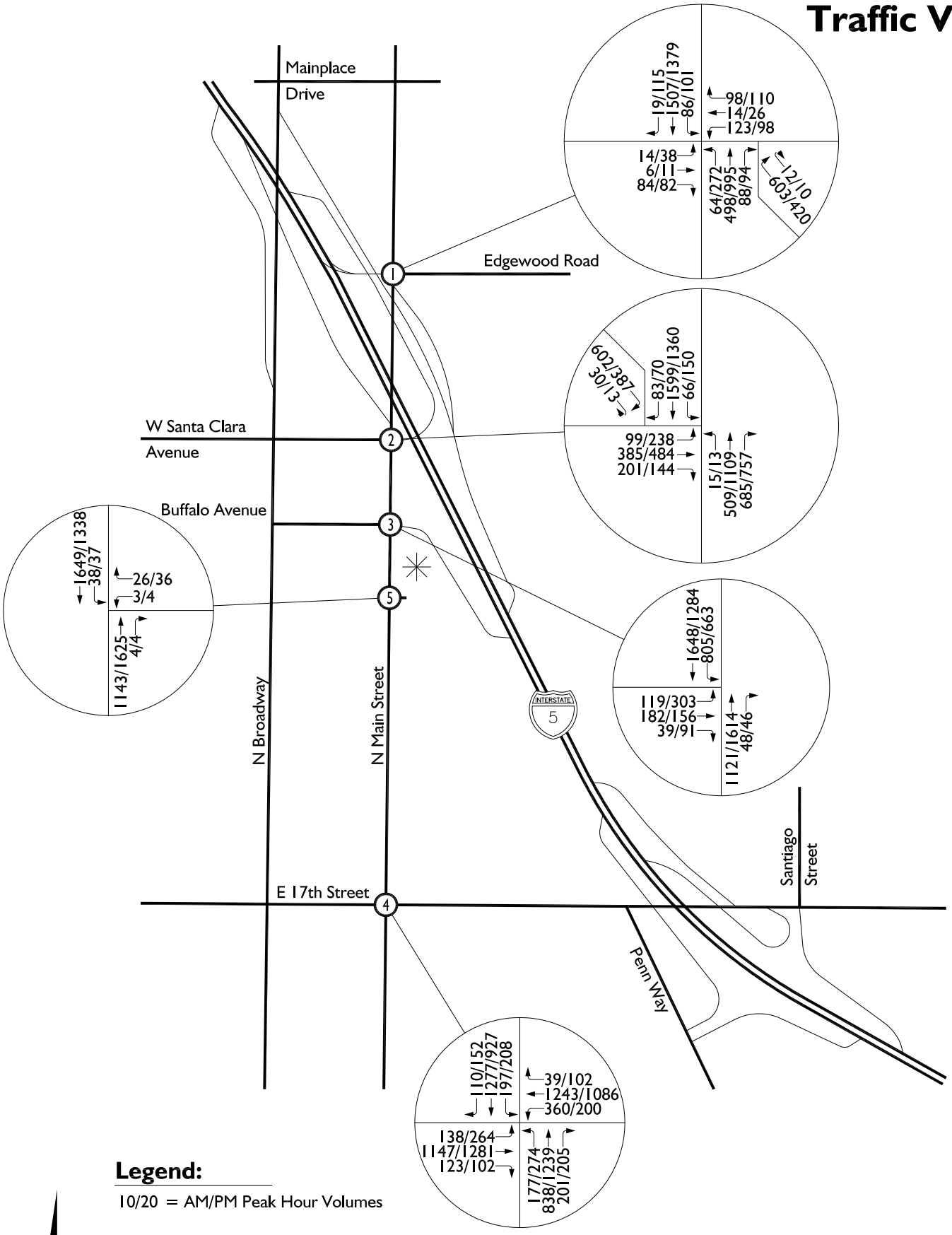
Legend:

10/20 = AM/PM Peak Hour Volumes

N

Exhibit 3-8

Project Completion (Year 2018) With Project Traffic Volumes



Legend:

10/20 = AM/PM Peak Hour Volumes

N

4.0 Traffic Impact Analysis

A. Existing Plus Project Conditions Study Intersection LOS Analysis

Table 4 summarizes Existing Plus Project Conditions AM peak hour and PM peak hour LOS of the study intersections. Detailed LOS analysis worksheets for Existing Plus Project Conditions is contained in Appendix D.

Table 4
Existing Plus Project Conditions
AM & PM Peak Hour Study Intersection LOS

Study Intersection	Acceptable LOS	Existing Plus Conditions				
		AM Peak Hour		PM Peak Hour		Significant Impact?
		V/C – LOS	Delay – LOS	V/C – LOS	Delay – LOS	
1. Main St / Edgewood Rd – I-5 HOV Ramps	D	0.641 – B	39.7 – D	0.625 – B	41.0 – D	No
2. Main St / Santa Clara Ave – I-5 NB Ramps	E	0.713 – C	60.6 – E	0.740 – C	28.3 – C	No
3. Main St / Buffalo Ave – I-5 SB On-Ramp	E	0.613 – B	20.2 – C	0.766 – C	33.2 – C	No
4. Main St / 17th St	D	0.759 – C	N/A	0.722 – C	N/A	No
5. Main St / Project Site Access	D	N/A	13.9 – B	N/A	17.6 – C	No

Notes: V/C = volume-to-capacity ratio utilizing ICU methodology; Delay reported in seconds utilizing HCM methodology; NB = Northbound; SB = Southbound; N/A = Not applicable.

As shown in Table 4, all study intersections are forecast to continue to operate at an acceptable LOS for Existing Plus Project Conditions.

As also shown in Table 4, based on agency-established thresholds of significance, the proposed project is forecast to not result in a significant traffic impact at the study intersections for Existing Plus Project Conditions.

B. Project Completion (Year 2018) Without Project Conditions Study Intersection LOS Analysis

Table 5 summarizes Project Completion Year (2018) Without Project Conditions AM peak hour and PM peak hour LOS of the study intersections. Detailed LOS analysis worksheets for Project Completion Year (2018) Without Project Conditions is contained in Appendix E.

Table 5
Project Completion Year (2018) Without Project Conditions
AM & PM Peak Hour Study Intersection LOS

Study Intersection	Acceptable LOS	Project Completion Year (2018) Without Project Conditions			
		AM Peak Hour		PM Peak Hour	
		V/C – LOS	Delay – LOS	V/C – LOS	Delay – LOS
1. Main St / Edgewood Rd – I-5 HOV Ramps	D	0.653 – B	40.9 – D	0.686 – B	43.4 – D
2. Main St / Santa Clara Ave – I-5 NB Ramps	E	0.771 – C	64.4 – E	0.766 – C	28.9 – C
3. Main St / Buffalo Ave – I-5 SB On-Ramp	E	0.649 – B	20.7 – C	0.772 – C	32.9 – C
4. Main St / 17th St	D	0.865 – D	N/A	0.804 – D	N/A

Notes: V/C = volume-to-capacity ratio utilizing ICU methodology; Delay reported in seconds utilizing HCM methodology; NB = Northbound; SB = Southbound; N/A = Not applicable.

As shown in Table 5, all study intersections are forecast to continue to operate at an acceptable LOS for Project Completion Year (2018) Without Project Conditions.

C. Project Completion (Year 2018) With Project Conditions Study Intersection LOS Analysis

Table 6 summarizes Project Completion Year (2018) With Project Conditions AM peak hour and PM peak hour LOS of the study intersections. Detailed LOS analysis worksheets for Project Completion Year (2018) With Project Conditions is contained in Appendix F.

Table 6
Project Completion Year (2018) With Project Conditions
AM & PM Peak Hour Study Intersection LOS

Study Intersection	Acceptable LOS	Project Completion Year (2018) With Project Conditions				
		AM Peak Hour		PM Peak Hour		Significant Impact?
		V/C – LOS	Delay – LOS	V/C – LOS	Delay – LOS	
1. Main St / Edgewood Rd – I-5 HOV Ramps	D	0.654 – B	39.9 – D	0.688 – B	44.4 – D	No
2. Main St / Santa Clara Ave – I-5 NB Ramps	E	0.782 – C	66.7 – E	0.777 – C	29.5 – C	No
3. Main St / Buffalo Ave – I-5 SB On-Ramp	E	0.654 – B	21.0 – C	0.779 – C	33.6 – C	No
4. Main St / 17th St	D	0.865 – D	N/A	0.806 – D	N/A	No
5. Main St / Project Site Access	D	N/A	14.8 – B	N/A	21.2 – C	No

Notes: V/C = volume-to-capacity ratio utilizing ICU methodology; Delay reported in seconds utilizing HCM methodology; NB = Northbound; SB = Southbound; N/A = Not applicable.

As shown in Table 6, all study intersections are forecast to continue to operate at an acceptable LOS for Project Completion Year (2018) With Project Conditions.

As also shown in Table 6, based on agency-established thresholds of significance, the proposed project is forecast to not result in a significant traffic impact at the study intersections for Project Completion Year (2018) With Project Conditions.

5.0 Queueing Analysis

The proposed project would improve site access on Main Street by relocating the existing access further south and further away from the Main Street / Buffalo Avenue – I-5 Southbound On-Ramp intersection.

As requested by City staff during the scoping agreement, to determine if adequate intersection spacing is provided between the project site access on Main Street and Buffalo Avenue to accommodate turning movements in and out of the project site without spill back, a Highway Capacity Manual 95th percentile vehicular queuing analysis has been prepared for the following movements:

- *Main Street / Project Site Access:*
    - southbound Main Street left-turn movement;
    - westbound project site access left-turn movement; and
    - westbound project site access right-turn movement.

Left-in access to the project site from southbound Main Street is currently accommodated via a two-way-left-turn lane.

Additionally, as requested by Caltrans, to determine if adequate storage capacity is provided to avoid vehicles backing onto the freeway, a Highway Capacity Manual 95th percentile vehicular queuing analysis has been prepared for the following movements of the State Highway study intersections:

- *Main Street / Edgewood Road – I-5 HOV Ramps:*
    - Northbound Main Street left-turn movement;
    - Northbound Main Street through/right-turn movement;
    - Southbound Main Street left-turn movement;
    - Southbound Main Street through movement;

- Southbound Main Street right-turn movement;
- Southbound I-5 Off-Ramp left-turn/through movement;
- Southbound I-5 Off-Ramp right-turn movement;
- Westbound Edgewood Road through/left-turn movement;
- Westbound Edgewood Road right-turn movement;
- Northbound I-5 Off-Ramp right-turn movement;

- *Main Street / Santa Clara Avenue – I-5 NB Ramps:*
  - Northbound Main Street left-turn movement;
  - Northbound Main Street through movement;
  - Northbound Main Street right-turn movement;
  - Southbound Main Street left-turn movement;
  - Southbound Main Street through/right-turn movement;
  - Eastbound Santa Clara Avenue left-turn movement;
  - Eastbound Santa Clara Avenue left-turn/through/right-turn movement;

- *Main Street / Buffalo Avenue– I-5 SB On Ramps:*
  - Northbound Main Street through/right-turn movement;
  - Southbound Main Street left-turn movement;
  - Southbound Main Street through/right-turn movement; and

- Eastbound left-turn/through/right-turn movement.

The vehicular queue analysis has been prepared for the following analysis scenarios which include the proposed project:

- Existing Plus Project Conditions; and
- Project Completion Year (2018) With Project Conditions.

The City of Santa Ana and Caltrans do not have established and adopted performance criteria and significant impact thresholds for vehicular queuing. Hence, the vehicular queuing analysis presented in this report is strictly for informational purposes and is not related to CEQA analysis or requirements.

It should be noted, this analysis conservatively assumes even though the proposed project will displace the existing parking lot, all the vehicles utilizing the existing parking lot will continue to park in this area.

Hence, the analysis assumes the vehicle trips associated with the existing parking lot will still be in the surrounding circulation system and the project trips are added on top of the existing traffic volumes, without taking any trip credit associated with the displaced parking lot.

Table 7 summarizes the results of the HCM 95th percentile vehicular queueing analysis. The HCM 95th percentile calculation sheets are contained in Appendix D and Appendix F.

Table 7
HCM 95th Percentile Vehicular Queuing Analysis Summary

Analysis Scenario/Movement	AM Peak Hour		PM Peak Hour		Available Storage (feet)	Adequate Storage Provided?
	Peak Hour Volume	95th Percentile Vehicular Queue (feet)	Peak Hour Volume	95th Percentile Vehicular Queue (feet)		
Existing Plus Project Conditions						
Main Street / Project Site Access:						
SB Main Street left-turn movement	38	5	37	8	375	Yes
WB project site access left-turn movement	3	1	4	2	100	Yes
WB project site access right-turn movement	26	5	36	9	100	Yes
Main Street / Edgewood Road – I-5 HOV Ramps:						
NB Main Street left-turn movement	63	50	269	163	175	Yes
NB Main Street through/right-turn movement	526	82	901	257	700	Yes
SB Main Street left-turn movement	85	124	100	141	155	Yes
SB Main Street through movement	1,251	409	1,259	401	385	**No**
SB Main Street right-turn movement	18	0	111	62	135	Yes
SB I-5 Off-Ramp left-turn/through movement	15	31	48	77	1,360	Yes
SB I-5 Off-Ramp right-turn movement	83	26	81	47	150	Yes
WB Edgewood Rd through/left-turn movement	136	177	123	176	250	Yes
WB Edgewood Road right-turn movement	97	39	109	61	65	Yes
NB I-5 Off-Ramp right-turn movement	614	338	359	212	1,530	Yes
Main Street / Santa Clara Avenue – I-5 NB Ramps						
NB Main Street left-turn movement	15	10	13	6	71	Yes

Analysis Scenario/Movement	AM Peak Hour		PM Peak Hour		Available Storage (feet)	Adequate Storage Provided?
	Peak Hour Volume	95th Percentile Vehicular Queue (feet)	Peak Hour Volume	95th Percentile Vehicular Queue (feet)		
NB Main Street through movement	450	187	921	55	340	Yes
NB Main Street right-turn movement	649	536	700	115	340	**No**
SB Main Street left-turn movement	65	39	149	112	450	Yes
SB Main Street through/right-turn movement	1,424	163	1,309	61	760	Yes
EB Santa Clara Avenue left-turn movement	98	126	236	280	525	Yes
EB Santa Clara Ave left-turn/thru/right-turn movement	580	362	622	413	525	Yes
SB I-5 Off-Ramp right-turn movement	580	382	362	263	1,250	Yes
Main Street / Buffalo Avenue– I-5 SB On Ramps						
NB Main Street through/right-turn movement	1,074	319	1,418	527	465	**No**
SB Main Street left-turn movement	729	209	640	338	170	**No**
SB Main Street through/right-turn movement	1,412	34	1,147	204	335	Yes
EB left-turn/through/right-turn movement	337	184	544	282	560	Yes
Project Completion (Year 2018) With Project Conditions						
Main Street / Project Site Access:						
SB Main Street left-turn movement	38	6	37	10	375	Yes
WB project site access left-turn movement	3	1	4	3	100	Yes
WB project site access right-turn movement	26	5	36	12	100	Yes
Main Street / Edgewood Road – I-5 HOV Ramps:						
NB Main Street left-turn movement	64	55	272	161	175	Yes

Analysis Scenario/Movement	AM Peak Hour		PM Peak Hour		Available Storage (feet)	Adequate Storage Provided?
	Peak Hour Volume	95th Percentile Vehicular Queue (feet)	Peak Hour Volume	95th Percentile Vehicular Queue (feet)		
NB Main Street through/right-turn movement	586	68	1,089	323	700	Yes
SB Main Street left-turn movement	86	125	101	142	155	Yes
SB Main Street through movement	1,507	490	1,379	458	385	**No**
SB Main Street right-turn movement	19	0	115	46	135	Yes
SB I-5 Off-Ramp left-turn/through movement	20	39	49	77	1,360	Yes
SB I-5 Off-Ramp right-turn movement	84	27	82	25	150	Yes
WB Edgewood Rd through/left-turn movement	137	206	124	165	250	Yes
WB Edgewood Road right-turn movement	98	41	110	52	65	Yes
NB I-5 Off-Ramp right-turn movement	615	352	430	275	1,530	Yes
Main Street / Santa Clara Avenue – I-5 NB Ramps						
NB Main Street left-turn movement	15	9	13	6	71	Yes
NB Main Street through movement	509	212	1,109	84	340	Yes
NB Main Street right-turn movement	685	568	757	241	340	**No**
SB Main Street left-turn movement	66	37	150	85	450	Yes
SB Main Street through/right-turn movement	1,682	156	1,430	77	760	Yes
EB Santa Clara Avenue left-turn movement	99	131	238	280	525	Yes
EB Santa Clara Ave left-turn/thru/right-turn movement	586	404	628	407	525	Yes
SB I-5 Off-Ramp right-turn movement	632	450	400	304	1,250	Yes
Main Street / Buffalo Avenue– I-5 SB On Ramps						

Analysis Scenario/Movement	AM Peak Hour		PM Peak Hour		Available Storage (feet)	Adequate Storage Provided?
	Peak Hour Volume	95th Percentile Vehicular Queue (feet)	Peak Hour Volume	95th Percentile Vehicular Queue (feet)		
NB Main Street through/right-turn movement	1,169	354	1,660	538	465	**No**
SB Main Street left-turn movement	805	238	663	346	170	**No**
SB Main Street through/right-turn movement	1,648	44	1,284	234	335	Yes
EB left-turn/through/right-turn movement	340	187	550	285	560	Yes

As shown in Table 7, adequate storage capacity is forecast to continue to be provided for all of the evaluated movements with the exception of the following movements:

- *Main Street / Edgewood Road – I-5 HOV Ramps:*
    - Southbound Main Street through movement;
- *Main Street / Santa Clara Avenue – I-5 NB Ramps:*
    - Northbound Main Street right-turn movement;
- *Main Street / Buffalo Avenue– I-5 SB On Ramps:*
    - Northbound Main Street through/right-turn movement;
    - Southbound Main Street left-turn movement;

As previously noted, the City of Santa Ana and Caltrans do not have established and adopted performance criteria and significant impact thresholds for vehicular queuing. Hence, the vehicular queuing analysis presented in this report is strictly for informational purposes and is not related to CEQA analysis or requirements.

Based on the analysis and as shown in Table 7:

- The above identified queue deficiencies are present for existing and also "without project" conditions. Hence, the forecast identified deficiencies are not a result of implementation of the proposed project;

- None of the identified deficiencies are for the off-ramp movements which could result in backing up of the traffic onto the freeway mainline; and

- Providing additional storage capacity to eliminate the identified deficiencies is infeasible due to physical constraints and in many cases would require moving entire intersections to provide more storage between the intersections.

- Based on the distance between project site driveway and the Main Street / Buffalo Avenue – I-5 SB On-Ramp intersection (375 feet), the vehicular queue at the northbound Main Street movement is forecast to extend beyond the project site access.

  The identified queue spill back is an existing condition currently affecting the existing driveway for the public parking lot due to the high volume of existing and future traffic traveling on northbound Main Street and the identified deficiency not a direct result of the proposed project.

6.0 Project Site Access Gate Queuing/Stacking Analysis

As previously noted, the proposed project is planned to implement a gated entry with ticket dispenser at the project site access on Main Street. Based on the latest site plan, the gate arm is planned to be places approximately 90 feet away from the edge of Main Street.

RK has conducted an analysis of gate queueing/stacking to determine if adequate space is planned to be provided between the gate arm and the edge of Main Street to avoid vehicles backing up onto Main Street as they are waiting to enter the site.

The analysis is based on the intensity of the inbound traffic which is a factor of the arrival rate of vehicles at the entry location and also the service rate at which the vehicles are served by the gate system while entering the project site.

The Crommelin methodology has been utilized to determine the appropriate stacking capacity at the project entry location. The methodology utilizes the arrival rate of vehicles and the service rate at which arriving vehicles are processed to determine the traffic intensity and resulting vehicular queues building up behind the gate. The methodology calculates the number of vehicles which are waiting in the queue behind the one vehicle that is being served at the gate. The traffic intensity is calculated by dividing the average arrival rate by the average service rate. Crommelin analysis methodology is contained in Appendix G.

As previously shown in Table 3, during the peak hour, the proposed project is forecast to generate approximately 42 inbound trips in the AM peak hour and 41 inbound trips in the PM peak hour.

Based on the Crommelin methodology, a typical gated entry with ticket dispenser system has a design service rate of 305 to 520 vehicles per hour, depending on the angle of approach of the driveway. A gated entry with easy direct approach has a design service rate of 520 vehicles per hour, whereas an entry with a sharp angle approach has a design service rate of 305 vehicles per hour. Even though the project driveway has a relatively easy and direct driveway approach, this analysis conservatively utilizes a design service rate of 305 vehicles per hour.

Assuming an arrival rate of 42 vehicles per hour and a service rate of 305 vehicles per hour, (traffic intensity of 0.14), the 99-percentile required stacking capacity at the project gated

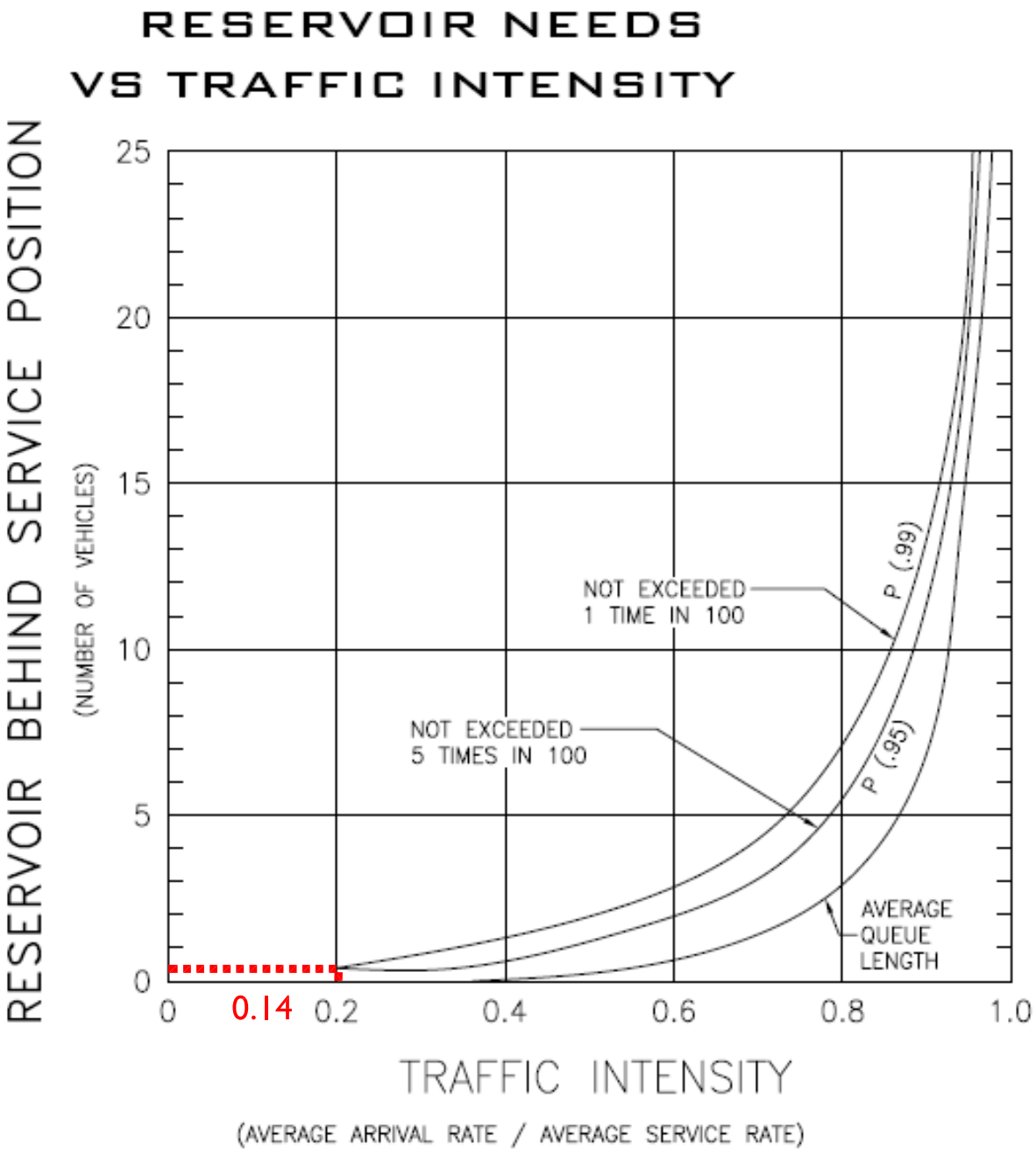
access is forecast to be less than two vehicles (rounded up to two vehicles) when accounting for the one vehicle in front of the queue that is being served at the gate. Utilizing the industry-standard vehicle length of 25 feet for the purposes of vehicular queueing analysis, this is equivalent to a queue of 50 feet.

Since the gate arm is planned to be place approximately 90 feet from the edge of Main Street, adequate stacking capacity is forecast to be provided for the gated project access on Main Street.

The Crommelin analysis work sheet and calculation chart is shown in Exhibit 6-1.

Exhibit 6-1

Crommelin Gate Stacking Analysis for Project Access on Main Street



N

7.0 Findings & Recommendations

A. Intersection Analysis Summary

All study intersections are currently operating at an acceptable Level of Service for Existing Conditions and are forecast to continue to operate at an acceptable Level of Service for the future analysis scenarios evaluated as part of this report.

Based on agency-established thresholds of significance, the proposed project is forecast to not result in a significant traffic impact at the study intersections for any of the analysis scenarios evaluated as part of this report.

Hence, no study intersection mitigation measures are required for the proposed project.

It should be noted, this analysis conservatively assumes even though the proposed project will displace the existing parking lot, all the vehicles utilizing the existing parking lot will continue to park in this area.

Hence, the analysis assumes the vehicle trips associated with the existing parking lot will still be in the surrounding circulation system and the project trips are added on top of the existing traffic volumes, without taking any trip credit associated with the displaced parking lot.

Vehicular Queueing

The proposed project would improve site access on Main Street by relocating the existing access further south and further away from the Main Street / Buffalo Avenue – I-5 Southbound On-Ramp intersection.

Adequate storage capacity is forecast to continue to be provided for all of the evaluated movements with the exception of the following movements:

- *Main Street / Edgewood Road – I-5 HOV Ramps:*
    - Southbound Main Street through movement;

- *Main Street / Santa Clara Avenue – I-5 NB Ramps:*

    - Northbound Main Street right-turn movement;

- *Main Street / Buffalo Avenue– I-5 SB On Ramps:*

    - Northbound Main Street through/right-turn movement;

    - Southbound Main Street left-turn movement;

The City of Santa Ana and Caltrans do not have established and adopted performance criteria and significant impact thresholds for vehicular queuing.

Hence, the vehicular queuing analysis presented in this report is strictly for informational purposes and is not related to CEQA analysis or requirements.

Based on the analysis:

- The above identified queue deficiencies are present for existing and also "without project" conditions. Hence, the forecast identified deficiencies are not a result of implementation of the proposed project;

- None of the identified deficiencies are for the off-ramp movements which could result in backing up of the traffic onto the freeway mainline; and

- Providing additional storage capacity to eliminate the identified deficiencies is infeasible due to physical constraints and in many cases would require moving entire intersections to provide more storage between the intersections.

- Based on the distance between project site driveway and the Main Street / Buffalo Avenue – I-5 SB On-Ramp intersection (375 feet), the vehicular queue at the northbound Main Street movement is forecast to extend beyond the project site access.

  The identified queue spill back is an existing condition currently affecting the existing driveway for the public parking lot due to the high volume of

existing and future traffic traveling on northbound Main Street and the identified deficiency not a direct result of the proposed project.

B. Circulation Recommendations

B.1 On-Site

I. Construct the on-site circulation system per the detailed site plan.

II. Continue to provide one (1) full access driveway onto North Main Street.

III. Continue to provide one (1) full access driveway onto Bush Street (emergency only access).

B.2 Area-Wide

I. Complete any remaining half-section street improvements for Main Street adjacent to the project site.

Project recommendations are graphically shown on Exhibit 7-1.

C. Safety & Operational Improvements

Sight distance at the project access point should be reviewed at the time of construction per the City of Santa Ana standards.

As is the case for any roadway design, the City of Santa Ana should periodically review traffic operations in the vicinity of the site once the project is constructed to assure that the traffic operations are satisfactory.

D. OCTA Bus Stops & Operations

If the proposed project and construction is expected to impact the operations and functionality of the existing bus stop(s), OCTA should be contacted and informed of any planned disruptions. It is recommended disruptions be avoided and minimized as feasible.

Consider including and promoting rideshare and vanpooling opportunities.

Inform patrons and employees of available public transportation opportunities and services near the site, such as bus stops.

E. Regional Funding Mechanisms

Participate in any approved transportation or development impact fees required by the City of Santa Ana.

F. Conclusions

Based on ITE trip generation rates, the proposed project is forecast to generate approximately 1,103 daily trips which include approximately 71 AM peak hour trips and approximately 81 PM peak hour trips.

All study intersections are currently operating at an acceptable Level of Service for Existing Conditions and are forecast to continue to operate at an acceptable Level of Service for the future analysis scenarios evaluated as part of this report.

Based on agency-established thresholds of significance, the proposed project is forecast to not result in a significant traffic impact at the study intersections for any of the analysis scenarios evaluated as part of this report.

Hence, no study intersection mitigation measures are required for the proposed project.

Adequate storage capacity is forecast to continue to be provided for all of the evaluated movements with the exception of the following movements:

- *Main Street / Edgewood Road – I-5 HOV Ramps:*
    - Southbound Main Street through movement;
- *Main Street / Santa Clara Avenue – I-5 NB Ramps:*
    - Northbound Main Street right-turn movement;

- *Main Street / Buffalo Avenue– I-5 SB On Ramps:*

    - Northbound Main Street through/right-turn movement;

    - Southbound Main Street left-turn movement;

The City of Santa Ana and Caltrans do not have established and adopted performance criteria and significant impact thresholds for vehicular queuing.

Hence, the vehicular queuing analysis presented in this report is strictly for informational purposes and is not related to CEQA analysis or requirements.

Based on the analysis:

- The above identified queue deficiencies are present for existing and also "without project" conditions. Hence, the forecast identified deficiencies are not a result of implementation of the proposed project;

- None of the identified deficiencies are for the off-ramp movements which could result in backing up of the traffic onto the freeway mainline; and

- Providing additional storage capacity to eliminate the identified deficiencies is infeasible due to physical constraints and in many cases would require moving entire intersections to provide more storage between the intersections.

- Based on the distance between project site driveway and the Main Street / Buffalo Avenue – I-5 SB On-Ramp intersection (375 feet), the vehicular queue at the northbound Main Street movement is forecast to extend beyond the project site access.

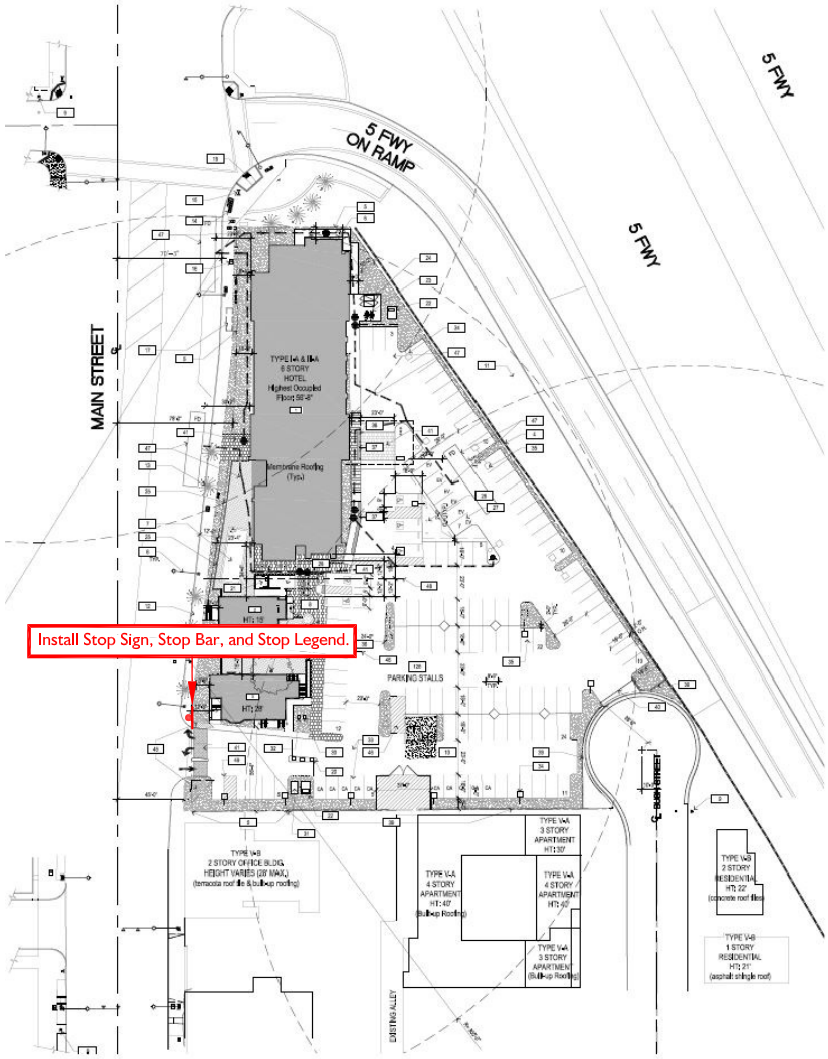
  The identified queue spill back is an existing condition currently affecting the existing driveway for the public parking lot due to the high volume of existing and future traffic traveling on northbound Main Street and the identified deficiency not a direct result of the proposed project.

The 99-percentile required stacking capacity at the project gated access is forecast to be less than two vehicles (rounded up to two vehicles). Utilizing the industry-

standard vehicle length of 25 feet for the purposes of vehicular queueing analysis, this is equivalent to a queue of 50 feet.

Since the gate arm is planned to be place approximately 90 feet from the edge of Main Street, adequate stacking capacity is forecast to be provided for the gated project access on Main Street.□

Recommendations



On-Site Recommendations

I. Site Access

Access for the proposed project is planned as follows as shown in the most recent site plan provided on Exhibit 1-2:

- One proposed full access driveway on Main Street.
- One proposed full access driveway on Bush Street (emergency access only).

II. Regional Funding Mechanisms

Participate in any approved transportation or development impact fees required by the City of Santa Ana.

III. Sight Distance

It is also important that adequate sight distance be provided for drivers entering and exiting the project site.

- The minimum required sight distance should be provided at all access points.
- A limited use area is maintained where a clear line of sight can be established.

On-Site Recommendations (Continued)

- The limited use area shall be used for the purpose of prohibiting or clearing obstructions to maintain adequate sight distance at intersections.
- Limited use area to be kept clear of all obstructions over 30 inches high, including vegetation.
- No trees, walls, or any obstructions shall be allowed in the limited use area.
- The toe of the slope shall not encroach into the limited use area.

IV. On-Site Recommendations

- Construct an on-site circulation system per the detailed site plan. Install stop signs, stop bars, and stop legends at all project access points.

Appendices

Appendix A

Traffic Count Worksheets

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Santa Ana
N/S: Main Street - I-5 NB Off Ramp
E/W: Edgewood Road - I-5 SB Off/NB On
Weather: Clear

File Name : SNAMAEDAM
Site Code : 05117256
Start Date : 4/26/2017

Groups Printed- Total Volume

	Main Street Southbound					Edgewood Drive Westbound					I-5 Northbound Off Ramp Northwestbound					Main Street Northbound					I-5 SB Off Ramp / I-5 NB On Ramp Eastbound					
Start Time	Left	Bear Left	Thru	Right	App. Total	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Int. Total
07:00 AM	10	0	264	2	276	0	22	1	12	35	0	0	117	6	123	7	72	14	0	93	1	1	0	15	17	544
07:15 AM	15	0	293	2	310	0	29	4	11	44	0	0	118	5	123	9	71	38	0	118	2	0	0	18	20	615
07:30 AM	22	0	340	4	366	0	35	3	28	66	0	0	137	3	140	11	99	34	0	144	1	3	0	20	24	740
07:45 AM	14	0	352	5	371	0	23	1	29	53	0	0	162	3	165	18	115	25	0	158	2	2	0	23	27	774
Total	61	0	1249	13	1323	0	109	9	80	198	0	0	534	17	551	45	357	111	0	513	6	6	0	76	88	2673
08:00 AM	29	0	264	3	296	0	36	6	26	68	0	0	148	3	151	21	111	16	0	148	0	0	0	18	18	681
08:15 AM	20	0	276	6	302	0	28	4	14	46	0	0	155	3	158	13	110	12	0	135	6	1	0	22	29	670
08:30 AM	10	0	258	3	271	0	24	2	15	41	0	0	194	3	197	8	114	18	0	140	2	2	0	26	30	679
08:45 AM	14	0	227	4	245	0	21	4	19	44	0	0	188	3	191	6	102	10	0	118	6	2	0	23	31	629
Total	73	0	1025	16	1114	0	109	16	74	199	0	0	685	12	697	48	437	56	0	541	14	5	0	89	108	2659
Grand Total	134	0	2274	29	2437	0	218	25	154	397	0	0	1219	29	1248	93	794	167	0	1054	20	11	0	165	196	5332
Apprch %	5.5	0	93.3	1.2		0	54.9	6.3	38.8		0	0	97.7	2.3		8.8	75.3	15.8	0		10.2	5.6	0	84.2		
Total %	2.5	0	42.6	0.5	45.7	0	4.1	0.5	2.9	7.4	0	0	22.9	0.5	23.4	1.7	14.9	3.1	0	19.8	0.4	0.2	0	3.1	3.7	

	Main Street Southbound					Edgewood Drive Westbound					I-5 Northbound Off Ramp Northwestbound					Main Street Northbound					I-5 SB Off Ramp / I-5 NB On Ramp Eastbound					
Start Time	Left	Bear Left	Thru	Right	App. Total	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 07:30 AM																										
07:30 AM	22	0	340	4	366	0	35	3	28	66	0	0	137	**3**	140	11	99	**34**	0	144	1	**3**	0	20	24	740
07:45 AM	14	0	**352**	5	**371**	0	23	1	**29**	53	0	0	**162**	3	**165**	18	**115**	25	0	**158**	2	2	0	**23**	27	**774**
08:00 AM	**29**	0	264	3	296	0	**36**	**6**	26	**68**	0	0	148	3	151	**21**	111	16	0	148	0	0	0	18	18	681
08:15 AM	20	0	276	**6**	302	0	28	4	14	46	0	0	155	3	158	13	110	12	0	135	**6**	1	0	22	**29**	670
Total Volume	85	0	1232	18	1335	0	122	14	97	233	0	0	602	12	614	63	435	87	0	585	9	6	0	83	98	2865
% App. Total	6.4	0	92.3	1.3		0	52.4	6	41.6		0	0	98	2		10.8	74.4	14.9	0		9.2	6.1	0	84.7		
PHF	.733	.000	.875	.750	.900	.000	.847	.583	.836	.857	.000	.000	.929	1.00	.930	.750	.946	.640	.000	.926	.375	.500	.000	.902	.845	.925

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City of Santa Ana
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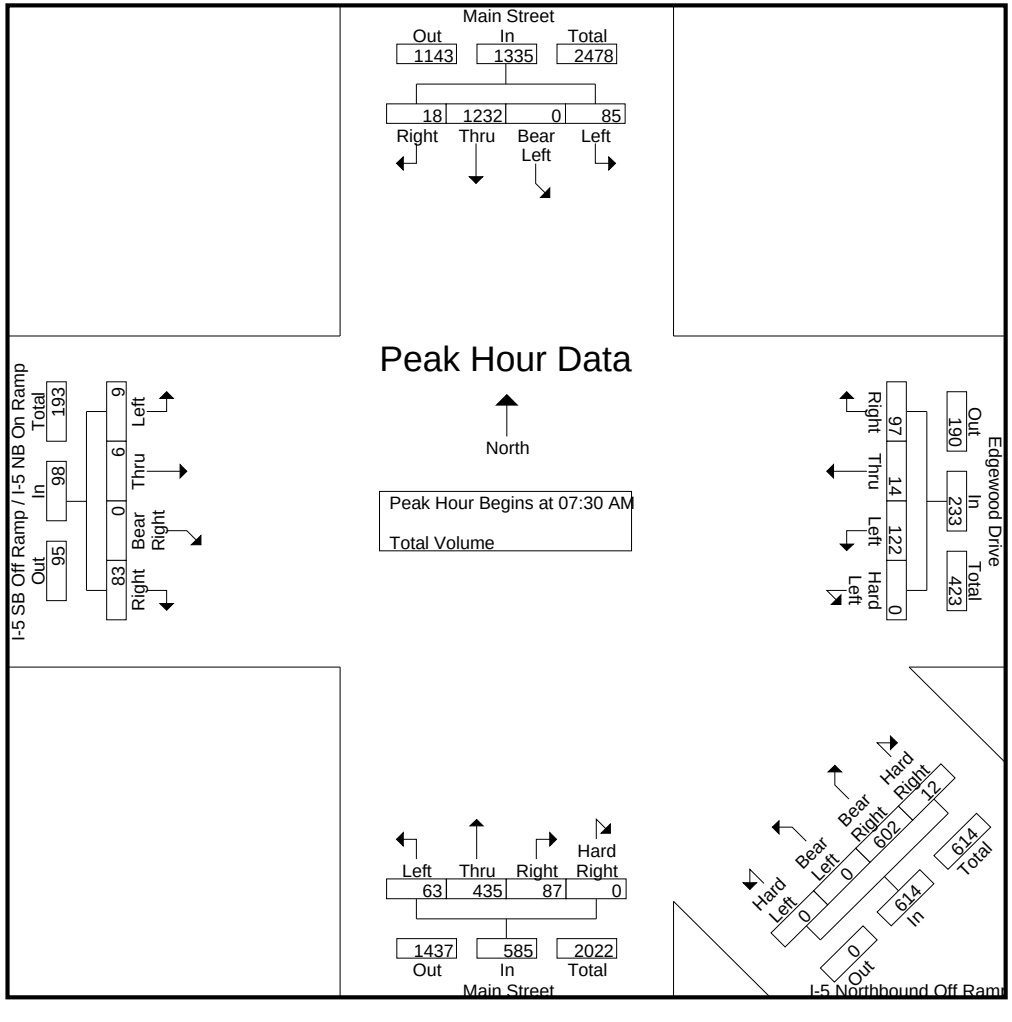
Weather: Clear

File Name : SNAMAEDAM
Site Code : 05117256
Start Date : 4/26/2017
Page No : 2



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File Name : SNAMAEDAM
Site Code : 05117256
Start Date : 4/26/2017

	Main Street Southbound					Edgewood Drive Westbound					I-5 Northbound Off Ramp Northwestbound					Main Street Northbound					I-5 SB Off Ramp / I-5 NB On Ramp Eastbound					
Start Time	Left	Bear Left	Thru	Right	App. Total	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																									
Peak Hour for Each Approach Begins at:																									
	07:15 AM					07:30 AM					08:00 AM					07:30 AM					08:00 AM					
+0 mins.	15	0	293	2	310	0	35	3	28	66	0	0	148	**3**	151	11	99	**34**	0	144	0	0	0	18	18	
+15 mins.	22	0	340	4	366	0	23	1	**29**	53	0	0	155	3	158	18	**115**	25	0	**158**	**6**	1	0	22	29	
+30 mins.	14	0	**352**	**5**	**371**	0	**36**	**6**	26	**68**	0	0	**194**	3	**197**	**21**	111	16	0	148	2	**2**	0	**26**	30	
+45 mins.	**29**	0	264	3	296	0	28	4	14	46	0	0	188	3	191	13	110	12	0	135	6	2	0	23	**31**	
Total Volume	80	0	1249	14	1343	0	122	14	97	233	0	0	685	12	697	63	435	87	0	585	14	5	0	89	108	
% App. Total	6	0	93	1		0	52.4	6	41.6		0	0	98.3	1.7		10.8	74.4	14.9	0		13	4.6	0	82.4		
PHF	.690	.000	.887	.700	.905	.000	.847	.583	.836	.857	.000	.000	.883	1.000	.885	.750	.946	.640	.000	.926	.583	.625	.000	.856	.871	

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Weather: Clear

File Name : SNAMAEDPM
Site Code : 05117256
Start Date : 4/26/2017

Groups Printed- Total Volume

	Main Street Southbound					Edgewood Drive Westbound					I-5 Northbound Off Ramp Northwestbound					Main Street Northbound					I-5 SB Off Ramp / I-5 NB On Ramp Eastbound					
Start Time	Left	Bear Left	Thru	Right	App. Total	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Int. Total
04:00 PM	11	0	313	17	341	0	18	3	17	38	0	0	64	3	67	31	182	16	0	229	7	3	0	22	32	707
04:15 PM	17	0	274	21	312	0	17	4	17	38	0	0	83	2	85	41	146	21	0	208	7	1	0	20	28	671
04:30 PM	16	0	294	14	324	0	17	3	22	42	0	0	75	1	76	30	189	23	0	242	11	0	0	21	32	716
04:45 PM	17	0	273	18	308	0	18	7	17	42	0	0	68	4	72	52	182	21	0	255	10	2	0	28	40	717
Total	61	0	1154	70	1285	0	70	17	73	160	0	0	290	10	300	154	699	81	0	934	35	6	0	91	132	2811
05:00 PM	27	0	325	40	392	0	22	3	21	46	0	0	83	0	83	85	172	16	0	273	10	4	0	16	30	824
05:15 PM	22	0	328	33	383	0	27	5	26	58	0	0	81	5	86	67	203	28	0	298	11	4	0	18	33	858
05:30 PM	30	0	352	17	399	0	18	12	33	63	0	0	98	3	101	57	231	23	0	311	5	2	0	19	26	900
05:45 PM	21	0	236	21	278	0	30	6	29	65	0	0	87	2	89	60	196	26	0	282	11	1	0	28	40	754
Total	100	0	1241	111	1452	0	97	26	109	232	0	0	349	10	359	269	802	93	0	1164	37	11	0	81	129	3336
Grand Total	161	0	2395	181	2737	0	167	43	182	392	0	0	639	20	659	423	1501	174	0	2098	72	17	0	172	261	6147
Apprch %	5.9	0	87.5	6.6		0	42.6	11	46.4		0	0	97	3		20.2	71.5	8.3	0		27.6	6.5	0	65.9		
Total %	2.6	0	39	2.9	44.5	0	2.7	0.7	3	6.4	0	0	10.4	0.3	10.7	6.9	24.4	2.8	0	34.1	1.2	0.3	0	2.8	4.2	

	Main Street Southbound					Edgewood Drive Westbound					I-5 Northbound Off Ramp Northwestbound					Main Street Northbound					I-5 SB Off Ramp / I-5 NB On Ramp Eastbound					
Start Time	Left	Bear Left	Thru	Right	App. Total	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 05:00 PM																										
05:00 PM	27	0	325	**40**	392	0	22	3	21	46	0	0	83	0	83	**85**	172	16	0	273	10	**4**	0	16	30	824
05:15 PM	22	0	328	33	383	0	27	5	26	58	0	0	81	**5**	86	67	203	**28**	0	298	**11**	4	0	18	33	858
05:30 PM	**30**	0	**352**	17	**399**	0	18	**12**	**33**	63	0	0	**98**	3	**101**	57	**231**	23	0	**311**	5	2	0	19	26	**900**
05:45 PM	21	0	236	21	278	0	**30**	6	29	**65**	0	0	87	2	89	60	196	26	0	282	11	1	0	**28**	**40**	754
Total Volume	100	0	1241	111	1452	0	97	26	109	232	0	0	349	10	359	269	802	93	0	1164	37	11	0	81	129	3336
% App. Total	6.9	0	85.5	7.6		0	41.8	11.2	47		0	0	97.2	2.8		23.1	68.9	8	0		28.7	8.5	0	62.8		
PHF	.833	.000	.881	.694	.910	.000	.808	.542	.826	.892	.000	.000	.890	.500	.889	.791	.868	.830	.000	.936	.841	.688	.000	.723	.806	.927

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File Name : SNAMAEDPM
Site Code : 05117256
Start Date : 4/26/2017
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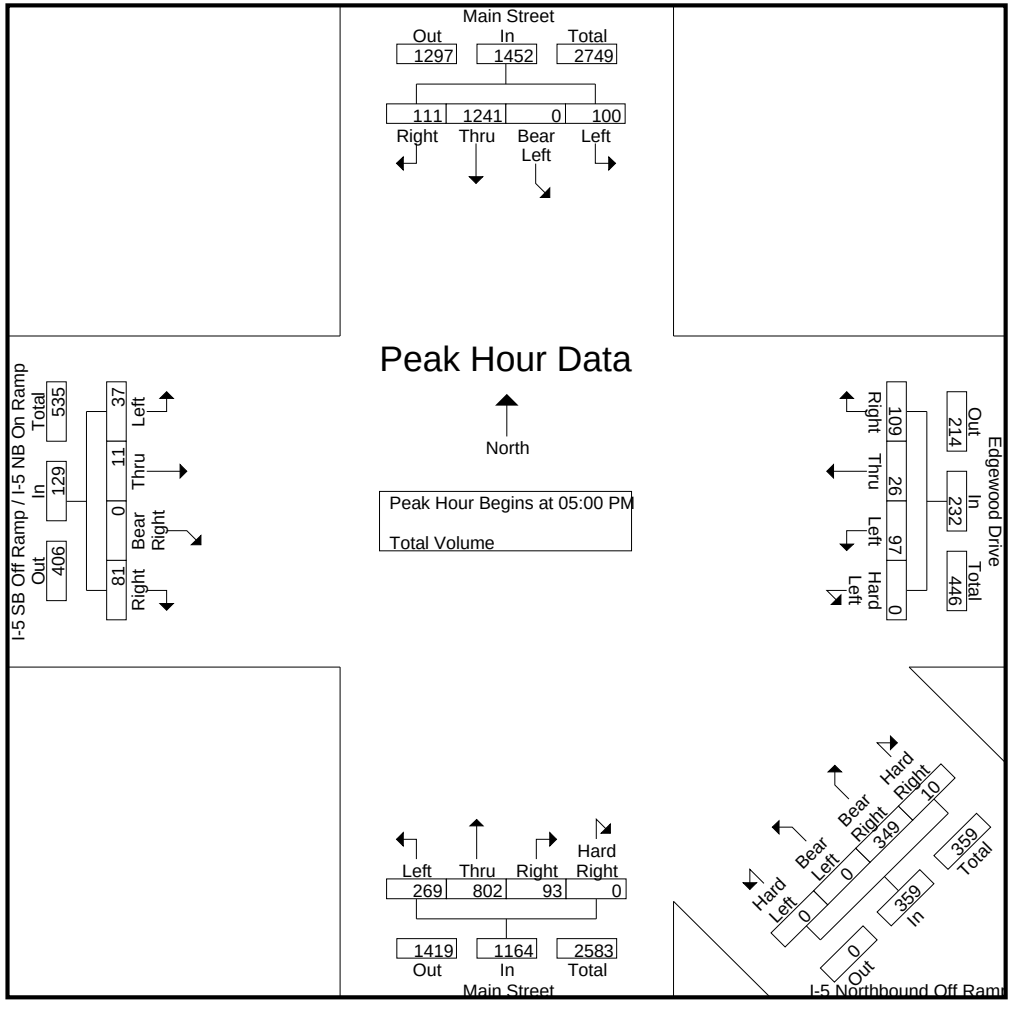

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Site Code : 05117256
Start Date : 4/26/2017

	Main Street Southbound					Edgewood Drive Westbound					I-5 Northbound Off Ramp Northwestbound					Main Street Northbound					I-5 SB Off Ramp / I-5 NB On Ramp Eastbound					
Start Time	Left	Bear Left	Thru	Right	App. Total	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																									
Peak Hour for Each Approach Begins at:																									
	04:45 PM					05:00 PM					05:00 PM					05:00 PM					04:30 PM					
+0 mins.	17	0	273	18	308	0	22	3	21	46	0	0	83	0	83	**85**	172	16	0	273	**11**	0	0	21	32	
+15 mins.	27	0	325	**40**	392	0	27	5	26	58	0	0	81	**5**	86	67	203	**28**	0	298	10	2	0	**28**	**40**	
+30 mins.	22	0	328	33	383	0	18	**12**	**33**	63	0	0	**98**	3	**101**	57	**231**	23	0	**311**	10	**4**	0	16	30	
+45 mins.	**30**	0	**352**	17	**399**	0	**30**	6	29	**65**	0	0	87	2	89	60	196	26	0	282	11	4	0	18	33	
Total Volume	96	0	1278	108	1482	0	97	26	109	232	0	0	349	10	359	269	802	93	0	1164	42	10	0	83	135	
% App. Total	6.5	0	86.2	7.3		0	41.8	11.2	47		0	0	97.2	2.8		23.1	68.9	8	0		31.1	7.4	0	61.5		
PHF	.800	.000	.908	.675	.929	.000	.808	.542	.826	.892	.000	.000	.890	.500	.889	.791	.868	.830	.000	.936	.955	.625	.000	.741	.844	

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City of Santa Ana
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E/W: Santa Clara Avenue - I-5 NB On Ramp
Weather: Clear

File Name : SNAMASCAM
Site Code : 10517256
Start Date : 4/26/2017
Page No : 1

Groups Printed- Total Volume

	Main Street Southbound					I-5 Northbound On Ramp Westbound					Main Street Northbound					Santa Clara Avenue Eastbound					I-5 Southbound Off Ramp Southeastbound					
Start Time	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Left	Bear Left	Thru	Right	App. Total	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Int. Total
07:00 AM	12	248	10	0	270	0	0	0	0	0	1	0	71	137	209	0	13	59	46	118	0	0	142	4	146	743
07:15 AM	16	308	21	0	345	0	0	0	0	0	2	0	90	142	234	0	20	82	51	153	0	0	139	7	146	878
07:30 AM	17	364	17	0	398	0	0	0	0	0	4	0	115	140	259	0	24	102	63	189	0	0	137	8	145	991
07:45 AM	17	372	24	0	413	0	0	0	0	0	3	0	122	180	305	0	23	105	45	173	0	0	144	9	153	1044
Total	62	1292	72	0	1426	0	0	0	0	0	10	0	398	599	1007	0	80	348	205	633	0	0	562	28	590	3656
08:00 AM	15	279	20	0	314	0	0	0	0	0	6	0	119	174	299	0	31	92	40	163	0	0	111	6	117	893
08:15 AM	27	309	15	0	351	0	0	0	0	0	6	0	112	117	235	0	15	92	64	171	0	0	107	7	114	871
08:30 AM	18	256	24	0	298	0	0	0	0	0	3	0	99	109	211	0	31	64	43	138	0	0	109	8	117	764
08:45 AM	20	210	16	0	246	0	0	0	0	0	7	0	102	99	208	0	27	62	46	135	0	0	131	10	141	730
Total	80	1054	75	0	1209	0	0	0	0	0	22	0	432	499	953	0	104	310	193	607	0	0	458	31	489	3258
Grand Total	142	2346	147	0	2635	0	0	0	0	0	32	0	830	1098	1960	0	184	658	398	1240	0	0	1020	59	1079	6914
Apprch %	5.4	89	5.6	0		0	0	0	0		1.6	0	42.3	56		0	14.8	53.1	32.1		0	0	94.5	5.5		
Total %	2.1	33.9	2.1	0	38.1	0	0	0	0	0	0.5	0	12	15.9	28.3	0	2.7	9.5	5.8	17.9	0	0	14.8	0.9	15.6	

	Main Street Southbound					I-5 Northbound On Ramp Westbound					Main Street Northbound					Santa Clara Avenue Eastbound					I-5 Southbound Off Ramp Southeastbound					
Start Time	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Left	Bear Left	Thru	Right	App. Total	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 07:15 AM																										
07:15 AM	16	308	21	0	345	0	0	0	0	0	2	0	90	142	234	0	20	82	51	153	0	0	139	7	146	878
07:30 AM	**17**	364	17	0	398	0	0	0	0	0	4	0	115	140	259	0	24	102	**63**	**189**	0	0	137	8	145	991
07:45 AM	17	**372**	**24**	0	**413**	0	0	0	0	0	3	0	**122**	**180**	**305**	0	23	**105**	45	173	0	0	**144**	**9**	**153**	**1044**
08:00 AM	15	279	20	0	314	0	0	0	0	0	**6**	0	119	174	299	0	**31**	92	40	163	0	0	111	6	117	893
Total Volume	65	1323	82	0	1470	0	0	0	0	0	15	0	446	636	1097	0	98	381	199	678	0	0	531	30	561	3806
% App. Total	4.4	90	5.6	0		0	0	0	0		1.4	0	40.7	58		0	14.5	56.2	29.4		0	0	94.7	5.3		
PHF	.956	.889	.854	.000	.890	.000	.000	.000	.000	.000	.625	.000	.914	.883	.899	.000	.790	.907	.790	.897	.000	.000	.922	.833	.917	.911

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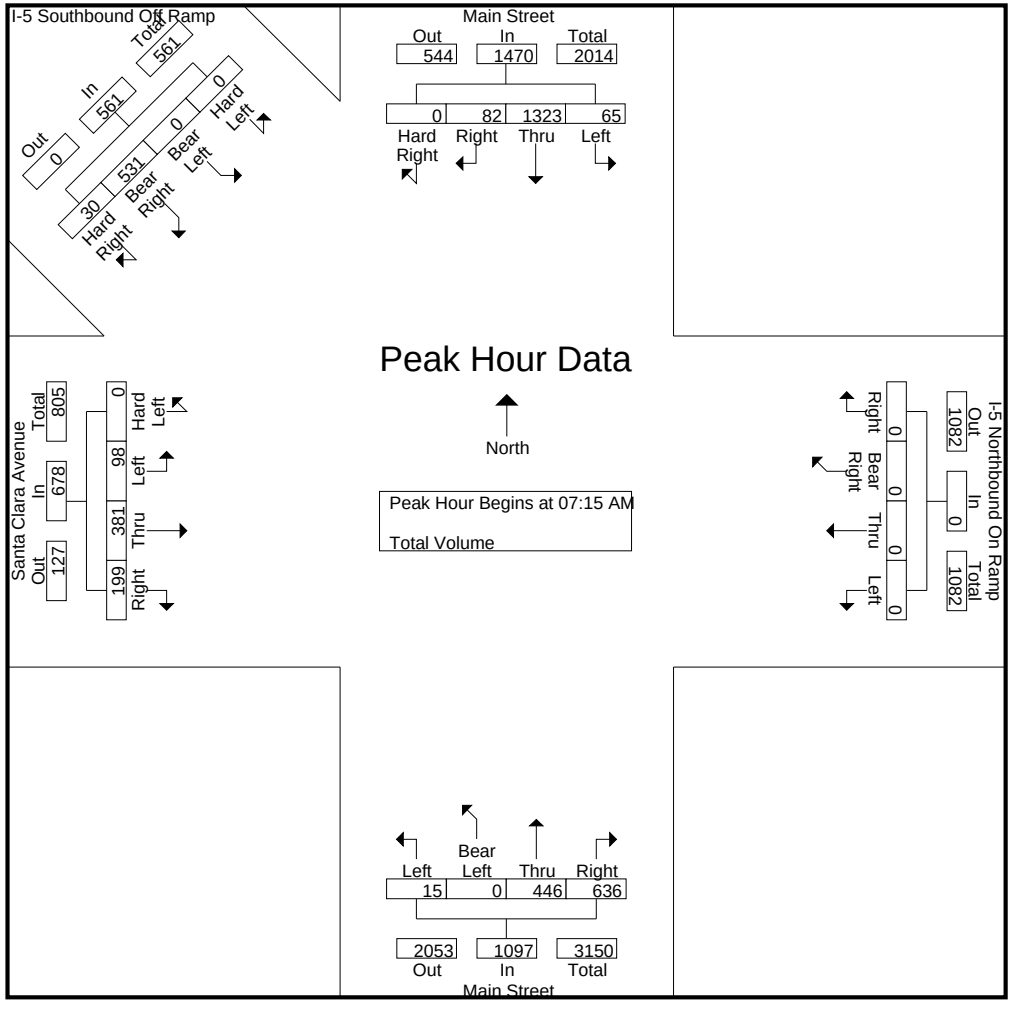

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	Main Street Southbound					I-5 Northbound On Ramp Westbound					Main Street Northbound					Santa Clara Avenue Eastbound					I-5 Southbound Off Ramp Southeastbound					
Start Time	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Left	Bear Left	Thru	Right	App. Total	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																									
Peak Hour for Each Approach Begins at:																									
	07:30 AM					07:00 AM					07:30 AM					07:30 AM					07:00 AM					
+0 mins.	17	364	17	0	398	0	0	0	0	0	4	0	115	140	259	0	24	102	63	**189**	0	0	142	4	146	
+15 mins.	17	**372**	**24**	0	**413**	0	0	0	0	0	3	0	**122**	**180**	**305**	0	23	**105**	45	173	0	0	139	7	146	
+30 mins.	15	279	20	0	314	0	0	0	0	0	**6**	0	119	174	299	0	**31**	92	40	163	0	0	137	8	145	
+45 mins.	**27**	309	15	0	351	0	0	0	0	0	6	0	112	117	235	0	15	92	**64**	171	0	0	**144**	**9**	**153**	
Total Volume	76	1324	76	0	1476	0	0	0	0	0	19	0	468	611	1098	0	93	391	212	696	0	0	562	28	590	
% App. Total	5.1	89.7	5.1	0		0	0	0	0		1.7	0	42.6	55.6		0	13.4	56.2	30.5		0	0	95.3	4.7		
PHF	.704	.890	.792	.000	.893	.000	.000	.000	.000	.000	.792	.000	.959	.849	.900	.000	.750	.931	.828	.921	.000	.000	.976	.778	.964	

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File Name : SNAMASCpm
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Groups Printed- Total Volume

	Main Street Southbound					I-5 Northbound On Ramp Westbound					Main Street Northbound					Santa Clara Avenue Eastbound					I-5 Southbound Off Ramp Southeastbound					
Start Time	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Left	Bear Left	Thru	Right	App. Total	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Int. Total
04:00 PM	27	276	11	0	314	0	0	0	0	0	6	0	181	178	365	0	41	78	23	142	0	0	42	8	50	871
04:15 PM	43	295	17	0	355	0	0	0	0	0	3	0	174	167	344	0	36	112	24	172	0	0	56	4	60	931
04:30 PM	30	280	11	0	321	0	0	0	0	0	9	0	205	169	383	0	35	103	37	175	0	0	74	2	76	955
04:45 PM	26	285	20	0	331	0	0	0	0	0	2	0	208	187	397	0	48	113	34	195	0	0	92	6	98	1021
Total	126	1136	59	0	1321	0	0	0	0	0	20	0	768	701	1489	0	160	406	118	684	0	0	264	20	284	3778
05:00 PM	34	311	18	0	363	0	0	0	0	0	2	0	231	155	388	0	53	125	35	213	0	0	67	4	71	1035
05:15 PM	39	333	16	0	388	0	0	0	0	0	4	0	224	159	387	0	60	128	34	222	0	0	95	2	97	1094
05:30 PM	34	325	16	0	375	0	0	0	0	0	3	0	239	191	433	0	51	103	32	186	0	0	83	3	86	1080
05:45 PM	42	253	19	0	314	0	0	0	0	0	4	0	221	177	402	0	72	123	42	237	0	0	86	4	90	1043
Total	149	1222	69	0	1440	0	0	0	0	0	13	0	915	682	1610	0	236	479	143	858	0	0	331	13	344	4252
Grand Total	275	2358	128	0	2761	0	0	0	0	0	33	0	1683	1383	3099	0	396	885	261	1542	0	0	595	33	628	8030
Apprch %	10	85.4	4.6	0		0	0	0	0		1.1	0	54.3	44.6		0	25.7	57.4	16.9		0	0	94.7	5.3		
Total %	3.4	29.4	1.6	0	34.4	0	0	0	0	0	0.4	0	21	17.2	38.6	0	4.9	11	3.3	19.2	0	0	7.4	0.4	7.8	

	Main Street Southbound					I-5 Northbound On Ramp Westbound					Main Street Northbound					Santa Clara Avenue Eastbound					I-5 Southbound Off Ramp Southeastbound					
Start Time	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Left	Bear Left	Thru	Right	App. Total	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 05:00 PM																										
05:00 PM	34	311	18	0	363	0	0	0	0	0	2	0	231	155	388	0	53	125	35	213	0	0	67	**4**	71	1035
05:15 PM	39	**333**	16	0	**388**	0	0	0	0	0	**4**	0	224	159	387	0	60	**128**	34	222	0	0	**95**	2	**97**	**1094**
05:30 PM	34	325	16	0	375	0	0	0	0	0	3	0	**239**	**191**	**433**	0	51	103	32	186	0	0	83	3	86	1080
05:45 PM	**42**	253	**19**	0	314	0	0	0	0	0	4	0	221	177	402	0	**72**	123	**42**	**237**	0	0	86	4	90	1043
Total Volume	149	1222	69	0	1440	0	0	0	0	0	13	0	915	682	1610	0	236	479	143	858	0	0	331	13	344	4252
% App. Total	10.3	84.9	4.8	0		0	0	0	0		0.8	0	56.8	42.4		0	27.5	55.8	16.7		0	0	96.2	3.8		
PHF	.887	.917	.908	.000	.928	.000	.000	.000	.000	.000	.813	.000	.957	.893	.930	.000	.819	.936	.851	.905	.000	.000	.871	.813	.887	.972

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City of Santa Ana
N/S: Main Street
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Weather: Clear

File Name : SNAMASCpm
Site Code : 10517256
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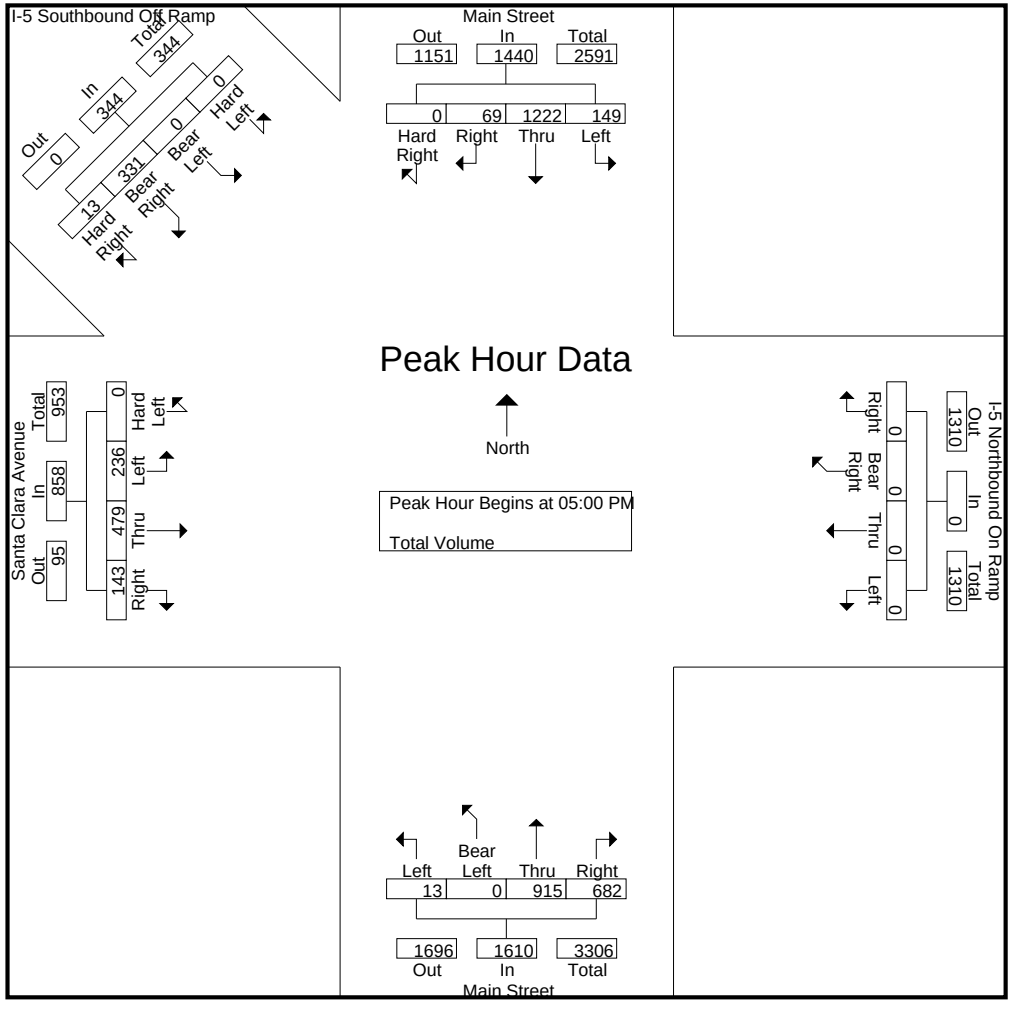

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	Main Street Southbound					I-5 Northbound On Ramp Westbound					Main Street Northbound					Santa Clara Avenue Eastbound					I-5 Southbound Off Ramp Southeastbound					
Start Time	Left	Thru	Right	Hard Right	App. Total	Left	Thru	Bear Right	Right	App. Total	Left	Bear Left	Thru	Right	App. Total	Hard Left	Left	Thru	Right	App. Total	Hard Left	Bear Left	Bear Right	Hard Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																									
Peak Hour for Each Approach Begins at:																									
	04:45 PM					04:00 PM					05:00 PM					05:00 PM					04:45 PM					
+0 mins.	26	285	**20**	0	331	0	0	0	0	0	2	0	231	155	388	0	53	125	35	213	0	0	92	**6**	**98**	
+15 mins.	34	311	18	0	363	0	0	0	0	0	**4**	0	224	159	387	0	60	**128**	34	222	0	0	67	4	71	
+30 mins.	**39**	**333**	16	0	**388**	0	0	0	0	0	3	0	**239**	**191**	**433**	0	51	103	32	186	0	0	**95**	2	97	
+45 mins.	34	325	16	0	375	0	0	0	0	0	4	0	221	177	402	0	**72**	123	**42**	**237**	0	0	83	3	86	
Total Volume	133	1254	70	0	1457	0	0	0	0	0	13	0	915	682	1610	0	236	479	143	858	0	0	337	15	352	
% App. Total	9.1	86.1	4.8	0		0	0	0	0		0.8	0	56.8	42.4		0	27.5	55.8	16.7		0	0	95.7	4.3		
PHF	.853	.941	.875	.000	.939	.000	.000	.000	.000	.000	.813	.000	.957	.893	.930	.000	.819	.936	.851	.905	.000	.000	.887	.625	.898	

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Groups Printed- Total Volume

	Main Street Southbound				I-5 Southbound On Ramp Westbound				Main Street Northbound				Buffalo Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	156	298	0	454	0	0	0	0	0	187	7	194	15	37	7	59	707
07:15 AM	162	328	0	490	0	0	0	0	0	205	7	212	31	45	4	80	782
07:30 AM	203	391	0	594	0	0	0	0	0	249	6	255	27	53	9	89	938
07:45 AM	174	366	0	540	0	0	0	0	0	276	14	290	30	40	14	84	914
Total	695	1383	0	2078	0	0	0	0	0	917	34	951	103	175	34	312	3341
08:00 AM	190	289	0	479	0	0	0	0	0	279	12	291	30	42	12	84	854
08:15 AM	162	302	0	464	0	0	0	0	0	188	8	196	33	54	15	102	762
08:30 AM	147	299	0	446	0	0	0	0	0	190	5	195	23	30	15	68	709
08:45 AM	119	271	0	390	0	0	0	0	0	180	8	188	13	32	6	51	629
Total	618	1161	0	1779	0	0	0	0	0	837	33	870	99	158	48	305	2954
Grand Total	1313	2544	0	3857	0	0	0	0	0	1754	67	1821	202	333	82	617	6295
Apprch %	34	66	0		0	0	0		0	96.3	3.7		32.7	54	13.3		
Total %	20.9	40.4	0	61.3	0	0	0	0	0	27.9	1.1	28.9	3.2	5.3	1.3	9.8	

	Main Street Southbound				I-5 Southbound On Ramp Westbound				Main Street Northbound				Buffalo Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	162	328	0	490	0	0	0	0	0	205	7	212	**31**	45	4	80	782
07:30 AM	**203**	**391**	0	**594**	0	0	0	0	0	249	6	255	27	**53**	9	**89**	**938**
07:45 AM	174	366	0	540	0	0	0	0	0	276	**14**	290	30	40	**14**	84	914
08:00 AM	190	289	0	479	0	0	0	0	0	**279**	12	**291**	30	42	12	84	854
Total Volume	729	1374	0	2103	0	0	0	0	0	1009	39	1048	118	180	39	337	3488
% App. Total	34.7	65.3	0		0	0	0		0	96.3	3.7		35	53.4	11.6		
PHF	.898	.879	.000	.885	.000	.000	.000	.000	.000	.904	.696	.900	.952	.849	.696	.947	.930

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File Name : SNAMABUAM
Site Code : 10517256
Start Date : 4/26/2017
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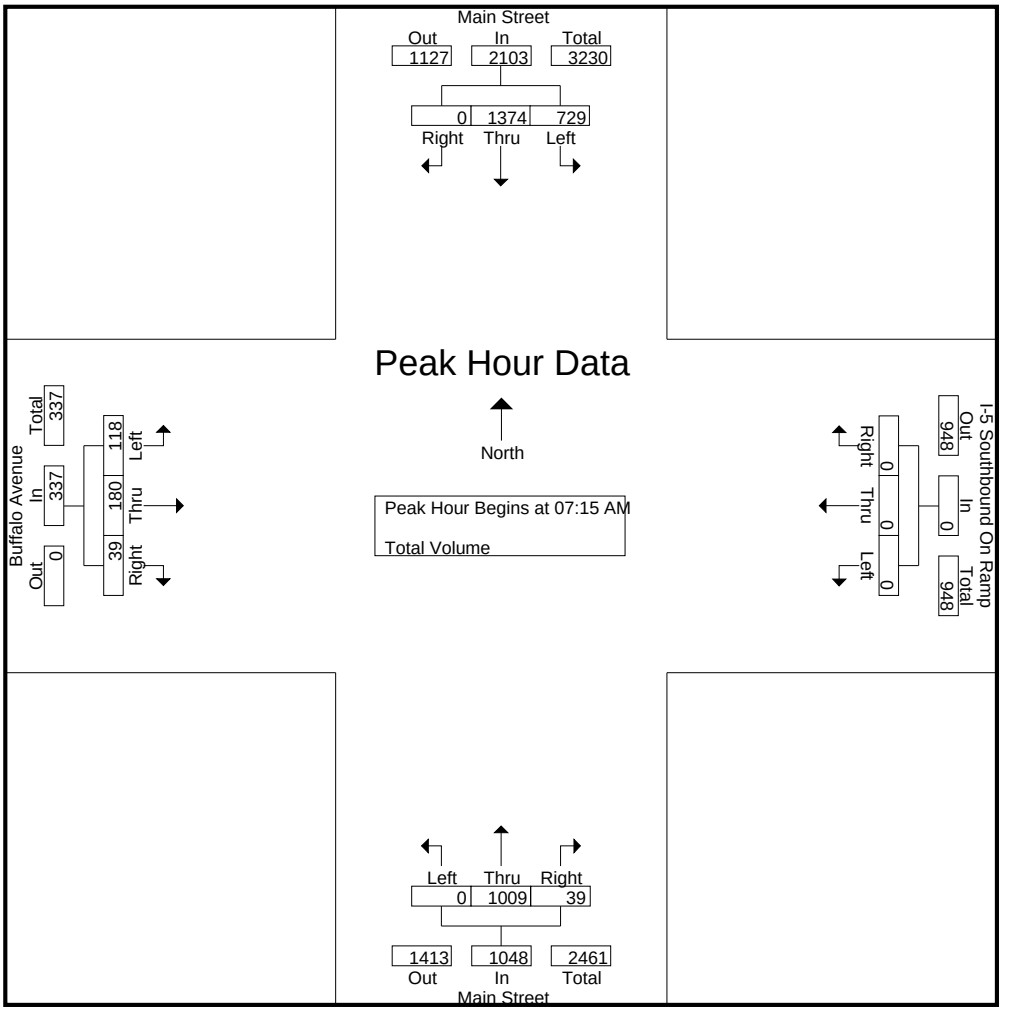

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM				07:00 AM				07:15 AM				07:30 AM			
+0 mins.	162	328	0	490	0	0	0	0	0	205	7	212	27	53	9	89
+15 mins.	**203**	**391**	0	**594**	0	0	0	0	0	249	6	255	30	40	14	84
+30 mins.	174	366	0	540	0	0	0	0	0	276	**14**	290	30	42	12	84
+45 mins.	190	289	0	479	0	0	0	0	0	**279**	12	**291**	**33**	**54**	**15**	**102**
Total Volume	729	1374	0	2103	0	0	0	0	0	1009	39	1048	120	189	50	359
% App. Total	34.7	65.3	0		0	0	0		0	96.3	3.7		33.4	52.6	13.9	
PHF	.898	.879	.000	.885	.000	.000	.000	.000	.000	.904	.696	.900	.909	.875	.833	.880

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City of Santa Ana
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Groups Printed- Total Volume

	Main Street Southbound				I-5 Southbound On Ramp Westbound				Main Street Northbound				Buffalo Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	151	236	0	387	0	0	0	0	0	298	13	311	70	38	13	121	819
04:15 PM	121	234	0	355	0	0	0	0	0	310	14	324	52	24	15	91	770
04:30 PM	168	244	0	412	0	0	0	0	0	304	10	314	65	30	18	113	839
04:45 PM	130	283	0	413	0	0	0	0	0	341	4	345	81	28	24	133	891
Total	570	997	0	1567	0	0	0	0	0	1253	41	1294	268	120	70	458	3319
05:00 PM	176	240	0	416	0	0	0	0	0	307	10	317	65	41	21	127	860
05:15 PM	154	304	0	458	0	0	0	0	0	361	9	370	85	50	21	156	984
05:30 PM	180	283	0	463	0	0	0	0	0	340	11	351	69	35	24	128	942
05:45 PM	136	234	0	370	0	0	0	0	0	346	3	349	47	44	15	106	825
Total	646	1061	0	1707	0	0	0	0	0	1354	33	1387	266	170	81	517	3611
Grand Total	1216	2058	0	3274	0	0	0	0	0	2607	74	2681	534	290	151	975	6930
Apprch %	37.1	62.9	0		0	0	0		0	97.2	2.8		54.8	29.7	15.5		
Total %	17.5	29.7	0	47.2	0	0	0	0	0	37.6	1.1	38.7	7.7	4.2	2.2	14.1	

	Main Street Southbound				I-5 Southbound On Ramp Westbound				Main Street Northbound				Buffalo Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	130	283	0	413	0	0	0	0	0	341	4	345	81	28	**24**	133	891
05:00 PM	176	240	0	416	0	0	0	0	0	307	10	317	65	41	21	127	860
05:15 PM	154	**304**	0	458	0	0	0	0	0	**361**	9	**370**	**85**	**50**	21	**156**	**984**
05:30 PM	**180**	283	0	**463**	0	0	0	0	0	340	**11**	351	69	35	24	128	942
Total Volume	640	1110	0	1750	0	0	0	0	0	1349	34	1383	300	154	90	544	3677
% App. Total	36.6	63.4	0		0	0	0		0	97.5	2.5		55.1	28.3	16.5		
PHF	.889	.913	.000	.945	.000	.000	.000	.000	.000	.934	.773	.934	.882	.770	.938	.872	.934

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File Name : SNAMABUPM
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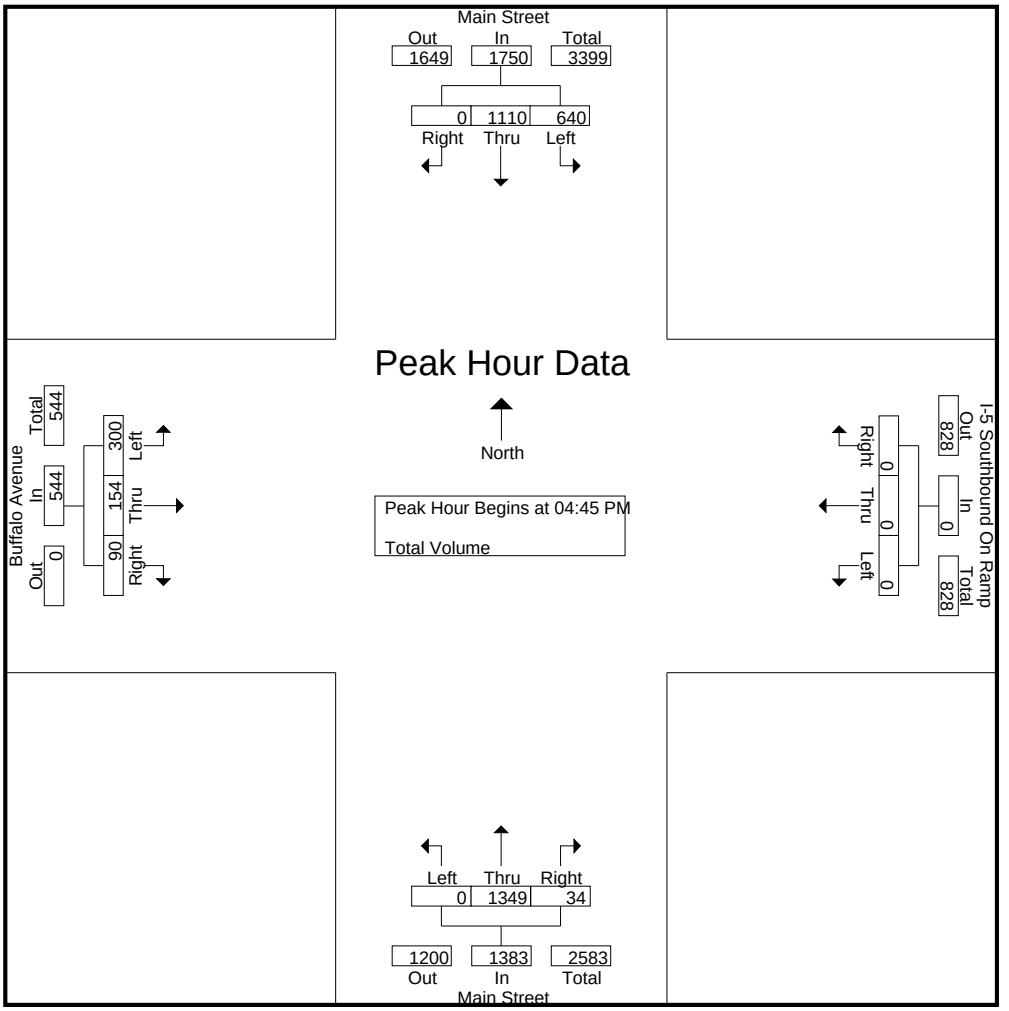

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:00 PM				05:00 PM				04:45 PM			
+0 mins.	130	283	0	413	0	0	0	0	0	307	10	317	81	28	**24**	133
+15 mins.	176	240	0	416	0	0	0	0	0	**361**	9	**370**	65	41	21	127
+30 mins.	154	**304**	0	458	0	0	0	0	0	340	**11**	351	**85**	**50**	21	**156**
+45 mins.	**180**	283	0	**463**	0	0	0	0	0	346	3	349	69	35	24	128
Total Volume	640	1110	0	1750	0	0	0	0	0	1354	33	1387	300	154	90	544
% App. Total	36.6	63.4	0		0	0	0		0	97.6	2.4		55.1	28.3	16.5	
PHF	.889	.913	.000	.945	.000	.000	.000	.000	.000	.938	.750	.937	.882	.770	.938	.872

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City of Santa Ana
N/S: Main Street
E/W: 17th Street
Weather: Clear

File Name : SNAMA17AM
Site Code : 10517256
Start Date : 4/26/2017
Page No : 1

Groups Printed- Total Volume

	Main Street Southbound				17th Street Westbound				Main Street Northbound				17th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	31	271	10	312	60	230	4	294	30	163	20	213	20	311	26	357	1176
07:15 AM	50	262	17	329	71	278	11	360	41	166	25	232	24	318	22	364	1285
07:30 AM	38	243	19	300	78	282	6	366	40	175	35	250	25	238	15	278	1194
07:45 AM	41	292	18	351	113	322	5	440	43	224	61	328	32	255	17	304	1423
Total	160	1068	64	1292	322	1112	26	1460	154	728	141	1023	101	1122	80	1303	5078
08:00 AM	40	295	31	366	49	289	15	353	25	182	51	258	52	272	22	346	1323
08:15 AM	52	246	22	320	53	248	12	313	36	167	22	225	36	269	26	331	1189
08:30 AM	44	266	25	335	70	275	14	359	33	154	33	220	20	240	16	276	1190
08:45 AM	37	217	15	269	57	221	25	303	37	145	20	202	38	231	18	287	1061
Total	173	1024	93	1290	229	1033	66	1328	131	648	126	905	146	1012	82	1240	4763
Grand Total	333	2092	157	2582	551	2145	92	2788	285	1376	267	1928	247	2134	162	2543	9841
Apprch %	12.9	81	6.1		19.8	76.9	3.3		14.8	71.4	13.8		9.7	83.9	6.4		
Total %	3.4	21.3	1.6	26.2	5.6	21.8	0.9	28.3	2.9	14	2.7	19.6	2.5	21.7	1.6	25.8	

	Main Street Southbound				17th Street Westbound				Main Street Northbound				17th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	**50**	262	17	329	71	278	11	360	41	166	25	232	24	**318**	**22**	**364**	1285
07:30 AM	38	243	19	300	78	282	6	366	40	175	35	250	25	238	15	278	1194
07:45 AM	41	292	18	351	**113**	**322**	5	**440**	**43**	**224**	**61**	**328**	32	255	17	304	**1423**
08:00 AM	40	**295**	**31**	**366**	49	289	**15**	353	25	182	51	258	**52**	272	22	346	1323
Total Volume	169	1092	85	1346	311	1171	37	1519	149	747	172	1068	133	1083	76	1292	5225
% App. Total	12.6	81.1	6.3		20.5	77.1	2.4		14	69.9	16.1		10.3	83.8	5.9		
PHF	.845	.925	.685	.919	.688	.909	.617	.863	.866	.834	.705	.814	.639	.851	.864	.887	.918

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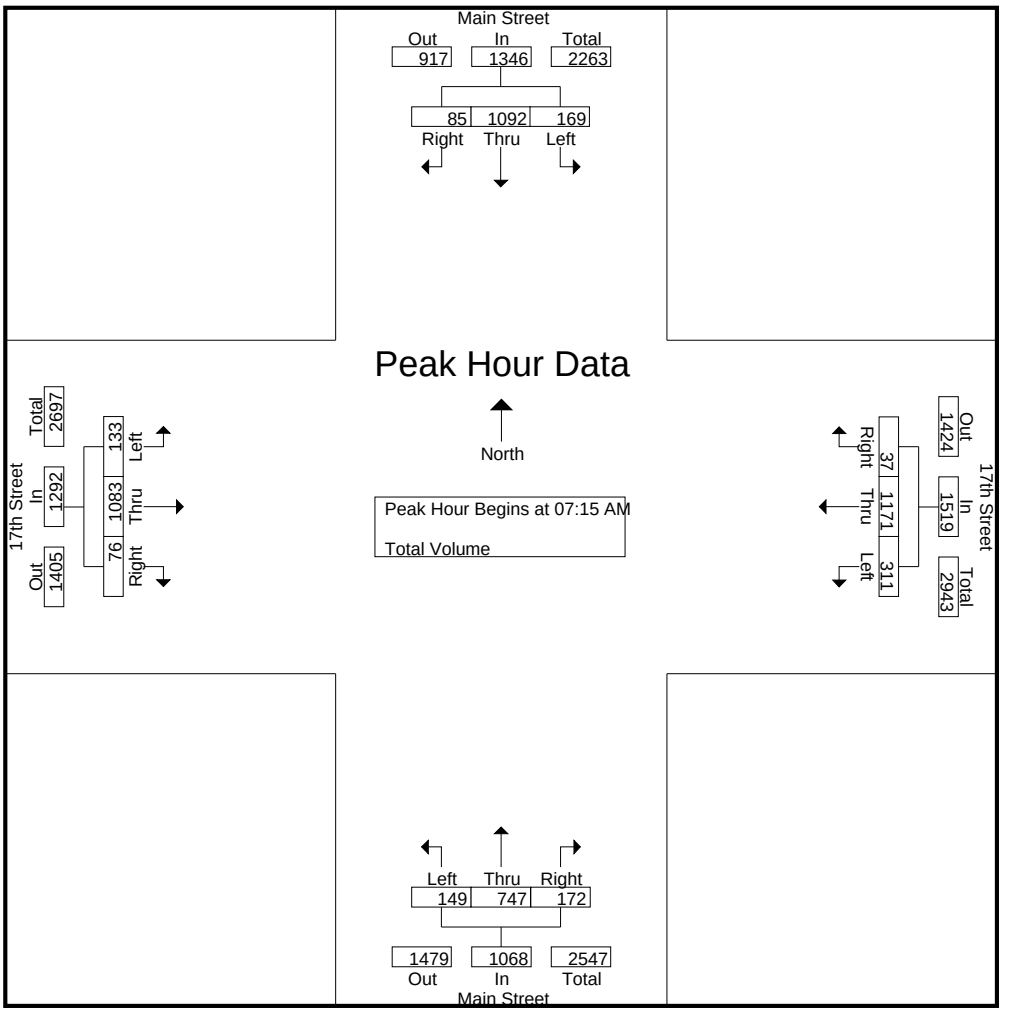

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:15 AM				07:15 AM				07:00 AM			
+0 mins.	41	292	18	351	71	278	11	360	41	166	25	232	20	311	**26**	357
+15 mins.	40	**295**	**31**	**366**	78	282	6	366	40	175	35	250	24	**318**	22	**364**
+30 mins.	**52**	246	22	320	**113**	**322**	5	**440**	**43**	**224**	**61**	**328**	25	238	15	278
+45 mins.	44	266	25	335	49	289	**15**	353	25	182	51	258	**32**	255	17	304
Total Volume	177	1099	96	1372	311	1171	37	1519	149	747	172	1068	101	1122	80	1303
% App. Total	12.9	80.1	7		20.5	77.1	2.4		14	69.9	16.1		7.8	86.1	6.1	
PHF	.851	.931	.774	.937	.688	.909	.617	.863	.866	.834	.705	.814	.789	.882	.769	.895

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Groups Printed- Total Volume

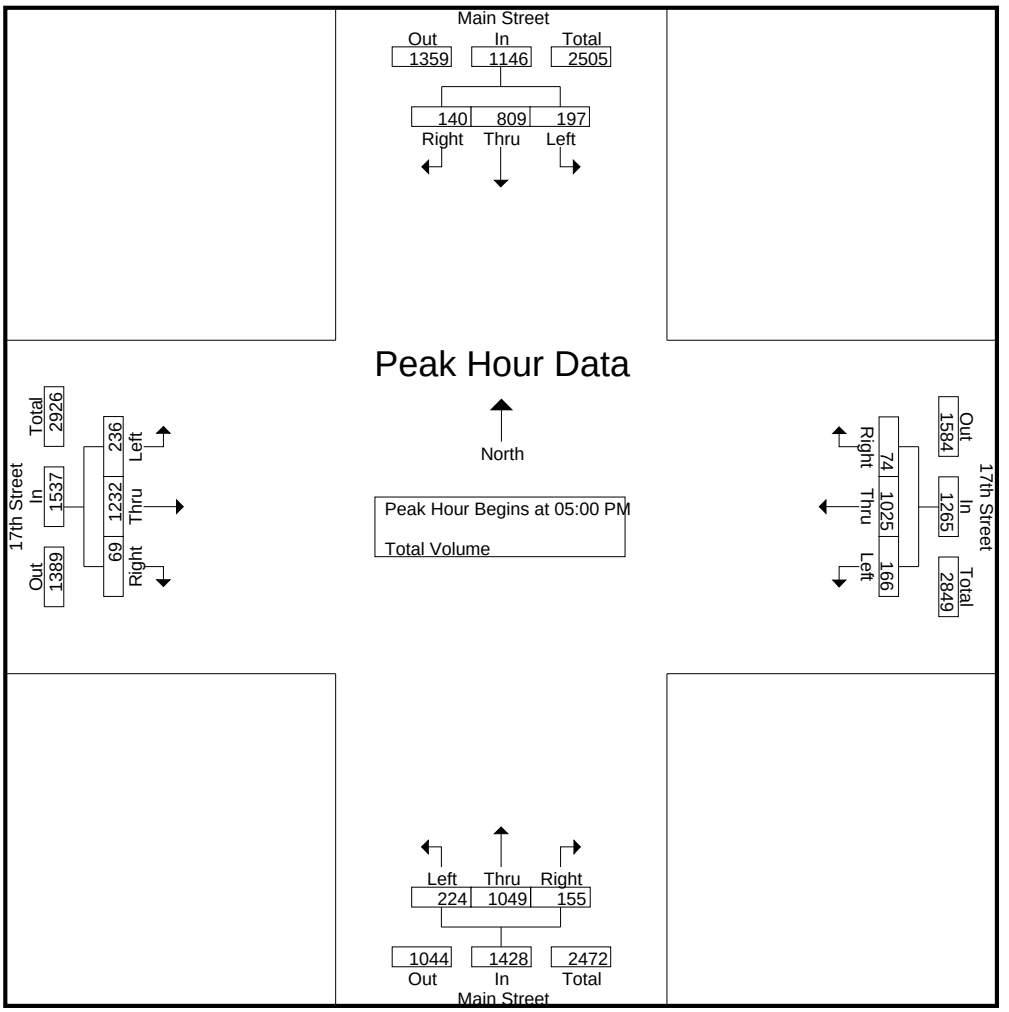
	Main Street Southbound				17th Street Westbound				Main Street Northbound				17th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	45	167	41	253	62	271	14	347	38	234	59	331	46	259	25	330	1261
04:15 PM	26	149	28	203	42	283	14	339	40	250	41	331	59	296	26	381	1254
04:30 PM	34	185	24	243	57	275	19	351	65	256	38	359	47	296	16	359	1312
04:45 PM	38	182	35	255	65	281	19	365	46	220	45	311	48	298	14	360	1291
Total	143	683	128	954	226	1110	66	1402	189	960	183	1332	200	1149	81	1430	5118
05:00 PM	47	205	37	289	47	251	18	316	69	248	58	375	65	311	18	394	1374
05:15 PM	58	206	28	292	37	251	18	306	55	271	46	372	64	314	18	396	1366
05:30 PM	51	209	43	303	45	259	13	317	46	268	27	341	51	304	11	366	1327
05:45 PM	41	189	32	262	37	264	25	326	54	262	24	340	56	303	22	381	1309
Total	197	809	140	1146	166	1025	74	1265	224	1049	155	1428	236	1232	69	1537	5376
Grand Total	340	1492	268	2100	392	2135	140	2667	413	2009	338	2760	436	2381	150	2967	10494
Apprch %	16.2	71	12.8		14.7	80.1	5.2		15	72.8	12.2		14.7	80.2	5.1		
Total %	3.2	14.2	2.6	20	3.7	20.3	1.3	25.4	3.9	19.1	3.2	26.3	4.2	22.7	1.4	28.3	

	Main Street Southbound				17th Street Westbound				Main Street Northbound				17th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	47	205	37	289	**47**	251	18	316	**69**	248	**58**	**375**	**65**	311	18	394	**1374**
05:15 PM	**58**	206	28	292	37	251	18	306	55	**271**	46	372	64	**314**	18	**396**	1366
05:30 PM	51	**209**	**43**	**303**	45	259	13	317	46	268	27	341	51	304	11	366	1327
05:45 PM	41	189	32	262	37	**264**	**25**	**326**	54	262	24	340	56	303	**22**	381	1309
Total Volume	197	809	140	1146	166	1025	74	1265	224	1049	155	1428	236	1232	69	1537	5376
% App. Total	17.2	70.6	12.2		13.1	81	5.8		15.7	73.5	10.9		15.4	80.2	4.5		
PHF	.849	.968	.814	.946	.883	.971	.740	.970	.812	.968	.668	.952	.908	.981	.784	.970	.978

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Santa Ana
N/S: Main Street
E/W: 17th Street
Weather: Clear

File Name : SNAMA17pm
Site Code : 10517256
Start Date : 4/26/2017
Page No : 2

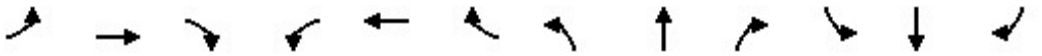


Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM				04:00 PM				05:00 PM				05:00 PM			
+0 mins.	47	205	37	289	62	271	14	347	**69**	248	**58**	**375**	**65**	311	18	394
+15 mins.	**58**	206	28	292	42	**283**	14	339	55	**271**	46	372	64	**314**	18	**396**
+30 mins.	51	**209**	**43**	**303**	57	275	**19**	351	46	268	27	341	51	304	11	366
+45 mins.	41	189	32	262	**65**	281	19	**365**	54	262	24	340	56	303	**22**	381
Total Volume	197	809	140	1146	226	1110	66	1402	224	1049	155	1428	236	1232	69	1537
% App. Total	17.2	70.6	12.2		16.1	79.2	4.7		15.7	73.5	10.9		15.4	80.2	4.5	
PHF	.849	.968	.814	.946	.869	.981	.868	.960	.812	.968	.668	.952	.908	.981	.784	.970

Appendix B

Existing Level of Service Analysis Worksheets

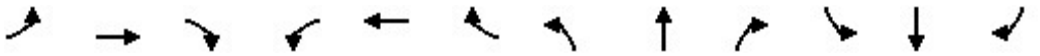


Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0			0		60	170		0			130
Storage Lanes	0			0		1	2		0			1
Taper Length (ft)	25			25			25					
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	1.00
Ped Bike Factor												
Frt			0.850			0.850		0.975				0.850
Flt Protected		0.970			0.957		0.950			0.950		
Satd. Flow (prot)	0	1807	1583	0	1783	1583	3433	4958	0	1770	5085	1583
Flt Permitted		0.840			0.736		0.950			0.950		
Satd. Flow (perm)	0	1565	1583	0	1371	1583	3433	4958	0	1770	5085	1583
Right Turn on Red			Yes			Yes						Yes
Satd. Flow (RTOR)			118			118						82
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		916			717			903			1485	
Travel Time (s)		20.8			16.3			20.5			33.8	

Intersection Summary	
Area Type:	Other

Lane Group	NWR	NWR2
Lane Configurations		
Ideal Flow (vphpl)	1900	1900
Lane Width (ft)	12	12
Grade (%)		
Storage Length (ft)	500	
Storage Lanes	1	
Taper Length (ft)		
Lane Util. Factor	0.88	1.00
Ped Bike Factor		
Frt	0.850	
Flt Protected		
Satd. Flow (prot)	2787	0
Flt Permitted		
Satd. Flow (perm)	2787	0
Right Turn on Red		No
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		

Intersection Summary



Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Volume (vph)	9	6	83	122	14	97	63	435	87	85	1232	18
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	10	6	89	131	15	104	68	468	94	91	1325	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	16	89	0	146	104	68	562	0	91	1325	19

Intersection Summary

Lane Group	NWR	NWR2
Volume (vph)	602	12
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor	0.93	0.93
Growth Factor	100%	100%
Heavy Vehicles (%)	2%	2%
Bus Blockages (#/hr)	0	0
Parking (#/hr)		
Mid-Block Traffic (%)		
Adj. Flow (vph)	647	13
Shared Lane Traffic (%)		
Lane Group Flow (vph)	660	0

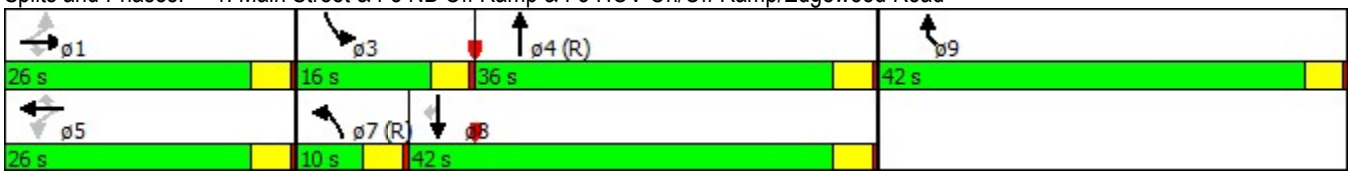
Intersection Summary

Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	SBL2	SBT	SBR	NWR
Lane Configurations												
Volume (vph)	9	6	83	122	14	97	63	435	85	1232	18	602
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA	Perm	Prot
Protected Phases		1			5		7	4	3	8		9
Permitted Phases	1		1	5		5					8	
Detector Phase	1	1	1	5	5	5	7	4	3	8	8	9
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	20.0	8.0	20.0	20.0	8.0
Total Split (s)	26.0	26.0	26.0	26.0	26.0	26.0	10.0	36.0	16.0	42.0	42.0	42.0
Total Split (%)	21.7%	21.7%	21.7%	21.7%	21.7%	21.7%	8.3%	30.0%	13.3%	35.0%	35.0%	35.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag							Lead	Lag	Lead	Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	Max	Max	None
Act Effct Green (s)		17.3	17.3		17.3	17.3	15.6	42.9	10.7	38.0	38.0	33.1
Actuated g/C Ratio		0.14	0.14		0.14	0.14	0.13	0.36	0.09	0.32	0.32	0.28
v/c Ratio		0.07	0.27		0.74	0.32	0.15	0.32	0.58	0.82	0.03	0.86
Control Delay		42.6	5.4		70.4	8.4	67.8	9.3	66.8	43.1	0.1	52.9
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		42.6	5.4		70.4	8.4	67.8	9.3	66.8	43.1	0.1	52.9
LOS		D	A		E	A	E	A	E	D	A	D
Approach Delay		11.1			44.6			15.7		44.0		
Approach LOS		B			D			B		D		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 40 (33%), Referenced to phase 4:NBT and 7:NBL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 39.0 Intersection LOS: D
Intersection Capacity Utilization 64.0% ICU Level of Service C
Analysis Period (min) 15

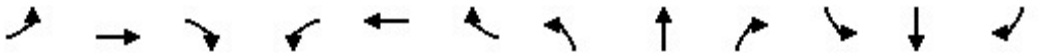
Splits and Phases: 1: Main Street & I-5 NB Off Ramp & I-5 HOV On/Off Ramp/Edgewood Road



Lane Group	EBT	EBR2	WBT	WBR	NBL	NBT	SBL2	SBT	SBR	NWR
Lane Group Flow (vph)	16	89	146	104	68	562	91	1325	19	660
v/c Ratio	0.07	0.27	0.74	0.32	0.15	0.32	0.58	0.82	0.03	0.86
Control Delay	42.6	5.4	70.4	8.4	67.8	9.3	66.8	43.1	0.1	52.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.6	5.4	70.4	8.4	67.8	9.3	66.8	43.1	0.1	52.9
Queue Length 50th (ft)	11	0	109	0	24	17	68	346	0	274
Queue Length 95th (ft)	31	26	177	39	m50	m80	124	406	0	338
Internal Link Dist (ft)	836		637			823		1405		
Turn Bay Length (ft)		150		60	170		150		130	500
Base Capacity (vph)	286	386	251	386	445	1771	181	1610	557	882
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.23	0.58	0.27	0.15	0.32	0.50	0.82	0.03	0.75

Intersection Summary

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



Movement	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Lane Configurations												
Volume (vph)	9	6	83	122	14	97	63	435	87	85	1232	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	0.97	0.91		1.00	0.91	1.00
Frt		1.00	0.85		1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected		0.97	1.00		0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1806	1583		1783	1583	3433	4958		1770	5085	1583
Flt Permitted		0.84	1.00		0.74	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1565	1583		1372	1583	3433	4958		1770	5085	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	10	6	89	131	15	104	68	468	94	91	1325	19
RTOR Reduction (vph)	0	0	76	0	0	89	0	0	0	0	0	13
Lane Group Flow (vph)	0	16	13	0	146	15	68	562	0	91	1325	6
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases		1			5		7	4		3	8	
Permitted Phases	1		1	5		5						8
Actuated Green, G (s)		17.3	17.3		17.3	17.3	15.6	42.9		10.7	38.0	38.0
Effective Green, g (s)		17.3	17.3		17.3	17.3	15.6	42.9		10.7	38.0	38.0
Actuated g/C Ratio		0.14	0.14		0.14	0.14	0.13	0.36		0.09	0.32	0.32
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		225	228		197	228	446	1772		157	1610	501
v/s Ratio Prot							0.02	c0.11		c0.05	c0.26	
v/s Ratio Perm		0.01	0.01		c0.11	0.01						0.00
v/c Ratio		0.07	0.06		0.74	0.07	0.15	0.32		0.58	0.82	0.01
Uniform Delay, d1		44.4	44.3		49.2	44.4	46.3	27.9		52.5	37.9	28.1
Progression Factor		1.00	1.00		1.00	1.00	1.31	0.29		1.00	1.00	1.00
Incremental Delay, d2		0.1	0.1		13.9	0.1	0.7	0.5		5.1	4.9	0.0
Delay (s)		44.5	44.4		63.1	44.5	61.4	8.7		57.6	42.8	28.2
Level of Service		D	D		E	D	E	A		E	D	C
Approach Delay (s)		44.4			55.4			14.4			43.5	
Approach LOS		D			E			B			D	

Intersection Summary			
HCM 2000 Control Delay	40.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	64.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NWR	NWR2
Lane Configurations		
Volume (vph)	602	12
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	
Lane Util. Factor	0.88	
Frt	0.85	
Flt Protected	1.00	
Satd. Flow (prot)	2787	
Flt Permitted	1.00	
Satd. Flow (perm)	2787	
Peak-hour factor, PHF	0.93	0.93
Adj. Flow (vph)	647	13
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	660	0
Turn Type	Prot	
Protected Phases	9	
Permitted Phases		
Actuated Green, G (s)	33.1	
Effective Green, g (s)	33.1	
Actuated g/C Ratio	0.28	
Clearance Time (s)	4.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	768	
v/s Ratio Prot	c0.24	
v/s Ratio Perm		
v/c Ratio	0.86	
Uniform Delay, d1	41.2	
Progression Factor	1.00	
Incremental Delay, d2	9.5	
Delay (s)	50.7	
Level of Service	D	
Approach Delay (s)		
Approach LOS		

Intersection Summary

Lane Group	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			
Storage Length (ft)	0		0			300	450		0	600	
Storage Lanes	1		0			1	2		0	1	
Taper Length (ft)	25						25				
Lane Util. Factor	0.91	0.91	0.95	0.97	0.91	1.00	0.97	0.91	0.91	0.88	1.00
Ped Bike Factor											
Frt		0.949				0.850		0.991		0.850	
Flt Protected	0.950	0.999		0.950			0.950				
Satd. Flow (prot)	1610	3214	0	3433	5085	1583	3433	5040	0	2787	0
Flt Permitted	0.950	0.999		0.950			0.950				
Satd. Flow (perm)	1610	3214	0	3433	5085	1583	3433	5040	0	2787	0
Right Turn on Red			Yes			Yes					No
Satd. Flow (RTOR)		60				599					
Link Speed (mph)		30			30			30			
Link Distance (ft)		645			468			903			
Travel Time (s)		14.7			10.6			20.5			

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Volume (vph)	98	381	199	15	446	636	65	1323	82	531	30
Confl. Peds. (#/hr)											
Confl. Bikes (#/hr)											
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)											
Mid-Block Traffic (%)		0%			0%			0%			
Adj. Flow (vph)	108	419	219	16	490	699	71	1454	90	584	33
Shared Lane Traffic (%)	10%										
Lane Group Flow (vph)	97	649	0	16	490	699	71	1544	0	617	0

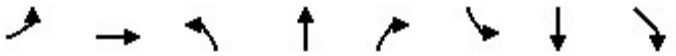
Intersection Summary

Lane Group	EBL	EBT	NBL2	NBT	NBR	SBL	SBT	SER
Lane Configurations								
Volume (vph)	98	381	15	446	636	65	1323	531
Turn Type	Perm	NA	Prot	NA	Perm	Prot	NA	Prot
Protected Phases		1	7	4		3	8	9
Permitted Phases	1				4			
Detector Phase	1	1	7	4	4	3	8	9
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	8.0	20.0	20.0	8.0	20.0	8.0
Total Split (s)	29.0	29.0	8.0	48.0	48.0	8.0	48.0	35.0
Total Split (%)	24.2%	24.2%	6.7%	40.0%	40.0%	6.7%	40.0%	29.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
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	Lag	Lead	Lag	
Lead-Lag Optimize?								
Recall Mode	None	None	None	C-Max	C-Max	None	C-Max	None
Act Effct Green (s)	25.0	25.0	4.3	47.2	47.2	4.4	50.4	29.5
Actuated g/C Ratio	0.21	0.21	0.04	0.39	0.39	0.04	0.42	0.25
v/c Ratio	0.29	0.91	0.13	0.25	0.71	0.57	0.73	0.90
Control Delay	42.7	59.6	38.9	36.5	36.9	85.5	12.2	61.4
Queue Delay	0.0	0.0	0.0	0.0	12.8	0.0	0.0	0.0
Total Delay	42.7	59.6	38.9	36.5	49.7	85.5	12.2	61.4
LOS	D	E	D	D	D	F	B	E
Approach Delay		57.4		44.2			15.5	
Approach LOS		E		D			B	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 40 (33%), Referenced to phase 4:NBT and 8:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 38.0 Intersection LOS: D
Intersection Capacity Utilization 70.6% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 2: Main Street & Santa Clara Avenue/I-5 NB On Ramp & I-5 SB Off Ramp



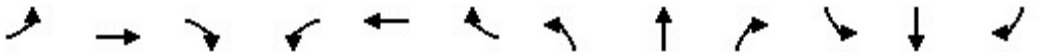
Lane Group	EBL	EBT	NBL2	NBT	NBR	SBL	SBT	SER
Lane Group Flow (vph)	97	649	16	490	699	71	1544	617
v/c Ratio	0.29	0.91	0.13	0.25	0.71	0.57	0.73	0.90
Control Delay	42.7	59.6	38.9	36.5	36.9	85.5	12.2	61.4
Queue Delay	0.0	0.0	0.0	0.0	12.8	0.0	0.0	0.0
Total Delay	42.7	59.6	38.9	36.5	49.7	85.5	12.2	61.4
Queue Length 50th (ft)	70	248	6	146	403	30	92	259
Queue Length 95th (ft)	126	#362	m10	183	523	m39	168	#363
Internal Link Dist (ft)		565		388			823	
Turn Bay Length (ft)			70		300	450		600
Base Capacity (vph)	340	726	123	1999	985	125	2116	719
Starvation Cap Reductn	0	0	0	0	271	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.89	0.13	0.25	0.98	0.57	0.73	0.86

Intersection Summary

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.

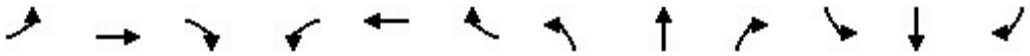
Movement	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Lane Configurations											
Volume (vph)	98	381	199	15	446	636	65	1323	82	531	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor	0.91	0.91		0.97	0.91	1.00	0.97	0.91		0.88	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.99		0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		1.00	
Satd. Flow (prot)	1610	3216		3433	5085	1583	3433	5041		2787	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		1.00	
Satd. Flow (perm)	1610	3216		3433	5085	1583	3433	5041		2787	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	108	419	219	16	490	699	71	1454	90	584	33
RTOR Reduction (vph)	0	48	0	0	0	368	0	0	0	0	0
Lane Group Flow (vph)	97	602	0	16	490	331	71	1544	0	617	0
Turn Type	Perm	NA		Prot	NA	Perm	Prot	NA		Prot	
Protected Phases		1		7	4		3	8		9	
Permitted Phases	1					4					
Actuated Green, G (s)	25.0	25.0		1.6	46.3	46.3	3.2	47.9		29.5	
Effective Green, g (s)	25.0	25.0		1.6	46.3	46.3	3.2	47.9		29.5	
Actuated g/C Ratio	0.21	0.21		0.01	0.39	0.39	0.03	0.40		0.25	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	335	670		45	1961	610	91	2012		685	
v/s Ratio Prot				0.00	0.10		c0.02	c0.31		c0.22	
v/s Ratio Perm	0.06	0.19				0.21					
v/c Ratio	0.29	0.90		0.36	0.25	0.54	0.78	0.77		0.90	
Uniform Delay, d1	40.0	46.3		58.7	25.0	28.6	58.1	31.2		43.8	
Progression Factor	1.00	1.00		0.66	1.43	6.45	1.30	0.35		1.00	
Incremental Delay, d2	0.5	14.7		3.8	0.2	2.7	24.3	1.9		15.0	
Delay (s)	40.5	61.0		42.4	36.0	187.4	99.6	12.9		58.8	
Level of Service	D	E		D	D	F	F	B		E	
Approach Delay (s)		58.3			123.9			16.8			
Approach LOS		E			F			B			

Intersection Summary			
HCM 2000 Control Delay	61.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	170		0
Storage Lanes	0		0	0		0	0		0	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.91	0.91	0.97	0.91	1.00
Ped Bike Factor												
Frt		0.983						0.994				
Flt Protected		0.983								0.950		
Satd. Flow (prot)	0	3420	0	0	0	0	0	5055	0	3433	5085	0
Flt Permitted		0.983								0.950		
Satd. Flow (perm)	0	3420	0	0	0	0	0	5055	0	3433	5085	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10						5				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		633			1129			308			468	
Travel Time (s)		14.4			25.7			7.0			10.6	

Intersection Summary	
Area Type:	Other



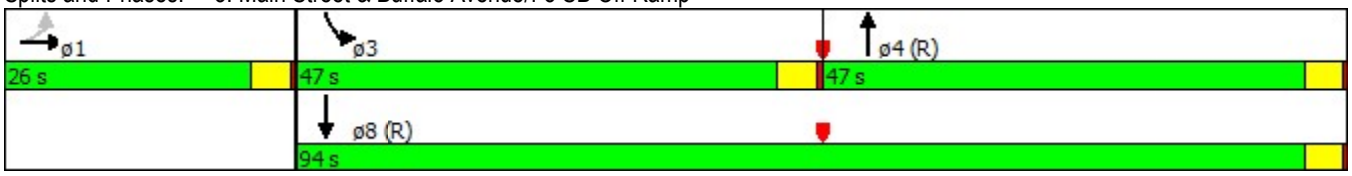
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	118	180	39	0	0	0	0	1009	39	729	1374	0
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	127	194	42	0	0	0	0	1085	42	784	1477	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	363	0	0	0	0	0	1127	0	784	1477	0

Intersection Summary

Lane Group	EBT	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	180	1009	729	1374
Turn Type	NA	NA	Prot	NA
Protected Phases	1	4	3	8
Permitted Phases				
Detector Phase	1	4	3	8
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0
Total Split (s)	26.0	47.0	47.0	94.0
Total Split (%)	21.7%	39.2%	39.2%	78.3%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?				
Recall Mode	None	C-Max	Max	C-Max
Act Effct Green (s)	17.6	43.0	47.4	94.4
Actuated g/C Ratio	0.15	0.36	0.40	0.79
v/c Ratio	0.71	0.62	0.58	0.37
Control Delay	55.3	33.5	21.5	1.6
Queue Delay	2.6	0.0	0.5	0.4
Total Delay	57.9	33.5	22.0	1.9
LOS	E	C	C	A
Approach Delay	57.9	33.5		8.9
Approach LOS	E	C		A

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 98 (82%), Referenced to phase 4:NBT and 8:SBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 21.0	Intersection LOS: C
Intersection Capacity Utilization 60.8%	ICU Level of Service B
Analysis Period (min) 15	

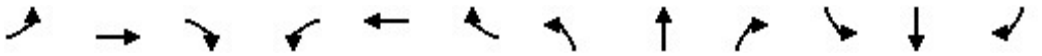
Splits and Phases: 3: Main Street & Buffalo Avenue/I-5 SB Off Ramp



Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	363	1127	784	1477
v/c Ratio	0.71	0.62	0.58	0.37
Control Delay	55.3	33.5	21.5	1.6
Queue Delay	2.6	0.0	0.5	0.4
Total Delay	57.9	33.5	22.0	1.9
Queue Length 50th (ft)	138	260	164	31
Queue Length 95th (ft)	184	310	m213	32
Internal Link Dist (ft)	553	228		388
Turn Bay Length (ft)			170	
Base Capacity (vph)	635	1814	1357	4001
Starvation Cap Reductn	0	0	210	1724
Spillback Cap Reductn	165	36	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.77	0.63	0.68	0.65

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	118	180	39	0	0	0	0	1009	39	729	1374	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0		4.0	4.0	
Lane Util. Factor		0.95						0.91		0.97	0.91	
Frt		0.98						0.99		1.00	1.00	
Flt Protected		0.98						1.00		0.95	1.00	
Satd. Flow (prot)		3418						5057		3433	5085	
Flt Permitted		0.98						1.00		0.95	1.00	
Satd. Flow (perm)		3418						5057		3433	5085	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	127	194	42	0	0	0	0	1085	42	784	1477	0
RTOR Reduction (vph)	0	9	0	0	0	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	354	0	0	0	0	0	1124	0	784	1477	0
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		1						4		3	8	
Permitted Phases	1											
Actuated Green, G (s)		17.6						43.0		47.4	94.4	
Effective Green, g (s)		17.6						43.0		47.4	94.4	
Actuated g/C Ratio		0.15						0.36		0.39	0.79	
Clearance Time (s)		4.0						4.0		4.0	4.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		501						1812		1356	4000	
v/s Ratio Prot								c0.22		c0.23	0.29	
v/s Ratio Perm		0.10										
v/c Ratio		0.71						0.62		0.58	0.37	
Uniform Delay, d1		48.7						31.8		28.5	3.8	
Progression Factor		1.00						1.00		0.70	0.35	
Incremental Delay, d2		4.5						1.6		1.1	0.2	
Delay (s)		53.3						33.4		20.9	1.5	
Level of Service		D						C		C	A	
Approach Delay (s)		53.3			0.0			33.4			8.2	
Approach LOS		D			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

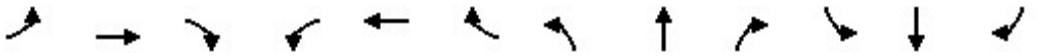
2129 NORTH MAIN ST TIA (JN:0016-2016-01)
EXISTING CONDITION
AM PEAK HOUR

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #4 Main Street / 17th Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.759
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	45	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2 0	2 0	1	2 0	1 1	0	2 0	2 1	0	2 0	2 1	0
Volume Module:												
Base Vol:	149	747	172	169	1092	85	133	1083	76	311	1171	37
Growth 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
Initial Bse:	149	747	172	169	1092	85	133	1083	76	311	1171	37
User 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
PHF 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
PHF Volume:	149	747	172	169	1092	85	133	1083	76	311	1171	37
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	149	747	172	169	1092	85	133	1083	76	311	1171	37
PCE 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
MLF 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
FinalVolume:	149	747	172	169	1092	85	133	1083	76	311	1171	37
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	1.86	0.14	2.00	2.80	0.20	2.00	2.91	0.09
Final Sat.:	3400	3400	1700	3400	3154	246	3400	4766	334	3400	4944	156
Capacity Analysis Module:												
Vol/Sat:	0.04	0.22	0.10	0.05	0.35	0.35	0.04	0.23	0.23	0.09	0.24	0.24
Crit Moves:	****			****			****			****		



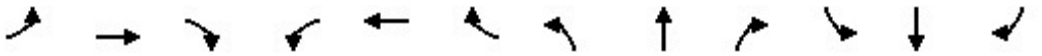
Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0			0		60	170		0			130
Storage Lanes	0			0		1	2		0			1
Taper Length (ft)	25			25			25					
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	1.00
Ped Bike Factor												
Frt			0.850			0.850		0.984				0.850
Flt Protected		0.963			0.962		0.950			0.950		
Satd. Flow (prot)	0	1794	1583	0	1792	1583	3433	5004	0	1770	5085	1583
Flt Permitted		0.615			0.737		0.950			0.950		
Satd. Flow (perm)	0	1146	1583	0	1373	1583	3433	5004	0	1770	5085	1583
Right Turn on Red			Yes			Yes						Yes
Satd. Flow (RTOR)			118			118						118
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		916			717			903			1485	
Travel Time (s)		20.8			16.3			20.5			33.8	

Intersection Summary

Area Type: Other

Lane Group	NWR	NWR2
Lane Configurations		
Ideal Flow (vphpl)	1900	1900
Lane Width (ft)	12	12
Grade (%)		
Storage Length (ft)	500	
Storage Lanes	1	
Taper Length (ft)		
Lane Util. Factor	0.88	1.00
Ped Bike Factor		
Frt	0.850	
Flt Protected		
Satd. Flow (prot)	2787	0
Flt Permitted		
Satd. Flow (perm)	2787	0
Right Turn on Red		No
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		

Intersection Summary



Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Volume (vph)	37	11	81	97	26	109	269	802	93	100	1241	111
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	40	12	87	104	28	117	289	862	100	108	1334	119
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	52	87	0	132	117	289	962	0	108	1334	119

Intersection Summary

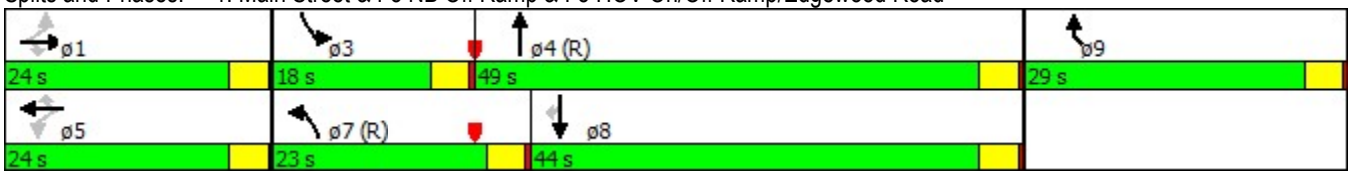
Lane Group	NWR	NWR2
Volume (vph)	349	10
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor	0.93	0.93
Growth Factor	100%	100%
Heavy Vehicles (%)	2%	2%
Bus Blockages (#/hr)	0	0
Parking (#/hr)		
Mid-Block Traffic (%)		
Adj. Flow (vph)	375	11
Shared Lane Traffic (%)		
Lane Group Flow (vph)	386	0

Intersection Summary

Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	SBL2	SBT	SBR	NWR
Lane Configurations												
Volume (vph)	37	11	81	97	26	109	269	802	100	1241	111	349
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA	Perm	Prot
Protected Phases		1			5		7	4	3	8		9
Permitted Phases	1		1	5		5					8	
Detector Phase	1	1	1	5	5	5	7	4	3	8	8	9
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	20.0	8.0	20.0	20.0	8.0
Total Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	23.0	49.0	18.0	44.0	44.0	29.0
Total Split (%)	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	19.2%	40.8%	15.0%	36.7%	36.7%	24.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag							Lead	Lag	Lead	Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	Max	Max	None
Act Effct Green (s)		16.0	16.0		16.0	16.0	26.8	54.8	11.9	40.0	40.0	21.3
Actuated g/C Ratio		0.13	0.13		0.13	0.13	0.22	0.46	0.10	0.33	0.33	0.18
v/c Ratio		0.34	0.28		0.72	0.37	0.38	0.42	0.62	0.79	0.20	0.78
Control Delay		52.0	5.5		71.2	11.2	48.4	33.4	66.7	40.2	5.9	58.6
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		52.0	5.5		71.2	11.2	48.4	33.4	66.7	40.2	5.9	58.6
LOS		D	A		E	B	D	C	E	D	A	E
Approach Delay		22.9			43.0			36.9		39.4		
Approach LOS		C			D			D		D		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 78 (65%), Referenced to phase 4:NBT and 7:NBL, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 40.2	Intersection LOS: D
Intersection Capacity Utilization 62.4%	ICU Level of Service B
Analysis Period (min) 15	

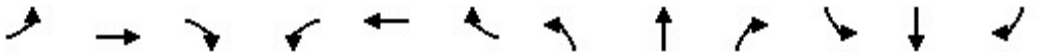
Splits and Phases: 1: Main Street & I-5 NB Off Ramp & I-5 HOV On/Off Ramp/Edgewood Road



Lane Group	EBT	EBR2	WBT	WBR	NBL	NBT	SBL2	SBT	SBR	NWR
Lane Group Flow (vph)	52	87	132	117	289	962	108	1334	119	386
v/c Ratio	0.34	0.28	0.72	0.37	0.38	0.42	0.62	0.79	0.20	0.78
Control Delay	52.0	5.5	71.2	11.2	48.4	33.4	66.7	40.2	5.9	58.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.0	5.5	71.2	11.2	48.4	33.4	66.7	40.2	5.9	58.6
Queue Length 50th (ft)	37	0	99	0	111	189	81	340	1	163
Queue Length 95th (ft)	75	24	164	51	m158	m249	141	399	42	217
Internal Link Dist (ft)	836		637			823		1405		
Turn Bay Length (ft)		150		60	170		150		130	500
Base Capacity (vph)	191	362	228	362	765	2286	208	1695	606	580
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.24	0.58	0.32	0.38	0.42	0.52	0.79	0.20	0.67

Intersection Summary

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



Movement	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Lane Configurations												
Volume (vph)	37	11	81	97	26	109	269	802	93	100	1241	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	0.97	0.91		1.00	0.91	1.00
Frt		1.00	0.85		1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1794	1583		1792	1583	3433	5006		1770	5085	1583
Flt Permitted		0.61	1.00		0.74	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1145	1583		1372	1583	3433	5006		1770	5085	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	40	12	87	104	28	117	289	862	100	108	1334	119
RTOR Reduction (vph)	0	0	75	0	0	101	0	0	0	0	0	79
Lane Group Flow (vph)	0	52	12	0	132	16	289	962	0	108	1334	40
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases		1			5		7	4		3	8	
Permitted Phases	1		1	5		5						8
Actuated Green, G (s)		16.0	16.0		16.0	16.0	26.7	54.8		11.9	40.0	40.0
Effective Green, g (s)		16.0	16.0		16.0	16.0	26.7	54.8		11.9	40.0	40.0
Actuated g/C Ratio		0.13	0.13		0.13	0.13	0.22	0.46		0.10	0.33	0.33
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		152	211		182	211	763	2286		175	1695	527
v/s Ratio Prot							0.08	c0.19		c0.06	c0.26	
v/s Ratio Perm		0.05	0.01		c0.10	0.01						0.03
v/c Ratio		0.34	0.05		0.73	0.07	0.38	0.42		0.62	0.79	0.08
Uniform Delay, d1		47.2	45.4		49.9	45.5	39.6	21.9		51.9	36.2	27.4
Progression Factor		1.00	1.00		1.00	1.00	1.13	1.39		1.00	1.00	1.00
Incremental Delay, d2		1.3	0.1		13.4	0.1	1.2	0.5		6.3	3.8	0.3
Delay (s)		48.6	45.5		63.3	45.7	45.9	31.0		58.2	39.9	27.6
Level of Service		D	D		E	D	D	C		E	D	C
Approach Delay (s)		46.7			55.0			34.5			40.3	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	41.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NWR	NWR2
Lane Configurations		
Volume (vph)	349	10
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	
Lane Util. Factor	0.88	
Frt	0.85	
Flt Protected	1.00	
Satd. Flow (prot)	2787	
Flt Permitted	1.00	
Satd. Flow (perm)	2787	
Peak-hour factor, PHF	0.93	0.93
Adj. Flow (vph)	375	11
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	386	0
Turn Type	Prot	
Protected Phases	9	
Permitted Phases		
Actuated Green, G (s)	21.3	
Effective Green, g (s)	21.3	
Actuated g/C Ratio	0.18	
Clearance Time (s)	4.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	494	
v/s Ratio Prot	c0.14	
v/s Ratio Perm		
v/c Ratio	0.78	
Uniform Delay, d1	47.1	
Progression Factor	1.00	
Incremental Delay, d2	7.9	
Delay (s)	55.0	
Level of Service	D	
Approach Delay (s)		
Approach LOS		

Intersection Summary

Lane Group	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			
Storage Length (ft)	0		0			300	450		0	600	
Storage Lanes	1		0			1	2		0	1	
Taper Length (ft)	25						25				
Lane Util. Factor	0.91	0.91	0.95	0.97	0.91	1.00	0.97	0.91	0.91	0.88	1.00
Ped Bike Factor											
Frt		0.967				0.850		0.992		0.850	
Flt Protected	0.950	0.998		0.950			0.950				
Satd. Flow (prot)	1610	3272	0	3433	5085	1583	3433	5045	0	2787	0
Flt Permitted	0.950	0.998		0.950			0.950				
Satd. Flow (perm)	1610	3272	0	3433	5085	1583	3433	5045	0	2787	0
Right Turn on Red			Yes			Yes					No
Satd. Flow (RTOR)		26				451					
Link Speed (mph)		30			30			30			
Link Distance (ft)		645			468			903			
Travel Time (s)		14.7			10.6			20.5			

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Volume (vph)	236	479	143	13	915	682	149	1222	69	331	13
Confl. Peds. (#/hr)											
Confl. Bikes (#/hr)											
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)											
Mid-Block Traffic (%)		0%			0%			0%			
Adj. Flow (vph)	259	526	157	14	1005	749	164	1343	76	364	14
Shared Lane Traffic (%)	10%										
Lane Group Flow (vph)	233	709	0	14	1005	749	164	1419	0	378	0

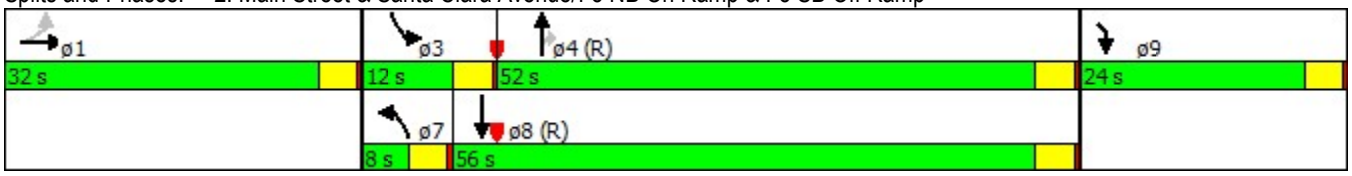
Intersection Summary

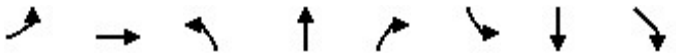
Lane Group	EBL	EBT	NBL2	NBT	NBR	SBL	SBT	SER
Lane Configurations								
Volume (vph)	236	479	13	915	682	149	1222	331
Turn Type	Perm	NA	Prot	NA	Perm	Prot	NA	Prot
Protected Phases		1	7	4		3	8	9
Permitted Phases	1				4			
Detector Phase	1	1	7	4	4	3	8	9
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	8.0	20.0	20.0	8.0	20.0	8.0
Total Split (s)	32.0	32.0	8.0	52.0	52.0	12.0	56.0	24.0
Total Split (%)	26.7%	26.7%	6.7%	43.3%	43.3%	10.0%	46.7%	20.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
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	Lag	Lead	Lag	
Lead-Lag Optimize?								
Recall Mode	None	None	None	C-Max	C-Max	None	C-Max	None
Act Effct Green (s)	27.8	27.8	4.3	49.0	49.0	8.0	57.9	19.1
Actuated g/C Ratio	0.23	0.23	0.04	0.41	0.41	0.07	0.48	0.16
v/c Ratio	0.63	0.91	0.11	0.48	0.82	0.72	0.58	0.85
Control Delay	49.8	60.4	81.8	12.0	14.5	89.6	4.9	67.5
Queue Delay	0.0	0.0	0.0	0.0	13.3	0.0	0.0	0.0
Total Delay	49.8	60.4	81.8	12.0	27.7	89.6	4.9	67.5
LOS	D	E	F	B	C	F	A	E
Approach Delay		57.8		19.2			13.6	
Approach LOS		E		B			B	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 94 (78%), Referenced to phase 4:NBT and 8:SBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 29.0 Intersection LOS: C
Intersection Capacity Utilization 72.9% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 2: Main Street & Santa Clara Avenue/I-5 NB On Ramp & I-5 SB Off Ramp





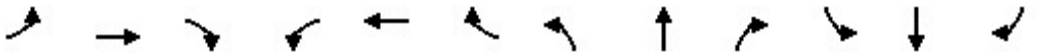
Lane Group	EBL	EBT	NBL2	NBT	NBR	SBL	SBT	SER
Lane Group Flow (vph)	233	709	14	1005	749	164	1419	378
v/c Ratio	0.63	0.91	0.11	0.48	0.82	0.72	0.58	0.85
Control Delay	49.8	60.4	81.8	12.0	14.5	89.6	4.9	67.5
Queue Delay	0.0	0.0	0.0	0.0	13.3	0.0	0.0	0.0
Total Delay	49.8	60.4	81.8	12.0	27.7	89.6	4.9	67.5
Queue Length 50th (ft)	179	285	6	61	133	70	52	162
Queue Length 95th (ft)	276	#401	m7	70	186	m91	64	#243
Internal Link Dist (ft)		565		388			823	
Turn Bay Length (ft)			70		300	450		600
Base Capacity (vph)	376	786	123	2077	913	229	2432	464
Starvation Cap Reductn	0	0	0	0	157	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.90	0.11	0.48	0.99	0.72	0.58	0.81

Intersection Summary

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.

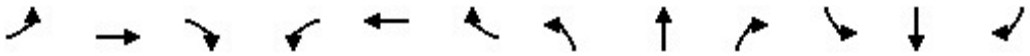
Movement	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Lane Configurations											
Volume (vph)	236	479	143	13	915	682	149	1222	69	331	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor	0.91	0.91		0.97	0.91	1.00	0.97	0.91		0.88	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.99		0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		1.00	
Satd. Flow (prot)	1610	3272		3433	5085	1583	3433	5044		2787	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		1.00	
Satd. Flow (perm)	1610	3272		3433	5085	1583	3433	5044		2787	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	259	526	157	14	1005	749	164	1343	76	364	14
RTOR Reduction (vph)	0	20	0	0	0	266	0	0	0	0	0
Lane Group Flow (vph)	233	689	0	14	1005	483	164	1419	0	378	0
Turn Type	Perm	NA		Prot	NA	Perm	Prot	NA		Prot	
Protected Phases		1		7	4		3	8		9	
Permitted Phases	1					4					
Actuated Green, G (s)	27.8	27.8		1.6	49.1	49.1	8.0	55.5		19.1	
Effective Green, g (s)	27.8	27.8		1.6	49.1	49.1	8.0	55.5		19.1	
Actuated g/C Ratio	0.23	0.23		0.01	0.41	0.41	0.07	0.46		0.16	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	372	758		45	2080	647	228	2332		443	
v/s Ratio Prot				0.00	0.20		c0.05	0.28		c0.14	
v/s Ratio Perm	0.14	0.21				c0.30					
v/c Ratio	0.63	0.91		0.31	0.48	0.75	0.72	0.61		0.85	
Uniform Delay, d1	41.4	44.9		58.7	26.1	30.1	54.9	24.1		49.1	
Progression Factor	1.00	1.00		1.42	0.43	0.70	1.41	0.18		1.00	
Incremental Delay, d2	3.3	14.7		2.5	0.5	5.0	7.3	0.8		14.7	
Delay (s)	44.7	59.5		86.1	11.8	26.0	84.8	5.1		63.8	
Level of Service	D	E		F	B	C	F	A		E	
Approach Delay (s)		55.9			18.4			13.4			
Approach LOS		E			B			B			

Intersection Summary			
HCM 2000 Control Delay	27.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	170		0
Storage Lanes	0		0	0		0	0		0	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.91	0.91	0.97	0.91	1.00
Ped Bike Factor												
Frt		0.975						0.996				
Flt Protected		0.973								0.950		
Satd. Flow (prot)	0	3358	0	0	0	0	0	5065	0	3433	5085	0
Flt Permitted		0.973								0.950		
Satd. Flow (perm)	0	3358	0	0	0	0	0	5065	0	3433	5085	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18						4				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		633			1129			308			468	
Travel Time (s)		14.4			25.7			7.0			10.6	

Intersection Summary	
Area Type:	Other



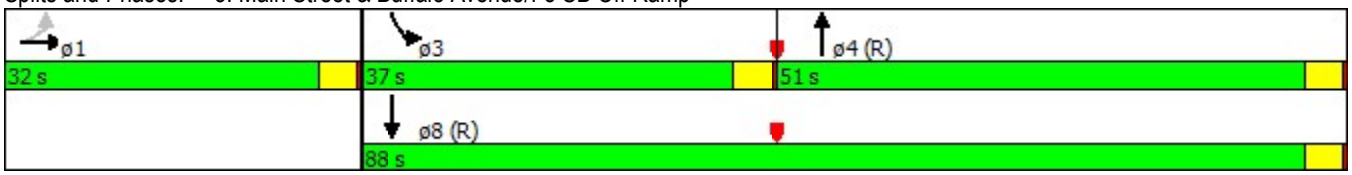
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	300	154	90	0	0	0	0	1349	34	640	1110	0
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	323	166	97	0	0	0	0	1451	37	688	1194	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	586	0	0	0	0	0	1488	0	688	1194	0

Intersection Summary

Lane Group	EBT	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	154	1349	640	1110
Turn Type	NA	NA	Prot	NA
Protected Phases	1	4	3	8
Permitted Phases				
Detector Phase	1	4	3	8
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0
Total Split (s)	32.0	51.0	37.0	88.0
Total Split (%)	26.7%	42.5%	30.8%	73.3%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?				
Recall Mode	None	C-Max	Max	C-Max
Act Effct Green (s)	25.2	47.0	35.8	86.8
Actuated g/C Ratio	0.21	0.39	0.30	0.72
v/c Ratio	0.82	0.75	0.67	0.32
Control Delay	53.5	34.2	45.2	9.4
Queue Delay	0.0	0.0	0.4	0.1
Total Delay	53.5	34.2	45.5	9.6
LOS	D	C	D	A
Approach Delay	53.5	34.2		22.7
Approach LOS	D	C		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 87 (73%), Referenced to phase 4:NBT and 8:SBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 31.6	Intersection LOS: C
Intersection Capacity Utilization 71.7%	ICU Level of Service C
Analysis Period (min) 15	

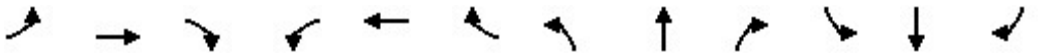
Splits and Phases: 3: Main Street & Buffalo Avenue/I-5 SB Off Ramp



Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	586	1488	688	1194
v/c Ratio	0.82	0.75	0.67	0.32
Control Delay	53.5	34.2	45.2	9.4
Queue Delay	0.0	0.0	0.4	0.1
Total Delay	53.5	34.2	45.5	9.6
Queue Length 50th (ft)	220	357	278	152
Queue Length 95th (ft)	282	416	m343	m198
Internal Link Dist (ft)	553	228		388
Turn Bay Length (ft)			170	
Base Capacity (vph)	797	1986	1025	3679
Starvation Cap Reductn	0	0	69	1237
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.74	0.75	0.72	0.49

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	154	90	0	0	0	0	1349	34	640	1110	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0		4.0	4.0	
Lane Util. Factor		0.95						0.91		0.97	0.91	
Frt		0.98						1.00		1.00	1.00	
Flt Protected		0.97						1.00		0.95	1.00	
Satd. Flow (prot)		3359						5066		3433	5085	
Flt Permitted		0.97						1.00		0.95	1.00	
Satd. Flow (perm)		3359						5066		3433	5085	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	323	166	97	0	0	0	0	1451	37	688	1194	0
RTOR Reduction (vph)	0	14	0	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	572	0	0	0	0	0	1486	0	688	1194	0
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		1						4		3	8	
Permitted Phases	1											
Actuated Green, G (s)		25.2						47.0		35.8	86.8	
Effective Green, g (s)		25.2						47.0		35.8	86.8	
Actuated g/C Ratio		0.21						0.39		0.30	0.72	
Clearance Time (s)		4.0						4.0		4.0	4.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		705						1984		1024	3678	
v/s Ratio Prot								c0.29		c0.20	0.23	
v/s Ratio Perm		0.17										
v/c Ratio		0.81						0.75		0.67	0.32	
Uniform Delay, d1		45.1						31.4		36.9	6.0	
Progression Factor		1.00						1.00		1.12	1.48	
Incremental Delay, d2		7.0						2.6		2.7	0.2	
Delay (s)		52.2						34.1		44.1	9.1	
Level of Service		D						C		D	A	
Approach Delay (s)		52.2			0.0			34.1			21.9	
Approach LOS		D			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

2129 NORTH MAIN ST TIA (JN:0016-2016-01)
EXISTING CONDITION
PM PEAK HOUR

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #4 Main Street / 17th Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.720
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	39	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2 0	2 0	1	2 0	1 1	0	2 0	2 1	0	2 0	2 1	0
Volume Module:												
Base Vol:	224	1049	155	197	809	140	236	1232	69	166	1025	74
Growth 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
Initial Bse:	224	1049	155	197	809	140	236	1232	69	166	1025	74
User 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
PHF 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
PHF Volume:	224	1049	155	197	809	140	236	1232	69	166	1025	74
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	224	1049	155	197	809	140	236	1232	69	166	1025	74
PCE 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
MLF 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
FinalVolume:	224	1049	155	197	809	140	236	1232	69	166	1025	74
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	1.70	0.30	2.00	2.84	0.16	2.00	2.80	0.20
Final Sat.:	3400	3400	1700	3400	2898	502	3400	4830	270	3400	4757	343
Capacity Analysis Module:												
Vol/Sat:	0.07	0.31	0.09	0.06	0.28	0.28	0.07	0.26	0.26	0.05	0.22	0.22
Crit Moves:		****		****				****		****		

Appendix C

Cumulative Projects
Information

Cumulative Development Trip Generation[1]

No.	TAZ	Project Name	APN Number	Land Use	ITE Trip Code	Quantity	Units	Peak Hour						Daily
								AM			PM			
								In	Out	Total	In	Out	Total	
1	1	Orange Collection	MJSP No. 0846-15	Apartments	220	544	DU	55	222	277	219	118	337	3,618
				Hotel	310	165	Rooms	52	36	88	50	49	99	1,348
							Subtotal	107	258	365	269	167	436	4,966
2	1	Oakmon Senior Living	MJSP 818-15	Senior Assisted Living Facility	252	98	Units	7	13	20	13	11	24	337
3	1	Bristol-Memory Commercial Builiding	002-261-06	Shopping Center Rate	820	6.9	TSF	4	3	7	12	13	25	295
							Zone 1 Total	**118**	**274**	**392**	**294**	**191**	**485**	**5,598**
4	2	Old Town Gateway	MJSP 0788-14	Apartments	220	12	DU	1	5	6	5	3	8	80
5	2	Town and Country Apartments and Townhomes	MJSP 0906-17	Apartments	220	915	DU	93	373	466	369	199	568	6,085
				Resd. Condo/Townhouse	230	77	DU	6	28	34	27	13	40	447
				Existing General Office	710	130.00	TSF	-178	-24	-202	-33	-161	-194	-1,434
							Subtotal	-79	377	298	363	51	414	5,098
6	2	The 301	041-215-03	Apartments	220	182	DU	19	74	93	73	39	112	1,210
				Shopping Center Rate	820	3.707	TSF	2	1	3	7	7	14	158
							Subtotal	21	75	96	80	46	126	1,368
							Zone 2 Total	**-57**	**457**	**400**	**448**	**100**	**548**	**6,546**
7	3	Discovery Science Center	002-180-49	Museum	580	53.384	TSF	**13**	**2**	**15**	**2**	**8**	**10**	**NA**
8	4	The Academy Charter High School	399-031-23	High School	530	110.50	TSF	240	98	338	58	49	107	1,424
9	4	New Convenience Store	004-020-18	Shopping Center Rate	820	2.45	TSF	1	1	2	4	5	9	105
10	4	Lam Residential	004-020-12	Single Family Homes	210	6	DU	1	3	4	4	2	6	57
11	4	Olson Residential	007-320-04	Resd. Condo/Townhouse	230	62	DU	5	23	28	22	11	33	360
							Zone 4 Total	**247**	**125**	**372**	**88**	**67**	**155**	**1,946**
12	5	Meta Housing Adaptive Reuse Residential	005-153-19	Apartments	220	58	DU	**6**	**24**	**30**	**23**	**13**	**36**	**386**
13	6	Sexlinger Homes	396-052-14	Single Family Homes	210	24	DU	5	14	19	15	9	24	228
14	6	Target Shopping Center Commercial Pads	400-231-02	Shopping Center Rate	820	9.112	TSF	5	3	8	16	18	34	389
15	6	Rocket Express Car Wash	396-031-16	Automated Car Wash	948	4.995	TSF	NA	NA	NA	36	35	71	NA
							Zone 6 Total	**10**	**17**	**27**	**67**	**62**	**129**	**617**

Cumulative Development Trip Generation[1]

No.	TAZ	Project Name	APN Number	Land Use	ITE Trip Code	Quantity	Units	Peak Hour AM In	Peak Hour AM Out	Peak Hour AM Total	Peak Hour PM In	Peak Hour PM Out	Peak Hour PM Total	Daily
16	7	Orleans Adaptive Reuse Apartments	398-541-13	Apartments	220	24	DU	2	10	12	10	5	15	160
17	7	One Broadway Plaza	398-561-18	General Office	710	518.00	TSF	711	97	808	131	641	772	5714
				High Turnover/Sit Down Rest.	932	16.00	TSF	95	78	173	95	63	158	2034
							Subtotal	806	175	981	226	704	930	7,748
18	7	Eight Eight 8 - Adaptive Reuse	005-185-30	Apartments	220	146	DU	15	60	75	59	32	91	971
19	7	West Ends Loft II	398-591-02	Shopping Center Rate	820	8.504	TSF	5	3	8	15	16	31	363
20	7	Artist Gateway	398-278-05	Resd. Condo/Townhouse	230	14	DU	1	5	6	5	2	7	81
21	7	Lostus Townhomes	398-152-16	Resd. Condo/Townhouse	230	8	DU	1	3	4	3	1	4	46
22	7	Depot at Santiago	398-202-01	Apartments	220	70	DU	7	29	36	28	15	43	466
				Shopping Center Rate	820	12.623	TSF	8	5	13	22	24	46	539
							Subtotal	15	34	49	50	39	89	1,005
23	7	City Venture	198-061-03	Resd. Condo/Townhouse	230	8	DU	1	3	4	3	1	4	46
24	7	Tom's Trucks Residential Development	398-471-03	Single Family Homes	210	170	DU	32	96	128	107	63	170	1,618
25	7	AMCAL First Street Family Aprtments	011-154-43	Apartments	220	69	DU	7	28	35	28	15	43	459
26	7	Madison Mixed-Use Commercial	400-071-03	Apartments	220	280	DU	29	114	143	113	61	174	1,862
				Shopping Center Rate	820	6.561	TSF	4	2	6	12	13	25	280
							Subtotal	33	116	149	125	74	199	2,142
							Zone 7 Total	**918**	**533**	**1,451**	**631**	**952**	**1,583**	**14,639**
							Total Cumulative Project Trip Generation	**1,255**	**1,432**	**2,687**	**1,553**	**1,393**	**2,946**	**29,732**

[1] Cumulative projects retrieved from City of Santa Ana and the City of Orange

Santa Ana Major Development List
March 2017

APN	Project Name	Address			Land Use	Res. Units	Square Feet	Status	CP
402-191-01	2114 East First Apartments	2114	E	First Street	Commercial		9,700	Site Plan Review	AN
402-191-01	2114 East First Apartments	2114	E	First Street	Affordable Apartments	694		Site Plan Review	AN
402-181-11	2222 E First St. Apartments (AMG)	2222	E	First St.	Senior Housing	419		Site Plan Review	AP
002-210-40	2700 Main St. Apartments	2700	N	Main St.	Residential apartments	247		Site Plan Review	VF
198-101-07	9Max Capital Townhomes	1122	N	Bewley St	For-Rent Townhomes	12		Site Plan Review	AN
396-191-44	Alliance Church of Orange	2130	N	Grand Ave.	Church Additon (Gym/classroom)		15,614	Under Construction	VF
011-154-43	AMCAL First Street Family Apartments	1440	E	First Street	Residential Apartments	69		Entitled 05/03/16	AP
198-162-02	Andalusia Apartments (C & C)	815	N	Harbor Blvd.	Residential Apartments	70			AP
402-181-11	Angel Preschool	918	N	Bewley St	Preshool Expansion (increase from14 to 45 children)		0	Site Plan Review	VF
398-278-05	Artist Gateway	117	S	Sycamore St.	Livework	14		Site Plan Review	VF
010-192-45	Boys & Girls Club	950	W	Highland Ave	Community Center addition		2,152	Site Plan Review	VC
002-261-06	Bristol-Memory Commercial Building	2702	N	Bristol St.	Commercial		6,900	Approved 12/2012	VF
198-011-03	C & C Development	1206	N	Harbor Blvd.	Single Family Residences	94		Under Construction	AP
198-011-04	C & C Development	1206	N	Harbor Blvd.	Livework	18		Under Construction	AP
188-071-05	C&C Single Family Homes	520	S	Harbor Blvd.	Single Family Residences	35		Entitled June 2015	AP
100-164-10	Calvary Church Master Plan	1010	N	Tustin Ave.	Master plan to modify center, classrooms, and office		50,000	Site Plan Review	VF
398--191-02	Certified Transportation	628	E	Washington Ave.	Bus Terminal Maintenance Bldg		7,165	Site Plan Review	HS
198-182-36	Charles Co. Apartments	421	N	Harbor Blvd.	Residential apartments	94		Site Plan Review	AN
198-182-36	Charles Co. Apartments	421	N	Harbor Blvd.	Commercial		9,900	Site Plan Review	AN
198-071-34	Christ Our Savior Church	2000	W	Alton Ave	Demo existing modular church		-7,190	Site Plan Review	JG
198-071-34	Christ Our Savior Parcel Map	2000	W	Alton Ave	New church, community center, and office		46,307	Site Plan Review	JG
108-772-50	City Venture	1010	S	Harbor Blvd.	live/work & Res. Townhouse	73		Entitled 2015	AN
198-061-03	City Venture	606-620	E	Fifth St.	Residential Condo	8		Site Plan Review	SK
198-061-03	City Venture: Magnolia Lane	4226	E	Fifth St.	Single Family Residences	28		Under Construction	AN
198-043-16	City Ventures Residential Townhomes	1406	N	Harbor Blvd.	Residential (townhomes)	38		Plan Check	AP
398-338-02	City Ventures-Site B	606-620	E	Fifth St.	Residential Condo	8		Entitled 2013	AP
108-681-05	Compass Mediation Center	520	S	Harbor Blvd.	Community Center		16,093	Site Plan Review	AP
011-256-05	Cornerstone Village DBA	940	S	Minnie St.	Residential Rehbitation			Site Plan Review Approved	AP
402-102-12	Crevier BWM Showroom Expansion	1500	S	Auto Mall Drive	Commercial		4,582	Site Plan Review	JG
398-202-01	Depot at Santiago	923	N	Santiago St.	Residential Apartments	70		Entitled 6/2014	VC
398-202-01	Depot at Santiago	923	N	Santiago St.	Commerical		12,623	Entitled 6/2014	VC
002-180-49	Discovery Science Center Expansion	2500	N	Main St.	Commercial/Educational		53,384	Entitled 2012	VC
430-221-13	Dyer 18 Residential Development	2001	E	Dyer Road	Residential/Commerical		1,400	Plan Check	VF
005-185-30	Eight Eight 8 - Adaptive Reuse	888	N	Main St.	Mixed-Use Commercial/Residential	146		Site Plan Review	RS
403-061-64	Ellis Lodge	1701	E	St. Andrew Place	Commercial/ Lodge		46,438	Site Plan Review	JG
414-091-06	Fairview Business Park Industrial Building	2830	S	Fairview St.	Industrial		12,100	Site Plan Review	VC
400-081-08	Fifth & Harbor Commercial Building	421	N	Harbor Blvd.	Commercial		35,349	Site Plan Review complete	VC
411-074-03	Fifth & Harbor Commercial Building	421	N	Harbor Blvd.	Parking Structure		67,583	Site Plan Review complete	VC
400-091-14	First Street Care Home	2151	E	First St.	Convert 75 Room Motel to Supportive Housing	72		Under Construction	AN
108-601-25	Habitat for Humanity Homes	4010	W	McFadden Ave	Single Family Residences	5		Under Construction	AP
003-113-81	Hampton Inn Hotel	2129	N	Main St.	Hampton Inn Hotel		73,322	Under Construction	SK

Santa Ana Major Development List
March 2017

APN	Project Name	Address			Land Use	Res. Units	Square Feet	Status	CP
407-107-23	Hapham Housing	3025	W	Edinger Ave.	Townhomes	18		Site Plan Review	AN
144-341-04	Hoa Buddhist Center Addition	3222	W	First St.	2 story addition		9,256	Site Plan Review	JG
396-321-21	Homeplace Center Expansion	1975	E	Seventeenth St.	Commercial		9,500	Site Plan Review	AP
405-214-04	King Street Five Home Subdivision	1102	N	King Street	Subdivision	5		Site Plan Review	IO
004-020-12	Lam Residential	1514	N	English St.	Single Family Residence	6		Site Plan Review	AN
411-074-03	Legado at The Met	200	E	First American Way	Residential Condo (rental)	284		Entitled May 2015	VC
198-261-26	Live/Work Lofts	3218	W	Fifth St.	Residential Condo	6		Site Plan Review	HS
398-152-16	Lotus Townhomes	627	E	Washington Ave.	Residential Townhomes	8		Plan check	VF
013-040-29	Mater Dei Park Structure	1202	W	Edinger Ave.	Parking Structure		3 Story	Approved 6/2016	VF
013-040-29	Mater Dei Performing Arts Building	1202	W	Edinger Ave.	Demo Old Gymnasium		-21,320	Entitled 2001	VF
013-040-29	Mater Dei Performing Arts Building	1202	W	Edinger Ave.	Performing Art Ctr		36,000	Entitled 2001	VF
005-153-19	Meta Housing Adaptive Reuse Residential	1666	N	Main St.	Residential Apartments	58		Entitled 5/09/2016	AP
412-131-12	Metro Town Square Expansion	3719	S	Plaza Drive	Retail/Resturant		6,000	Entitled 2011	VC
108-131-49	MSG Investment Condominiums	610	S	Newhope St.	Residential Condo	9		Site Plan Review	IO
004-020-18	New Convenience Store	2016	W	Seventeenth St.	Demo existing and build new store		2,450	Site Plan Review	VC
010-272-26	New Restaurant Building	1019	S	Bristol	Demo Mini market		-1,645	Site Plan Review	JG
010-272-26	New Restaurant Building	1019	S	Bristol	Demo apartment	-4		Site Plan Review	JG
010-272-26	New Restaurant Building	1019	S	Bristol	Restaurant		2,546	Site Plan Review	AP
007-110-06	OC Food Barn	2210	W	Fifth St.	Commercial Kitchen		5,450	Site Plan Review	IO
415-024-18	OC Star Academy Indoor Sports Facility	3100	S	Croddy Way	Indoor Sports Facility (Conversion from industrial)		16,712	Site Plan Review	VC
007-320-04	Olson Residential	1506	W	First Street	Townhomes	62		Plan check	VF
398-561-18	One Broadway Plaza	1109	N	Broadway	Office Tower		518,000	Plan check	VF
398-561-18	One Broadway Plaza	1109	N	Broadway	Restaurant		16,000	Plan check	VF
402-102-01	Orange Coast Subaru	1350	S	Auto Mall Drive	New service drive and delivery canopy		2,686	Site Plan Review	AP
108-591-68	Park Estates: City Venture	1030	S	Euclid Ave.	Single Family Residences	17		Entitled 2014	AN
041-213-04	Park View at Town and Country Manor	555	E	Memory Lane	Residential Apartments	174		Entitled 6/2014	VF
396-031-16	Rocket Express Car Wash	1703	E	Seventeenth St.	Car Wash		4,995	Site Plan Review	AN
396-031-16	Rocket Express Car Wash	1703	E	Seventeenth St.	Demolish Existing Commercial		-20,146	Site Plan Review	AN
400-032-03	Russell/Fisher Gas Station/Community Building	301 - 325	N	Tustin Ave.	Commercial		10,300	Site Plan Review	SK
108-073-14	Saigon Reformed Presbyterian	5321	W	McFadden Ave	Saigon Reformed Presbyterian		6,000	Site Plan Review	VF
016-151-65	SCE Johanna Substation	1318	E	Warner Ave.	New substation building		612	Site Plan Review	AP
396-052-14	Sexlinger Homes	1584	E	Santa Clara Ave.	Single Family Residence	24		In Litigation	VF
140-061-94	Shea Homes	2001	W	MacArthur Blvd.	Single Family Residence	42		Site Plan Review	VF
414-271-03	Shell Service Station Retail Building	3820	S	Fairview St.	Retail/ carwash		1,600	Site Plan Review	JG
411-081-28	Skyline Phase II	10	E	Hutton Centre	Residential Condo	150		Entitled Sept 2005	VF
412-191-04	South Coast Speedwash	2402	S	Bristol St.	Commercial		118,048	Site Plan Review	AP
398-254-01	Tancredi-Chalan Adaptive Reuse	511	N	Sycamore St.	Mixed-Use Commercial/Residential	40		Site Plan Review	SK
400-231-02	Target Shopping Center Commercial Pads	1330	E	Seventeenth St.	Two commercial buildings		9,112	Site Plan Review	VC
398-301-07	The Roost	601	E	Santa Ana Blvd.	Reuse com. to live/work, misc	1	-109	Site Plan Review	VC
041-215-03	The 301	301	E	Jeanette Ln.	MF Residential	182		Plan check	VC
041-215-03	The 301	301	E	Jeanette Ln.	Commercial		3,707	Plan check	VC
399-031-23	The Academy Charter High School	1901	N	Fairview St.	Educational (high school)		110,500	10 temp. classroms insatlled	VF

Santa Ana Major Development List
March 2017

APN	Project Name	Address			Land Use	Res. Units	Square Feet	Status	CP
399-031-23	The Academy Charter High School	1901	N	Fairview St.	"Family" apartments	8		Entitled 07/03/2012 On HOLD	VF
399-031-23	The Academy Charter High School	1901	N	Fairview St.	Educational (high school)		110,500	Under Construction	VF
398-278-05	The Artist Gateway Live/Work	117	S	Sycamore St.	Artist Live/Work Lofts	14		Site Plan Review	VF
430-221-13	The Heritage	2001	E	Dyer Rd.	Residential Condo (rental)	1221		Plan Check	VF
198-081-27	The Line	3630	W	Westminster Ave.	Commercial		4,000	Plan check	HS
198-081-27	The Line	3630	W	Westminster Ave.	Residential apartments	228		Plan check	HS
400-071-03	The Madison Mixed-Use Commercial	200	N	Cabrillo Park Drive	Residential Apartments (Modify 219 unit entitlements)	280		Site Plan Review	JA
400-071-03	The Madison Mixed-Use Commercial	200	N	Cabrillo Park Drive	Commercial		6,561	Site Plan Review	JA
411-081-03	The MET	200	E	First American Way	Residential Rental	272		Site Plan Review	JA
398-541-13	The Orleans Adaptive Reuse Apartments	1212	N	Broadway Ave.	Convert Existing Office to Residential Apartments	24		Site Plan Review	AN
398-471-03	Tom's Trucks Residential Development	1008	E	Fourth St.	Single Family Residential	170		Site Plan Review	VF
041-213-04	Town and Country Independ. Living	555	E	Memory Lane	MF Residential Condo	174		Entitled 7/3/14	VF
398-591-02	West End Lofts II	320	W	Fourth St.	Commercial/Residential		8,504	Plan check	HS
198-281-25	West Fifth Villas	3417	W	Fifth St.	Residential Condo	8		Site Plan Review	IO

Pending Land Use Applications as of April 20, 2017

The table below contains a list of the active land use applications in the City. To find a specific location, the second column is organized alphabetically by street. Please feel free to contact the case planner if you have any questions regarding the project. If you have general questions, please call 714744-7220.

Case type abbreviations:

AA – Administrative Adjustment
ADR – Administrative Design Review
CUP - Conditional Use Permit
DRC – Design Review
ENV – Environmental
GPA – General Plan Amendment
MJSP – Major Site Plan
MNSP – Minor Site Plan
SLP – Sober Living Facility Permit
TPM – Tentative Parcel Map
TTM – Tentative Tract Map
VAR – Variance
ZC – Zone Change

Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
Giannini Residence	**Almond Ave, W. 229**	DRC 4705-13 A proposal to construct a new two car garage in the Old Towne Historic District.	Marissa Moshier (714) 744-7243 mmoshier@cityoforange.org	3/6/14	DRC continued project on 4/16/14. Drawings resubmitted on 4/15/15
Orange Packing House, LLC	**Almond Ave, W. 426**	DRC 4890-16 and 0889-16 A proposal to demolish a shed and construct parking lot improvements on a historic packing house site	Marissa Moshier (714) 744-7243 mmoshier@cityoforange.org	1/5/2017	Under review
Friends Church Orange	**Almond Ave, W. 426**	CUP 2993-15, ~~DRC 4834-15, MNSP~~ ~~0843-15~~ A proposal to convert a portion of a historic packing house to a church. Scope of work reduced to require only CUP.	Marissa Moshier (714) 744-7243 mmoshier@cityoforange.org	12/1/2015	Approved by PC on 8/15/2016. Building permit issued.
Friends Church	**Almond Ave, W. 426, Suites A & B**	CUP 3026-16 A proposal to add a Sunday school in an existing suite in a historic packing house building. The Sunday school will be located in the lower level of the building, below the church sanctuary approved under CUP 2993-15	Marissa Moshier (714) 744-7243 mmoshier@cityoforange.org	10/11/2016	Application complete. Director's determination for amendment to CUP.

Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
McGloghlon building	**Batavia 1081 N.**	CUP 3014 Office area in excess of 25%	Monique Schwartz (714)744-7224 mschwartz@cityoforange.org	5/6/16	2nd Submittal received 7/12/16
Long Residence	**Batavia Street, S. 271**	DRC 4842-16 A proposal to construct a 42 square footage addition and modify the exterior of a non-contributing building in the Old Towne Historic District.	Marissa Moshier (714) 744-7243 mmoshier@cityoforange.org	2/25/16	Application incomplete. Comment letter with applicant
Sisters of St Joseph Temporary Kitchen Trailer	**Batavia Street, S. 450**	TUP 0197-17 A proposal to place a temporary kitchen trailer on the Sisters of St. Joseph campus to provide food service while the permanent residence kitchen is being remodeled.	Marissa Moshier (714) 744-7243 mmoshier@cityoforange.org	1.17.17	Approved by ZA on 3/30.
Walter Froemke	**Brenna 419 W.**	MNSP 0862 Addition to existing warehouse	Monique Schwartz (714)744-7224 mschwartz@cityoforange.org	6/9/16	Revised Plans received 11/21/16. SMART approval received 11/30/16 Planning Commission approval received on 2/22/17
Walter Froemke	**Brenna 420 W.**	MNSP 0863 Addition to existing warehouse	Monique Schwartz (714)744-7224 mschwartz@cityoforange.org	6/9/16	Revised Plans received 11/21/16. SMART approval received on 11/30/16 Planning Commission approval received on 2/22/17

Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
Brawley Residence	**Cambridge Street, S. 327**	DRC 4820-15 A proposal to demolish the rear portion of a historic single family residence and to construct a new addition in its place.	Marissa Moshier (714) 744-7243 mmoshier@cityoforange.org	9/16/2015	DRC continued project for redesign or submittal of historic resource assessment on 10/21/2015. Second resubmittal on 3/28. Comments sent to applicant on 4/11/16.
Watson's	**Chapman Avenue, E. 116-120**	DRC 4817-15 A proposal to rehabilitate existing storefronts and add signage to a contributing building in the Plaza Historic District	Marissa Moshier (714) 744-7243 mmoshier@cityoforange.org	9/3/2015	Approved by DRC on 9/16. Building permit issued. Temporary occupancy issued 3/16.
Casa Teresa	**Chapman Avenue, E. 815**	DRC No. 4683-13 Demolition of an existing duplex and construction of a new 4 unit structure to house homeless pregnant women.	Jennifer Le (714) 744-7238 jle@cityoforange.org		DRC provided comments for "preliminary review" on September 18th, 2013 and on June 18, 2014.
Urth Caffe	**Chapman Avenue W. 100**	DRC 4803-15 A proposal to rehabilitate a contributing building in the Plaza Historic District for use as restaurant and office.	Marissa Moshier (714) 744-7243 mmoshier@cityoforange.org	5/14/2015	DRC approved on 11/4/15. Building permit for core/shell issued. Revisions to exterior approved by DRC on 7/20/16
Urth Caffe	**Chapman Avenue W. 100**	DRC 4902-17 A proposal for new signage for Urth Caffe.	Marissa Moshier (714) 744-7243 mmoshier@cityoforange.org	2/15/17	Comment letter provided to applicant on 3/16 Resubmittal on 4/17 under review
Orange Event Center	**Chapman Avenue, W. 240 & Lemon Street, S. 135**	CUP 2998-16 & DRC 4841-16 A proposal to open an event center and modify the exterior of two buildings in the Old Towne Historic District.	Marissa Moshier (714) 744-7243 mmoshier@cityoforange.org	2/25/16	SMART review on 2/24/16. Comments provided to applicant. Preliminary review with DRC on 4/6. Comments provided to applicant.

Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
Old Town Gateway	**Chapman Avenue, W. 401**	MJSP 0788-14 & DRC 4763-14 A proposal to rehabilitate two contributing buildings in the Old Towne Historic District, demolish four noncontributing sheds, construct a two-story, 12 unit apartment building, and construct a trash and storage building.	Marissa Moshier (714) 744-7243 mmoshier@cityoforange.org	8/28/14	DRC preliminary review conducted on 5/20/15.
Verizon Wireless (Jewell)	**Chapman Avenue, W. 1525**	MNSP 0817-15 Request to co-locate 6 new antennas on an existing monopalm.	Chad Ortlieb (714) 744-7237 cortlieb@cityoforange.org	4/30/15	Staff provided comments to applicant on 6/3/15
Donde Adela, Inc.	**Chapman Avenue, W. 1707**	CUP 3023-16 Request for on-sale beer and wine in conjunction with an existing restaurant.	Vidal F. Márquez (714) 744-7214 vmarquez@cityoforange.org	9/16/16	Approved by PC on 1.4.17.
Orange Collection	**Chapman Avenue, W. 3800**	TPM No. 0008-16, MJSP No. 0845-15, DRC No. 4843-16, & ENV No. 1845-16 The applicant proposes to construct 277 multiple family residential apartment units with an internal parking structure and a commercial office parking structure to replace existing surface parking.	Robert Garcia (714) 744-7231 rgarcia@cityoforange.org	12/14/16	Provided Comments to Applicant on February 3rd along with potential schedule.
HyGen, Systems (Previously, Abovo Environmental)	**Chapman Avenue, E. 1914**	MNSP 0834, ADR 0035 A proposal to establish a Hydrogen fueling station facility at an existing service station site.	Anne Fox (714)744-7220 afox@cityoforange.org	10/21/15	Returned 2nd letter of incomplete application on 11/14/16.
Verizon Wireless	**Chapman Avenue, W. 1031**	CUP 3012 Wireless facility on roof	Monique Schwartz (714)744-7224 mschwartz@cityoforange.org	4/21/16	Incomplete Letter sent on 5/6/16
MT Signs	**Chapman Avenue, W. 1744**	DRC 4881-16 Proposal to establish a master sign program	Vidal F. Márquez (714) 744-7214 vmarquez@cityoforange.org	9/20/16	Scheduled for DRC 2/1/17.

Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
Orange Art of Dentistry	**Chapman Avenue, W. 2006**	DRC 4836, MNSP 0842 A proposal to demolish an existing 2,000 sq. ft. building and construct a 2,565 sq. ft. building with related site improvements.	Anne Fox (714)744-7220 afox@cityoforange.org	12/2/15	Tentative scheduled for the 01.18.17 Design Review Committee meeting.
Western Transport	**Chapman Avenue, E. 3301**	TUP 0196-17 Outdoor seasonal sales of flowers.	Vidal F. Márquez (714) 744-7214 vmarquez@cityoforange.org	1/12/17	Under review.
Woody's Diner	**Chapman Avenue, E. 2145**	DRC 4895-16, MNSP 0894-16, AA 0251-16 A proposal to construct a new restaurant.	Kelly Christensen Ribuffo (714) 744-7223 kribuffo@cityoforange.org	12.22.2016	Incomplete letter sent, awaiting applicant response.
Bloom Energy	**Chapman Avenue, W. 4245**	ADR 0053-16 Request to install fuel cell equipment and a 9 ft. screen wall for AT&T facility.	Vidal F. Márquez (714) 744-7214 vmarquez@cityoforange.org	9/14/16	CDD approved 12.5.16 Under Plan Check.
Orange Collection	**City Blvd West 1**	TPM No. 0010-16, MJSP No. 0847-15, DRC No. 4845-16, & ENV No. 1847-16 The applicant proposes to construct 331 multiple family residential apartment units with an internal parking structure and a commercial office parking structure to replace existing surface parking.	Robert Garcia (714) 744-7231 rgarcia@cityoforange.org	12/14/16	Provided Comments to Applicant on February 3rd along with potential schedule.
Orange Collection	**City Blvd West 1**	TPM No. 0011-16, MJSP No. 0848-15, DRC No. 4846-16, & ENV No. 1848-16 The applicant proposes to construct a 6story 165-room hotel with surface parking.	Robert Garcia (714) 744-7231 rgarcia@cityoforange.org	12/14/16	Provided Comments to Applicant on February 3rd along with potential schedule.
AMC at Outlets at Orange	**City Blvd West 20**	CUP No. 3009-16 ABC Liquor license request	Robert Garcia (714) 744-7231 rgarcia@cityoforange.org		Tentatively scheduled for PC hearing on March 6th.

Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
Orange Collection	**City Parkway 500 & 600**	TPM No. 0009-16, MJSP No. 0846-15, DRC No. 4844-16, & ENV No. 1846-16 The applicant proposes to construct 213 multiple family residential apartment units with an internal parking structure and a commercial office parking structure to replace existing surface parking.	Robert Garcia (714) 744-7231 rgarcia@cityoforange.org	12/14/16	Provided Comments to Applicant on February 3rd along with potential schedule.
Caitlin Residence	**Cleveland Street, N. 348**	DRC 4883-16 A proposal for rehabilitation of a contributing single family residence in the Old Towne Historic District.	Kelly Christensen Ribuffo (714) 744-7223 kribuffo@cityoforange.org	10/13/2016	Approved by DRC on 2.1.2017
Finefield Residence	**Clinton Street, N. 349**	AA 0250-17 A proposal to allow an extension of a legal non-conforming setback for a residential room addition.	Monique Schwartz (714) 744-7224 mschwartz@cityoforange.org	1/18/17	Approved by Zoning Administrator on 2.21.17
Villa Park Orchards Packing House Adaptive Reuse and West Residential Village	**Cypress Street, N. 350 and 400**	MNSP 0857-16 A proposal to construction a new four story mutli-family residential building and undertake an adaptive reuse of the existing historic packing house for food service and museum. This is a preliminary review only.	Kelly Christensen Ribuffo (714) 744-7223 kribuffo@cityoforange.org	5/26/2016	Complete.
Villa Park Orchards Packing House Adaptive Reuse and West Residential Village	**Cypress Street, N. 350 and 400 W. Sycamore Avenue**	MJSP 0898-17, DRC 4900-17, VAR 2244-17 A proposal to construction a new four story mutli-family residential building and undertake an adaptive reuse of the existing historic packing house for food service and museum.	Kelly Christensen Ribuffo (714) 744-7223 kribuffo@cityoforange.org	2.14.2017	Under review.
Communication Workers of America	**Eckhoff Street, N. 606**	CUP 3028-16 Request to have office and storage for CWA Union in an industrial building.	Vidal F. Márquez (714) 744-7214 vmarquez@cityoforange.org	10/24/16	Resubmitted 12.5.16. Under review.

Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
Garcia Residence	**Equestrian Drive, N. 487**	CUP 2911-13 and MNSP 0743-13 A proposal to construct a 1,253 s.f. detached game room w/ plumbing and, a 1,586 s.f. detached gym with plumbing.	Chad Ortlieb (714) 744-7237 cortlieb@cityoforange.org	6-20-13	Approved at 11-16-16 Zoning Administrator meeting. Final WQMP still required.
Grace Church	**Fairhaven 2201**	CUP 3016, DRC 4865, MNSP 0865 Addition to existing worship center and new enclosed sports center	Monique Schwartz (714)744-7224 mschwartz@cityoforange.org	6/21/16	Incomplete Letter sent 7/20/16 Revised Plans received 3.14.17 Incomplete Letter sent 3.15.17
Simply Self Storage	**Glassell Street, N. 1600**	MJSP 0871-16, DRC 4871-16 A proposal to demolish three existing buildings and construct a 156,654 sq. ft., three-story industrial building to be utilized as a self-storage facility with related on-site improvements.	Monique Schwartz (714) 744-7224 mschwartz@cityoforange.org Community Concerns Received on 4-7-17	8/2/16	Revised Plans received 10/11/16. SMART review 10/19/16 Incomplete Letter sent 10/31/16 Revised Plans received 11/21/16 SMART review 11/30/16 Incomplete Letter sent 12/9/17 SMART review 1/4/17 DRC 2/15/17 Revised Plans received 2.28.17 DRC 3/15/17 Planning Commission 4/17/17 Project Continued to June 5, 2017 PC meeting
Casa Teresa Signage	**Glassell Street, N. 234**	DRC 4958-16 A proposal for a new monument sign at an office/thrift store in the Old Towne Historic District.	Marissa Moshier (714) 744-7243 mmoshier@cityoforange.org	5/5/16	Application complete. Scheduled for DRC on 4/19

Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
Glassell Townhomes	**Glassell Street, N. 2380**	CUP No. 2983-15, MJSP No. 837-15 and DRC No. 4821-15 Request to construct 40 new townhomes.	Kelly Christensen Ribuffo (714) 744-7223 kribuffo@cityoforange.org	3/2/2016	Approved by City Council on 11.9.2017.
Discovery, LLC	**Glassell Street, N. 2829**	Parking lot/exterior building modifications	Monique Schwartz (714)744-7224 mschwartz@cityoforange.org	6/28/16	2nd Incomplete Letter sent to applicant on 9/8/16
Pomeroy Retail Center	**Glassell Street, N. 887**	DRC 4765-14, MNSP 0791 A proposal to relocate a historic gas station building from 305 S. Main Street to 887 N. Glassell Street and to construct a new 1,620 SF commercial building at 887 N. Glassell Street	Marissa Moshier (714) 744-7243 mmoshier@cityoforange.org	9/25/2014	Incomplete letter sent to applicant on 10/20/14.
Zae's Boutique Signage	**Glassell Street, S. 142**	DRC 4896-17 New projecting and window signs.	Kelly Christensen Ribuffo (714) 744-7223 kribuffo@cityoforange.org	2.2.2017	Under review.
Dang Residences	**Glassell Street, S. 655**	DRC 4816-15, MNSP 827-15 A proposal to demolish an existing single family residence and construct seven new units on a property in the Old Towne Historic District.	Marissa Moshier (714) 744-7243 mmoshier@cityoforange.org	8/12/2015	DRC preliminary review on 12/16/15.
76 Gas Station	**Glassell Street, S. 684**	CUP 3003-16 and DRC 4852-16 New proposed 2,800 SF convenience store and ABC License with fuel dispensing.	Robert Garcia (714) 744-7231 rgarcia@cityoforange.org		DRC approved the design and site layout at the January 18, 2017 meeting. PD working on memo for alcohol request. .

Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
Bollinger Carport	**Grand Street, N. 287**	DRC 4870-16 A proposal to permit a carport in the Old Towne Historic District	Marissa Moshier (714) 744-7243 mmoshier@cityoforange.org	8/1/2016	Resubmittal on 10/24. Under review.
Helen Nguyen	**Grant 131 N.**	DRC 4959, MNSP 0860 New duplex	Monique Schwartz (714)744-7224 mschwartz@cityoforange.org	5/13/16	Incomplete Letter sent 8/16/16 Revised plans received 1/4/17 Incomplete Letter sent 1/19/17 SMART 2/15/17 Incomplete Letter sent 2.27.17
Perlas Villas II	**Hewes Street, N. 140**	ZC 1280-16, DRC 4853-16, and MNSP 0354-16 Proposed zoned changed for a single family residence with accessory unit on property zoned for commercial.	Robert Garcia (714) 744-7231 rgarcia@cityoforange.org		Tentatively scheduled for PC hearing on March 6th.
Santiago Hills II Planned Community	**Jamboree Road at Chapman Avenue**	Zone Change No. 1281-16, Vesting Tentative Tract Map Nos. 17987, 17988, 17989, 17990, & 17995 (VTTM Nos. 0038-0042-15), DRC No. 4847-15, & Development Agreement No. 0003-16. A request for approval of tentative tract maps and modified Planned Community standards and design guidelines for a 1,180 unit residential subdivision in the Santiago Hills II Planned Community. A modified Runoff Management Plan (ROMP) and modified Development Agreement are also included in this request. (This request is a modification to a previously-approved project. The previous approvals allow for a maximum of 1,746 units in Santiago Hills II).	Jennifer Le (714) 744 7238 jle@cityoforange.org	12-10-15	The application was deemed complete on May 11, 2016. DRC review and recommendation re: the modified Design Guidelines is scheduled for May 18, 2016. The Planning Commission public hearing is scheduled for June 6, 2016 at 7pm.

Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
McDonalds/Chevron	**Katella Avenue, W.105**	ADR Roofline modification and parapet remodel.	Vidal F. Márquez (714) 744-7214 vmarquez@cityoforange.org	1/6/17	Under review.
Branch West Apartments	**Katella Avenue, W. 1725**	ZC 1284-16, MJSP 883-16, DRC 4888-16, MND 1853-16 An application for the redevelopment of an existing light-industrial complex with a 94 unit apartment development with structured parking and related residential amenities on a 1.10 acre site.	Anna Pehoushek (714) 744-7228 apehoushek@cityoforange.org	8/18/16	Incomplete Letter sent 12/15/16. Environmental Document under preparation.
Home Depot	**Katella Avenue, W. 435**	TUP 0192-16 Christmas tree lot.	Vidal F. Márquez (714) 744-7214 vmarquez@cityoforange.org	11/2/16	CDD approved 11/21/16.
Nguyen Residence	**Kings Crown Road E. 6629**	ADR 00653-17 Request for second story addition and new balcony.	Kelly Christensen Ribuffo (714) 744-7223 kribuffo@cityoforange.org	1.18.2017	Under review.
Woody Residence	**La Veta Ave, E. 127**	DRC 4815-15 Request to add an attached accessory second dwelling unit to an existing single family residence.	Kelly Christensen Ribuffo (714) 744-7223 kribuffo@cityoforange.org	8-11-2015	Second incomplete letter sent on 12/17/2015, awaiting response.
Rehab Institute of Southern California	**La Veta Avenue, E. 1800**	CUP 3015-16, DRC 4863-16 & MNSP 0864-16 A proposal to add 2,300 sq. ft. to an existing building, remodel 2,000 sq. ft. of an existing building, and modify related parking lot and landscape areas.	Anne Fox (714) 744-7220 afox@cityoforange.org	6/9/16	Resubmittal provided on 01.04.17. Under Review.
Batavia Woods Medical	**La Veta Avenue, E. 1800**	DRC 4889-16 Exterior remodel of medical office campus.	Vidal F. Márquez (714) 744-7214 vmarquez@cityoforange.org	1/3/17	Under review.

Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
City of Orange/ Metrolink Parking Structure	**Lemon Street, N. 130 (Lemon Street Public Parking Lot)**	Zone Change 1275-14, Major Site Plan 0649-10, Design 4675-13, Tentative Parcel Map 0005-14, and MND 183214 Construction of a new five-level, 611space parking structure on the Lemon Street parking lot	Jennifer Le (714) 744-7238 jle@cityoforange.org	3/21/13	DRC recommended approval on 11-4-15. Planning Commission recommended approval on 12-7-15. City Council hearing scheduled for 1-12-16
Killefer Square	**Lemon Street, N. 541**	SP-0850, ENV-1844, DRC 4807-15 A proposal to convert a former elementary school site into a private student dormitory. The site includes a historic building that has been designated in the National Register of Historic Places. The project consists of rehabilitation of the historic building to contain 6 units of student housing and construction of new buildings, containing 75 student housing units. The project has been submitted for DRC preliminary review for the proposed design. The project will ultimately require development of Specific Plan.	Marissa Moshier (714) 744-7243 mmoshier@cityoforange.org	7/16/2015	DRC provided comments for preliminary review on 9/2/15. Second DRC preliminary review on 8/17/2016. Third DRC preliminary review on 10/5/16. Fourth DRC preliminary review on 11/2/16 Application incomplete. Resubmittal on 3/16/17 under review.
Orange Health Pavilion	**Lewis, N. 200**	MNSP 0875-16 Solar carports	Monique Schwartz (714)744-7224 mschwartz@cityoforange.org	8/22/16	Incomplete Letter sent to applicant on 9/22/16 Revised Plans received 11.17.16 Second SMART review on 12/14/16 Incomplete Letter sent to applicant on 12/21/16 Third SMART review on 3.22.17 Approved by Community Development Director on 4/4/17

Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
JMJ Enterprise LLC	**Lincoln 1301**	MNSP 0856 New gate and fence	Monique Schwartz (714)744-7224 mschwartz@cityoforange.org	4/11/16	Incomplete letter sent to applicant on 4/26/16
Silvestri Residence	**Lomita Ave., E. 1220**	AA 0241-16 Installation of an AC unit in the side yard setback.	Vidal F. Márquez (714) 744-7214 vmarquez@cityoforange.org	9/13/16	Zoning Administrator approved 10.26.16.
Kingdom Hall of Jehovah's Witnesses	**Main Street, N. 800**	MJSP 0822-15, CUP 2983-15 & DRC 4811-15 Demolish existing improvements at the site in order to construct a 3,000 sq. ft. church with related parking and landscaping improvements.	Anne Fox (714) 744-7236 afox@cityoforange.org	7/9/15	2nd Incomplete Letter sent 1/19/16 on revised proposal. Waiting on applicant to resubmit.
Benlida Owen	**Main Street, S. 305**	TUP 0191-16 Operation of a non-recurring temporary fruit stand. Second and final request.	Vidal F. Márquez (714) 744-7214 vmarquez@cityoforange.org	9/30/16	CDD approved 11.21.16.
AT&T Wireless	**O'Donnell Way, N. 1605**	MNSP No. 775-14 Tower extension on an existing wireless facility, including 12 panel antennas, 1 microwave dish, and a CMU enclosure.	Robert Garcia (714) 744-7231 rgarcia@cityoforange.org		Application on hold by applicant.
Orange Court Apartments	**Oak Street, N. 259**	DRC 4882-16, MNSP 0879-16 1-Bedroom unit addition and remodeling 2-car garage at existing apartment complex.	Vidal F. Márquez (714) 744-7214 vmarquez@cityoforange.org	9/22/16	Incomplete letter sent 12/23/16.
Joe Steele	**Oak Lane, E. 6833**	CUP 3032-16 Proposal to construct 880 sq. ft. pool house with ½ bath and sink.	Vidal F. Márquez (714) 744-7214 vmarquez@cityoforange.org	11/16/16	Incomplete letter sent 11/13/16.

Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
Pomeroy Duplex (a.k.a. Harvard House Duplex Infill)	**Olive Street, N. 468**	~~Conditional Use Permit No. 2813-10 and~~ DRC 4518-10 Rehabilitation of a non-contributing substandard residence, demolition of substandard additions and second residence, and construction of a new 2story unit with ground level parking. Project is located within the Old Towne Orange National Registered Historic District.	Anna Pehoushek (714)744-7228 apehoushek@cityoforange.org	11/01/10	Under construction. Final landscape plan approved by DRC 12/17/14. Project approved by DRC 2/19/14.
1888 Center	**Orange Street N 115**	CUP 3046-17 A proposal for a restaurant/coffee shop with more than 10 seats in the OTMU-15S	Marissa Moshier 714-744-7243 mmoshier@cityoforange.org	4/4/2017	Under review
First Presbyterian Church of Orange	**Orange Street, N 191**	MNSP 0888-16 Preliminary review for a proposal to demolish three of four existing church campus buildings, construct a new 10,000 SF childcare center on an existing surface parking lot on N. Grand, construct a new 20,000 SF office building at the corner of Maple and Orange, and construct a new surface parking lot with 94 spaces.	Marissa Moshier 714-744-7243 mmoshier@cityoforange.org	12/9/2016	Under review. SMART on 12/21/16. Comment letter sent on 1/9/16. Resubmittal on 4/14 under reivew.
Irizarry Residence	**Orange Street, N. 843**	ADR 0050-16 and AA 0230-16 Proposal to add a new second story addition and a new two story detached garage with accessory second unit. Project includes a request to decrease required rear setback by 20%.	Kelly Christensen Ribuffo (714) 744-7223 kribuffo@cityoforange.org	1/11/2016	Approved on 11.23.2016.

Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
Brown Residence	**Orange Street, S. 609**	DRC 4630-12 A proposal to modify the porch roof overhang on a contributing two-story accessory structure. Request is to allow sufficient height of overhang on outside landing. Project is located within the Old Towne Orange National Registered Historic District.	Marissa Moshier 714-744-7243 mmoshier@cityoforange.org	06/14/12	Design Review Committee Continued project on July 5, 2012
MBK Homes/ Orange-Olive Residential	**Orange-Olive Road, N. 2025**	ZC 1274-14, TTM 17758 (#0033-14), MJSP 0778-14, DRC 4749-14 & ENV 1837-14 A request to develop 25 detached residential units on a 2.33 acre property currently used for RV parking. The Applicant has requested a Zone Change from C-1 (Limited Business) to R-3 (SP) (Multifamily Residential-Specific Plan), consistent with the Low Medium Density Residential (LMDR) General Plan designation. A Specific Plan is proposed to establish specific development standards for the project. A Tentative Tract Map for Condominium Purposes is proposed to establish common and exclusive use areas.	Jennifer Le (714) 744-7238 jle@cityoforange.org	8/27/15	DRC recommended approval with conditions on September 2, 2015. Planning Commission recommended approval with conditions on October 5, 2015. City Council approved the project with conditions on 1110-15 and 12-8-15. DRC review of landscape and lighting plan details is scheduled for June 1, 2016
Nelson Residence	**Parker Street, S. 296**	RA 0005-16 A request for reasonable accommodation to convert an existing attached garage into a living area for a disabled individual.	Kelly Christensen Ribuffo (714) 744-7223 kribuffo@cityoforange.org	11.21.2016	Under review.

Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
Salty Dawg Tavern	**Parker E.1214**	CUP 3031-16 ABC Type 47 License	Robert Garcia (714) 744-7231 rgarcia@cityoforange.org	11.16.16	PD in opposition to request. Staff requesting alcohol history with ABC
10 Plaza Building	**Plaza Square, 10**	DRC 4906-17 Exterior rehabilitation of a commercial building in the Plaza	Marissa Moshier (714) 744-7243 mmoshier@cityoforange.org	3/3/17	Comment letter sent to applicant on 3/21.
Plaza Bible Church	**Poplar Street N., 671**	CUP 3004-16 and ADR 0046-16 A proposal to locate a new church in an existing industrial building with new shared parking agreement.	Kelly Christensen Ribuffo (714) 744-7223 kribuffo@cityoforange.org	3/17/2016	Incomplete letter sent. Awaiting applicant response.
C&M Concrete Contractors	**Poplar Street N., 749**	MNSP 877-16 Installation of modular buildings for office and storage space	Vidal F. Márquez (714) 744-7214 vmarquez@cityoforange.org	9/6/16	Under review.
Abegunde Residence	**Robinhood 2340**	AA 0242 20% reduction to rear setback requirement.	Anne Fox (714)744-7220 afox@cityoforange.org	9/26	Zoning Administrator approved 10/19/16.
Design Concepts	**Santiago Blvd. N., 2640**	MNSP 787-16 Preliminary Review for a gas station convenience store addition and construction of a new drive thru carwash.	Vidal F. Márquez (714) 744-7214 vmarquez@cityoforange.org	9/14/16	Preliminary review complete. Comment letter provided 10/20/16.
Design Concepts	**Santiago Blvd., N. 2640**	CUP 3039-17, DRC 4898-17, MNSP 0896-17 A proposal to remodel to an existing service station, addition to existing convenience store, and new automatic drive through car wash.	Monique Schwartz (714) 744-7224 mschwartz@cityoforange.org	2.9.17	Incomplete Letter sent to applicant on 2.22.17

Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
Holy Sepulcher Cemetery	**Santiago Canyon Rd., E. 7845**	CUP 3041-17, VAR 2245-17, DRC 4901-17, MNSP 0899-17, ENV 1854-17 A proposal to construct a new cemetery maintenance facility	Monique Schwartz (714) 744-7224 mschwartz@cityoforange.org	2/14/17	Incomplete Letter sent to applicant on 3.13.17
Shaffer Project	**Shaffer Street, N. 1746**	TPM 0006-15, MNSP 0808-15, ADR 0023-15 Subdivision of one parcel into two parcels to construct two new homes.	Chad Ortlieb (714) 744-7237 cortlieb@cityoforange.org	4-2-15	DRC continued the meeting for plan revision opportunities. Awaiting revised plans.
PrimeVestment Residence	**Shaffer Street, S. 447**	DRC 4885-16 A proposal to reconstruct a demolished service porch at the rear of a historic residence and construct a new garage in the Old Towne Historic District	Marissa Moshier (714) 744-7243 mmoshier@cityoforange.org	10/19/16	Continued by DRC on 3/1
Nguyen Residence	**Silverleaf Ave., 4731**	Proposal for the construction of a 1,250 square foot single story addition to an existing 1,450 square foot, one story single family residence.	Monique Schwartz (714) 744-7224 mschwartz@cityoforange.org	1/12/17	Approved by the Community Development Director on 1/16/17
Kona Cleaners	**Taft Ave, W. 821**	DRC 4621-12 A request to complete façade remodeling of an existing building to accommodate a drycleaner	Chad Ortlieb (714) 744-7237 cortlieb@cityoforange.org	5-24-12	Approved by the DRC on April 4, 2012. Permits pulled. Modifications conducted. The DRC approved façade changes with conditions on 5-1-13. Landscape revisions require a return to the DRC.

Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
MJS Design Group	**Town & Country W. 1100**	DRC 4879-16 Landscape enhancements	Robert Garcia (714) 744-7239 rgarcia@cityoforange.org	9/15/16	SMART reviewed on January 18, 2017. Staff provided comments to applicant
Oakmont Senior Living	**The City Drive S., 630**	MJSP 818-15, DRC 4805-15 Proposal to construct a new 98 unit senior assisted living facility on an existing office building site.	Kelly Christensen Ribuffo (714) 744-7223 kcribuffo@cityoforange.org	5/14/2015	Approved by PC on 2/1/2016. Under construction.
AMLI Residential	**The City Way, 3537**	MJSP No. 0704-12, ENV No. 1831-12, VAR No. 2222-12, and DRC No. 465212. A request to construct a new 334-unit apartment complex with structured parking.	Anna Pehoushek (714) 744-7228 apehoushek@cityoforange.org	1/29/13	Parking structures finaled. Residential units nearing completion.

Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
Town and Country Apartments and Townhomes	**Town and Country Road W. 702**	MNSP 0886-16 A preliminary proposal to construct a multi-family residential complex to include 653 five and six-story multi- apartments, two six level parking structures and 77 three-story town homes with associated site improvements.	Monique Schwartz (714) 744-7224 mschwartz@cityoforange.org	11/21/16	Reviewed by SMART Committee on 12/7/16 Preliminary Review Comments sent to applicant on 12/21/16
Town and Country Apartments and Townhomes	**Town and Country Road W. 702-1078**	TTM 0045-17, MJSP 0906-17, DRC 4914-17, AA 0253-17, MND 1855-17 A proposal to redevelop a 12 acre office complex with 727 multi-family units (653 apartments, and 74 townhomes)	Monique Schwartz (714) 744-7224 mschwartz@cityoforange.org	4/14/17	SMART 5/3/17
Town & Country Mixed Use and Site Integration	**Town and Country Road, W. 999**	MJSP 0866-16, TTM0043-16 & DRC 4864-16 A proposal to construct a five-story residential building containing 262 apartment units surrounding a parking structure, construct an additional parking structure to serve an existing office building on an existing commercially developed property including related site improvements.	Anne Fox (714) 744-7220 afox@cityoforange.org	6/20/16	Resubmittal provided on 12.21.16. Under Review.
7-Eleven Inc.	**Tustin Street, N., 125**	CUP 3029-16 Request to sale beer and wine with new convenient store.	Vidal F. Márquez (714) 744-7214 vmarquez@cityoforange.org	11/9/16	Under review. Resubmittal 1/9/17.
Orange Sky Villas	**Tustin Street, N. 180**	CUP 3006-16, MJSP 0855-16 & DRC 4854-16 Proposal to construct a 35-unit senior housing center within a structure with a partially subgrade parking garage and two floors of residential units above, and related site improvements.	Anne Fox (714) 744-7220 afox@cityoforange.org	4/1/16	2nd Letter of Incomplete application sent 10/17/16. Waiting on applicant resubmittal.

Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
Truffle Bistro	**Tustin Street, N. 774**	CUP 3037-17 Proposal to permit the sale of beer and wine within a new 1,680 square foot restaurant.	Monique Schwartz (714) 744-7224 mschwartz@cityoforange.org	1/30/17	Application sent to Orange Police Department for review and consideration on 2/3/17
Glow Zone	**Tustin Street, N. 1411**	CUP 3036-17 Proposal to permit the operation of a 35,000 square foot indoor family entertainment facility within an existing retail building.	Monique Schwartz (714) 744-7224 mschwartz@cityoforange.org	1/18/17	Incomplete Letter sent 2/1/17
Home Depot	**Tustin St., N., 1885**	TUP 0193-16 Christmas tree lot.	Vidal F. Márquez (714) 744-7214 vmarquez@cityoforange.org	11/2/16	CDD approved 11/21/16
Lone Star Evergreen Co.	**Tustin St., N., 2100**	TUP 0195-16 Christmas tree lot.	Vidal F. Márquez (714) 744-7214 vmarquez@cityoforange.org	11/23/16	CDD approved 12/7/16
Rapids Express Carwash	**Tustin Street, N. 2045**	CUP 3000-16 & DRC 4851-16 Construction of a new 4,900 sq. ft. building and related site improvements to establish an automated express exterior car wash.	Anne Fox (714) 744-7220 afox@cityoforange.org	3/4/16	Approved by Planning Commission on 10/17/16.
Target	**Tustin Street, N. 2191**	ADR 0058-16 A proposal for façade and signage improvements	Monique Schwartz (714) 744-7224 mschwartz@cityoforange.org	10/17/16	Under review Revised Plans received 11/23/16 Approved by Community Development Director on 12/12/16
Patagonia Empanadas	**Tustin St., N., 2279**	CUP 3030-16 Request to serve beer and wine at existing restaurant.	Vidal F. Márquez (714) 744-7214 vmarquez@cityoforange.org	11/10/16	Incomplete letter sent 12.15.16

Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
McDonald's	**Tustin Street, N. 2401**	CUP 3021-16, MNSP 0853-16 Demo and reconstruct 5,790 sq. ft. McDonald's restaurant with drive-thru window and associated site improvements.	Vidal F. Márquez (714) 744-7214 vmarquez@cityoforange.org	2/19/16	Under review. Incomplete letter sent 9/21/16.
American Tire Depot	**Tustin Street, N. 310**	ADR 0055-16 A proposal for an exterior façade renovation for the existing building.	Kelly Christensen Ribuffo (714) 744-7223 kribuffo@cityoforange.org	9/21/2016	Approved by CDD on 1.11.2017.
Truffle Bistro	**Tustin Street, N. 774**	CUP 3037-17	Monique Schwartz (714)744-7224 mschwartz@cityoforange.org	1/30/17	Planning Commission meeting on 5/15/17
Shell Station	**Tustin Street, N. 883**	CUP 3013, MNSP 1059, DRC 4956 Refurbish existing Shell gas station and add the sale of beer and wine	Monique Schwartz (714)744-7224 mschwartz@cityoforange.org	4/26/16	Revised Plans received from applicant on 10/12/16. SMART approved 10/26/16 DRC 12/7/16 Planning Commission approved on 1/4/17
Shirali Residence	**Tustin Street, S. 250**	ADR 0011-14 Proposed addition to existing residence.	Reassigned to Robert Garcia (714) 744-7239 rgarcia@cityoforange.org	5/28/15	Inactivity letter sent to applicant.

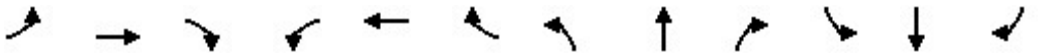
Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
Old Towne Zone Change – Multi-Family Residential	**Various Old Towne Parcels west of the railroad tracks, east of Batavia Street, south of Walnut Avenue, and north of Culver Avenue**	ZC No. 1271-13 A proposal to re-zone certain properties in the Old Towne 2010 General Plan Land Use Focus Area from Limited Business (C-1), Single Family Residential (R-1), and Duplex Residential (R-2) to R-2 and Multiple Family Residential (R-3) to establish consistency between the General Plan and Zoning designations in the area, in accordance with state law, and establish a single zoning for split zoned property.	Anna Pehoushek (714) 744-7228 apehoushek@cityoforange.org	1/29/13	City Council hearing date TBD. Planning Commission hearing held 10/21/13. PC recommended approval to CC.
Seventh Day Adventist Church	**Walnut Avenue E. 1310**	MNSP 0885-16 A proposal to convert an existing enclosed patio into multi-purpose room, relocation of kitchen, and ADA improvements.	Monique Schwartz (714) 744-7224 mschwartz@cityoforange.org	11.17.16	Reviewed by SMART Committee on 12/7/16 Incomplete Letter sent 12/13/16 Revised Plans received 1/11/17 Community Development Director Determination sent on 1/16/16
GS Homes Services LLC	**Walnut Avenue E. 2935**	ADR 0064-17 Construction of a new single family residence on a vacant lot.	Kelly Christensen Ribuffo (714) 744-7223 kribuffo@cityoforange.org	1.19.2017	Under review.
McGuire/Moreno Residence	**Washington Avenue, E. 539**	DRC 4897-17 Exterior modifications to an contributing historic residence in Old Towne.	Kelly Christensen Ribuffo (714) 744-7223 kribuffo@cityoforange.org	2.3.2017	Under review.
Yaghi Accessory Dwelling Unit	**Washington Avenue, E. 812**	DRC 4475-10 A proposal to relocate a historic single family residence and add a rear addition for an accessory dwelling unit	Marissa Moshier (714) 744-7243 mmoshier@cityoforange.org		Landscape and hardscape plan approved by DRC on 3/15 per project condition of approval. In plan check

Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
First Golden Village Duplexes	**Washington Avenue, E. 4521-4545**	MJSP No. 823-15/DRC No. 4812-15 Request to construct four new duplexes on four separate lots of record.	Anne E. Fox (714) 744-7220 afox@cityoforange.org	7/9/15	Resubmittal provided on 01.05.17. Under Review.
Nguyen Duplex	**Washington Avenue, E. 4512**	DRC 4876-16 & MNSP 0876-16 A proposal to demolish single-family residence and construct a detached duplex and related site improvements.	Anne Fox (714) 744-7220 afox@cityoforange.org	9/12/16	Letter of Incomplete Application sent to applicant 10/12/16. Waiting on resubmittal.
Centeno Residence	**Waverly Street, N. 318**	ADR 0072-17 Residential addition and new garage	Monique Schwartz (714) 744-7224 mschwartz@cityoforange.org	3/30/17	Under Review
Burgueno Residence	**Waverly Street, N. 514**	ADR 0061-16 2nd Story addition with 2 bedrooms and bath	Vidal F. Márquez (714) 744-7214 vmarquez@cityoforange.org	12/21/16	Under review.
West Katella Corridor Zone Change – Urban Mixed Use	**West Katella Avenue (between Main Street and the western City limit/Santa Ana River)**	ZC No. 1268-12 A proposal to re-zone the western Katella Corridor 2010 General Plan Land Use Focus Area from Commercial Recreation (CR) to Urban Mixed Use (UMIX) to establish consistency between the General Plan and Zoning designations in the area, in accordance with state law.	Anna Pehoushek (714) 744-7228 apehoushek@cityoforange.org	1/29/13	Zoning options under development. City Council hearing 10/22/13 and 2/10/15. Continued to unidentified date. Planning Commission hearing held 2/4/13. PC recommended approval to CC.
Lisk Residence	**Westhaven Street, N. 3084**	ADR 0057-16 A request for a second story addition to an existing single family residence	Kelly Christensen Ribuffo (714) 744-7223 kribuffo@cityoforange.org	9/12/2016	Incomplete letter sent 10/14/2016. Awaiting applicant response.

Applicant	Address	Land Use Applications/ Project Description	Case Planner	Date Submitted	Status
Jeerah Project (Wimbleton Ct. Subdivision)	**Wimbleton Ct., E. 6231**	TTM 0034-14, MJSP 0785-14, DRC 4758-14 Request to subdivide one parcel of land into 10 lots for 8 single family residences and 2 common recreation area.	Robert Garcia (714) 744-7231 rgarcia@cityoforange.org	8/21/14	Staff working on PC staff report and putting response to public comments together. Package goes out on February 9th.

Appendix D

Existing Plus Project
Level of Service Analysis Worksheets

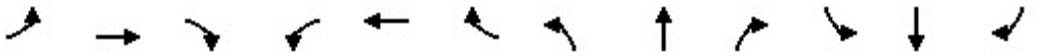


Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0			0		60	170		0			130
Storage Lanes	0			0		1	2		0			1
Taper Length (ft)	25			25			25					
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	1.00
Ped Bike Factor												
Frt			0.850			0.850		0.975				0.850
Flt Protected		0.970			0.957		0.950			0.950		
Satd. Flow (prot)	0	1807	1583	0	1783	1583	3433	4958	0	1770	5085	1583
Flt Permitted		0.840			0.736		0.950			0.950		
Satd. Flow (perm)	0	1565	1583	0	1371	1583	3433	4958	0	1770	5085	1583
Right Turn on Red			Yes			Yes						Yes
Satd. Flow (RTOR)			118			118						82
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		916			717			903			1485	
Travel Time (s)		20.8			16.3			20.5			33.8	

Intersection Summary	
Area Type:	Other

Lane Group	NWR	NWR2
Lane Configurations		
Ideal Flow (vphpl)	1900	1900
Lane Width (ft)	12	12
Grade (%)		
Storage Length (ft)	500	
Storage Lanes	1	
Taper Length (ft)		
Lane Util. Factor	0.88	1.00
Ped Bike Factor		
Frt	0.850	
Flt Protected		
Satd. Flow (prot)	2787	0
Flt Permitted		
Satd. Flow (perm)	2787	0
Right Turn on Red		No
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		

Intersection Summary



Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Volume (vph)	9	6	83	122	14	97	63	439	87	85	1251	18
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	10	6	89	131	15	104	68	472	94	91	1345	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	16	89	0	146	104	68	566	0	91	1345	19

Intersection Summary

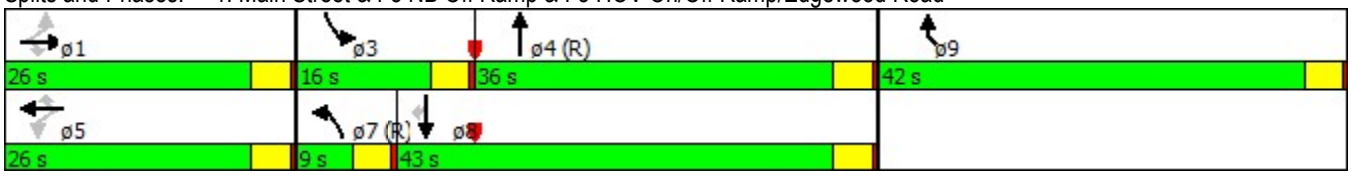
Lane Group	NWR	NWR2
Volume (vph)	602	12
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor	0.93	0.93
Growth Factor	100%	100%
Heavy Vehicles (%)	2%	2%
Bus Blockages (#/hr)	0	0
Parking (#/hr)		
Mid-Block Traffic (%)		
Adj. Flow (vph)	647	13
Shared Lane Traffic (%)		
Lane Group Flow (vph)	660	0

Intersection Summary

Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	SBL2	SBT	SBR	NWR
Lane Configurations												
Volume (vph)	9	6	83	122	14	97	63	439	85	1251	18	602
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA	Perm	Prot
Protected Phases		1			5		7	4	3	8		9
Permitted Phases	1		1	5		5					8	
Detector Phase	1	1	1	5	5	5	7	4	3	8	8	9
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	20.0	8.0	20.0	20.0	8.0
Total Split (s)	26.0	26.0	26.0	26.0	26.0	26.0	9.0	36.0	16.0	43.0	43.0	42.0
Total Split (%)	21.7%	21.7%	21.7%	21.7%	21.7%	21.7%	7.5%	30.0%	13.3%	35.8%	35.8%	35.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag							Lead	Lag	Lead	Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	Max	Max	None
Act Effct Green (s)		17.3	17.3		17.3	17.3	14.6	42.9	10.7	39.0	39.0	33.1
Actuated g/C Ratio		0.14	0.14		0.14	0.14	0.12	0.36	0.09	0.32	0.32	0.28
v/c Ratio		0.07	0.27		0.74	0.32	0.16	0.32	0.58	0.81	0.03	0.86
Control Delay		42.6	5.4		70.4	8.4	69.7	9.7	66.8	42.0	0.1	52.9
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		42.6	5.4		70.4	8.4	69.7	9.7	66.8	42.0	0.1	52.9
LOS		D	A		E	A	E	A	E	D	A	D
Approach Delay		11.1			44.6			16.1		43.0		
Approach LOS		B			D			B		D		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 44 (37%), Referenced to phase 4:NBT and 7:NBL, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 38.7	Intersection LOS: D
Intersection Capacity Utilization 64.1%	ICU Level of Service C
Analysis Period (min) 15	

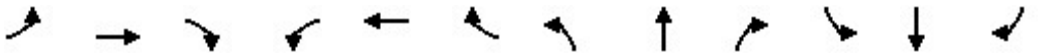
Splits and Phases: 1: Main Street & I-5 NB Off Ramp & I-5 HOV On/Off Ramp/Edgewood Road



Lane Group	EBT	EBR2	WBT	WBR	NBL	NBT	SBL2	SBT	SBR	NWR
Lane Group Flow (vph)	16	89	146	104	68	566	91	1345	19	660
v/c Ratio	0.07	0.27	0.74	0.32	0.16	0.32	0.58	0.81	0.03	0.86
Control Delay	42.6	5.4	70.4	8.4	69.7	9.7	66.8	42.0	0.1	52.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.6	5.4	70.4	8.4	69.7	9.7	66.8	42.0	0.1	52.9
Queue Length 50th (ft)	11	0	109	0	25	19	68	349	0	274
Queue Length 95th (ft)	31	26	177	39	m50	m82	124	409	0	338
Internal Link Dist (ft)	836		637			823		1405		
Turn Bay Length (ft)		150		60	170		150		130	500
Base Capacity (vph)	286	386	251	386	417	1771	181	1652	569	882
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.23	0.58	0.27	0.16	0.32	0.50	0.81	0.03	0.75

Intersection Summary

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



Movement	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Lane Configurations												
Volume (vph)	9	6	83	122	14	97	63	439	87	85	1251	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	0.97	0.91		1.00	0.91	1.00
Frt		1.00	0.85		1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected		0.97	1.00		0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1806	1583		1783	1583	3433	4959		1770	5085	1583
Flt Permitted		0.84	1.00		0.74	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1565	1583		1372	1583	3433	4959		1770	5085	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	10	6	89	131	15	104	68	472	94	91	1345	19
RTOR Reduction (vph)	0	0	76	0	0	89	0	0	0	0	0	13
Lane Group Flow (vph)	0	16	13	0	146	15	68	566	0	91	1345	6
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases		1			5		7	4		3	8	
Permitted Phases	1		1	5		5						8
Actuated Green, G (s)		17.3	17.3		17.3	17.3	14.6	42.9		10.7	39.0	39.0
Effective Green, g (s)		17.3	17.3		17.3	17.3	14.6	42.9		10.7	39.0	39.0
Actuated g/C Ratio		0.14	0.14		0.14	0.14	0.12	0.36		0.09	0.32	0.32
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		225	228		197	228	417	1772		157	1652	514
v/s Ratio Prot							0.02	c0.11		c0.05	c0.26	
v/s Ratio Perm		0.01	0.01		c0.11	0.01						0.00
v/c Ratio		0.07	0.06		0.74	0.07	0.16	0.32		0.58	0.81	0.01
Uniform Delay, d1		44.4	44.3		49.2	44.4	47.2	28.0		52.5	37.2	27.4
Progression Factor		1.00	1.00		1.00	1.00	1.32	0.30		1.00	1.00	1.00
Incremental Delay, d2		0.1	0.1		13.9	0.1	0.8	0.5		5.1	4.5	0.0
Delay (s)		44.5	44.4		63.1	44.5	63.2	9.0		57.6	41.7	27.5
Level of Service		D	D		E	D	E	A		E	D	C
Approach Delay (s)		44.4			55.4			14.8			42.5	
Approach LOS		D			E			B			D	

Intersection Summary			
HCM 2000 Control Delay	39.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NWR	NWR2
Lane Configurations		
Volume (vph)	602	12
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	
Lane Util. Factor	0.88	
Frt	0.85	
Flt Protected	1.00	
Satd. Flow (prot)	2787	
Flt Permitted	1.00	
Satd. Flow (perm)	2787	
Peak-hour factor, PHF	0.93	0.93
Adj. Flow (vph)	647	13
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	660	0
Turn Type	Prot	
Protected Phases	9	
Permitted Phases		
Actuated Green, G (s)	33.1	
Effective Green, g (s)	33.1	
Actuated g/C Ratio	0.28	
Clearance Time (s)	4.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	768	
v/s Ratio Prot	c0.24	
v/s Ratio Perm		
v/c Ratio	0.86	
Uniform Delay, d1	41.2	
Progression Factor	1.00	
Incremental Delay, d2	9.5	
Delay (s)	50.7	
Level of Service	D	
Approach Delay (s)		
Approach LOS		

Intersection Summary

Lane Group	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			
Storage Length (ft)	0		0			300	450		0	600	
Storage Lanes	1		0			1	2		0	1	
Taper Length (ft)	25						25				
Lane Util. Factor	0.91	0.91	0.95	0.97	0.91	1.00	0.97	0.91	0.91	0.88	1.00
Ped Bike Factor											
Frt		0.949				0.850		0.991		0.850	
Flt Protected	0.950	0.999		0.950			0.950				
Satd. Flow (prot)	1610	3214	0	3433	5085	1583	3433	5040	0	2787	0
Flt Permitted	0.950	0.999		0.950			0.950				
Satd. Flow (perm)	1610	3214	0	3433	5085	1583	3433	5040	0	2787	0
Right Turn on Red			Yes			Yes					No
Satd. Flow (RTOR)		60				599					
Link Speed (mph)		30			30			30			
Link Distance (ft)		645			468			903			
Travel Time (s)		14.7			10.6			20.5			

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Volume (vph)	98	381	199	15	450	649	65	1342	82	550	30
Confl. Peds. (#/hr)											
Confl. Bikes (#/hr)											
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)											
Mid-Block Traffic (%)		0%			0%			0%			
Adj. Flow (vph)	108	419	219	16	495	713	71	1475	90	604	33
Shared Lane Traffic (%)	10%										
Lane Group Flow (vph)	97	649	0	16	495	713	71	1565	0	637	0

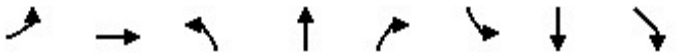
Intersection Summary

Lane Group	EBL	EBT	NBL2	NBT	NBR	SBL	SBT	SER
Lane Configurations								
Volume (vph)	98	381	15	450	649	65	1342	550
Turn Type	Perm	NA	Prot	NA	Perm	Prot	NA	Prot
Protected Phases		1	7	4		3	8	9
Permitted Phases	1				4			
Detector Phase	1	1	7	4	4	3	8	9
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	8.0	20.0	20.0	8.0	20.0	8.0
Total Split (s)	29.0	29.0	8.0	48.0	48.0	8.0	48.0	35.0
Total Split (%)	24.2%	24.2%	6.7%	40.0%	40.0%	6.7%	40.0%	29.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
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	Lag	Lead	Lag	
Lead-Lag Optimize?								
Recall Mode	None	None	None	C-Max	C-Max	None	C-Max	None
Act Effct Green (s)	24.7	24.7	4.3	46.9	46.9	4.4	50.1	29.9
Actuated g/C Ratio	0.21	0.21	0.04	0.39	0.39	0.04	0.42	0.25
v/c Ratio	0.29	0.91	0.13	0.25	0.73	0.57	0.74	0.92
Control Delay	42.9	60.8	38.7	37.5	38.0	86.2	11.9	63.1
Queue Delay	0.0	0.0	0.0	0.0	15.7	0.0	0.0	0.0
Total Delay	42.9	60.8	38.7	37.5	53.7	86.2	11.9	63.1
LOS	D	E	D	D	D	F	B	E
Approach Delay		58.5		47.0			15.2	
Approach LOS		E		D			B	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 44 (37%), Referenced to phase 4:NBT and 8:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.92
Intersection Signal Delay: 39.1 Intersection LOS: D
Intersection Capacity Utilization 71.3% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 2: Main Street & Santa Clara Avenue/I-5 NB On Ramp & I-5 SB Off Ramp



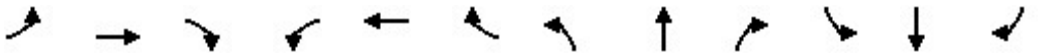
Lane Group	EBL	EBT	NBL2	NBT	NBR	SBL	SBT	SER
Lane Group Flow (vph)	97	649	16	495	713	71	1565	637
v/c Ratio	0.29	0.91	0.13	0.25	0.73	0.57	0.74	0.92
Control Delay	42.9	60.8	38.7	37.5	38.0	86.2	11.9	63.1
Queue Delay	0.0	0.0	0.0	0.0	15.7	0.0	0.0	0.0
Total Delay	42.9	60.8	38.7	37.5	53.7	86.2	11.9	63.1
Queue Length 50th (ft)	70	248	6	149	414	30	93	270
Queue Length 95th (ft)	126	#362	m10	187	536	m39	163	#382
Internal Link Dist (ft)		565		388			823	
Turn Bay Length (ft)			70		300	450		600
Base Capacity (vph)	337	720	123	1989	983	125	2106	719
Starvation Cap Reductn	0	0	0	0	266	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.90	0.13	0.25	0.99	0.57	0.74	0.89

Intersection Summary

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.

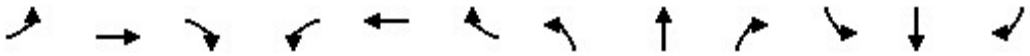
Movement	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Lane Configurations											
Volume (vph)	98	381	199	15	450	649	65	1342	82	550	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor	0.91	0.91		0.97	0.91	1.00	0.97	0.91		0.88	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.99		0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		1.00	
Satd. Flow (prot)	1610	3216		3433	5085	1583	3433	5041		2787	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		1.00	
Satd. Flow (perm)	1610	3216		3433	5085	1583	3433	5041		2787	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	108	419	219	16	495	713	71	1475	90	604	33
RTOR Reduction (vph)	0	48	0	0	0	368	0	0	0	0	0
Lane Group Flow (vph)	97	601	0	16	495	345	71	1565	0	637	0
Turn Type	Perm	NA		Prot	NA	Perm	Prot	NA		Prot	
Protected Phases		1		7	4		3	8		9	
Permitted Phases	1					4					
Actuated Green, G (s)	24.7	24.7		1.6	46.2	46.2	3.2	47.8		29.9	
Effective Green, g (s)	24.7	24.7		1.6	46.2	46.2	3.2	47.8		29.9	
Actuated g/C Ratio	0.21	0.21		0.01	0.39	0.39	0.03	0.40		0.25	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	331	661		45	1957	609	91	2007		694	
v/s Ratio Prot				0.00	0.10		c0.02	c0.31		c0.23	
v/s Ratio Perm	0.06	0.19				0.22					
v/c Ratio	0.29	0.91		0.36	0.25	0.57	0.78	0.78		0.92	
Uniform Delay, d1	40.3	46.6		58.7	25.1	29.0	58.1	31.5		43.9	
Progression Factor	1.00	1.00		0.65	1.46	6.08	1.31	0.34		1.00	
Incremental Delay, d2	0.5	16.4		3.7	0.2	2.9	24.5	2.1		17.0	
Delay (s)	40.8	63.0		42.1	36.9	179.3	100.4	12.6		60.9	
Level of Service	D	E		D	D	F	F	B		E	
Approach Delay (s)		60.1			119.9			16.5			
Approach LOS		E			F			B			

Intersection Summary			
HCM 2000 Control Delay	60.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	170		0
Storage Lanes	0		0	0		0	0		0	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.91	0.91	0.97	0.91	1.00
Ped Bike Factor												
Frt		0.983						0.993				
Flt Protected		0.983								0.950		
Satd. Flow (prot)	0	3420	0	0	0	0	0	5050	0	3433	5085	0
Flt Permitted		0.983								0.950		
Satd. Flow (perm)	0	3420	0	0	0	0	0	5050	0	3433	5085	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10						7				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		633			1129			308			468	
Travel Time (s)		14.4			25.7			7.0			10.6	

Intersection Summary	
Area Type:	Other



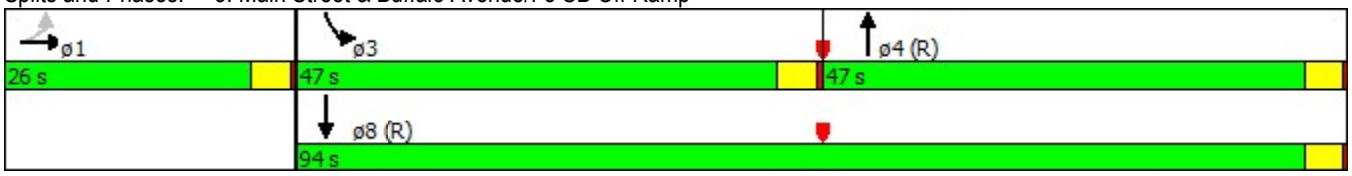
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	118	180	39	0	0	0	0	1026	48	729	1412	0
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	127	194	42	0	0	0	0	1103	52	784	1518	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	363	0	0	0	0	0	1155	0	784	1518	0

Intersection Summary

Lane Group	EBT	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	180	1026	729	1412
Turn Type	NA	NA	Prot	NA
Protected Phases	1	4	3	8
Permitted Phases				
Detector Phase	1	4	3	8
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0
Total Split (s)	26.0	47.0	47.0	94.0
Total Split (%)	21.7%	39.2%	39.2%	78.3%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?				
Recall Mode	None	C-Max	Max	C-Max
Act Effct Green (s)	17.6	43.0	47.4	94.4
Actuated g/C Ratio	0.15	0.36	0.40	0.79
v/c Ratio	0.71	0.64	0.58	0.38
Control Delay	55.3	33.7	21.9	1.5
Queue Delay	3.3	0.0	0.5	0.4
Total Delay	58.6	33.8	22.4	1.9
LOS	E	C	C	A
Approach Delay	58.6	33.8		8.9
Approach LOS	E	C		A

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 101 (84%), Referenced to phase 4:NBT and 8:SBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 21.1	Intersection LOS: C
Intersection Capacity Utilization 61.3%	ICU Level of Service B
Analysis Period (min) 15	

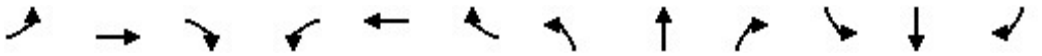
Splits and Phases: 3: Main Street & Buffalo Avenue/I-5 SB Off Ramp



Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	363	1155	784	1518
v/c Ratio	0.71	0.64	0.58	0.38
Control Delay	55.3	33.7	21.9	1.5
Queue Delay	3.3	0.0	0.5	0.4
Total Delay	58.6	33.8	22.4	1.9
Queue Length 50th (ft)	138	268	167	29
Queue Length 95th (ft)	184	319	m209	34
Internal Link Dist (ft)	553	228		388
Turn Bay Length (ft)			170	
Base Capacity (vph)	635	1814	1357	4001
Starvation Cap Reductn	0	0	213	1694
Spillback Cap Reductn	180	39	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.80	0.65	0.69	0.66

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	118	180	39	0	0	0	0	1026	48	729	1412	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0		4.0	4.0	
Lane Util. Factor		0.95						0.91		0.97	0.91	
Frt		0.98						0.99		1.00	1.00	
Flt Protected		0.98						1.00		0.95	1.00	
Satd. Flow (prot)		3418						5051		3433	5085	
Flt Permitted		0.98						1.00		0.95	1.00	
Satd. Flow (perm)		3418						5051		3433	5085	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	127	194	42	0	0	0	0	1103	52	784	1518	0
RTOR Reduction (vph)	0	9	0	0	0	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	354	0	0	0	0	0	1151	0	784	1518	0
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		1						4		3	8	
Permitted Phases	1											
Actuated Green, G (s)		17.6						43.0		47.4	94.4	
Effective Green, g (s)		17.6						43.0		47.4	94.4	
Actuated g/C Ratio		0.15						0.36		0.39	0.79	
Clearance Time (s)		4.0						4.0		4.0	4.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		501						1809		1356	4000	
v/s Ratio Prot								c0.23		c0.23	0.30	
v/s Ratio Perm		0.10										
v/c Ratio		0.71						0.64		0.58	0.38	
Uniform Delay, d1		48.7						32.0		28.5	3.9	
Progression Factor		1.00						1.00		0.71	0.33	
Incremental Delay, d2		4.5						1.7		1.1	0.2	
Delay (s)		53.3						33.7		21.3	1.5	
Level of Service		D						C		C	A	
Approach Delay (s)		53.3			0.0			33.7			8.2	
Approach LOS		D			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

2129 NORTH MAIN ST TIA (JN:0016-2016-01)
EXISTING PLUS PROJECT CONDITION
AM PEAK HOUR

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #4 Main Street / 17th Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.759
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	45	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2 0	2 0	1	2 0	1 1	0	2 0	2 1	0	2 0	2 1	0
Volume Module:												
Base Vol:	149	747	172	169	1092	85	133	1083	76	311	1171	37
Growth 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
Initial Bse:	149	747	172	169	1092	85	133	1083	76	311	1171	37
Added Vol:	0	0	0	3	0	0	0	0	0	0	0	4
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	149	747	172	172	1092	85	133	1083	76	311	1171	41
User 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
PHF 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
PHF Volume:	149	747	172	172	1092	85	133	1083	76	311	1171	41
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	149	747	172	172	1092	85	133	1083	76	311	1171	41
PCE 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
MLF 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
FinalVolume:	149	747	172	172	1092	85	133	1083	76	311	1171	41
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	1.86	0.14	2.00	2.80	0.20	2.00	2.90	0.10
Final Sat.:	3400	3400	1700	3400	3154	246	3400	4766	334	3400	4927	173
Capacity Analysis Module:												
Vol/Sat:	0.04	0.22	0.10	0.05	0.35	0.35	0.04	0.23	0.23	0.09	0.24	0.24
Crit Moves:	****			****			****			****		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	50	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.91
Ped Bike Factor						
Frt		0.850	0.999			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3536	0	1770	5085
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1583	3536	0	1770	5085
Link Speed (mph)	30		30			30
Link Distance (ft)	248		1710			308
Travel Time (s)	5.6		38.9			7.0

Intersection Summary	
Area Type:	Other

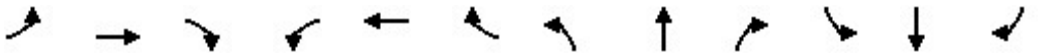
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Volume (vph)	3	26	1048	4	38	1413
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	3	28	1139	4	41	1536
Shared Lane Traffic (%)						
Lane Group Flow (vph)	3	28	1143	0	41	1536

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	3	26	1048	4	38	1413
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	28	1139	4	41	1536
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						308
pX, platoon unblocked	0.91					
vC, conflicting volume	1736	572			1143	
vC1, stage 1 conf vol	1141					
vC2, stage 2 conf vol	595					
vCu, unblocked vol	1467	572			1143	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	94			93	
cM capacity (veh/h)	250	463			607	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3	SB 4
Volume Total	3	28	759	384	41	512	512	512
Volume Left	3	0	0	0	41	0	0	0
Volume Right	0	28	0	4	0	0	0	0
cSH	250	463	1700	1700	607	1700	1700	1700
Volume to Capacity	0.01	0.06	0.45	0.23	0.07	0.30	0.30	0.30
Queue Length 95th (ft)	1	5	0	0	5	0	0	0
Control Delay (s)	19.6	13.3	0.0	0.0	11.4	0.0	0.0	0.0
Lane LOS	C	B			B			
Approach Delay (s)	13.9		0.0		0.3			
Approach LOS	B							

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	41.6%	ICU Level of Service	A
Analysis Period (min)	15		



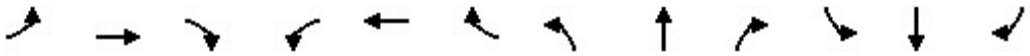
Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0			0		60	170		0			130
Storage Lanes	0			0		1	2		0			1
Taper Length (ft)	25			25			25					
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	1.00
Ped Bike Factor												
Frt			0.850			0.850		0.985				0.850
Flt Protected		0.963			0.962		0.950			0.950		
Satd. Flow (prot)	0	1794	1583	0	1792	1583	3433	5009	0	1770	5085	1583
Flt Permitted		0.606			0.737		0.950			0.950		
Satd. Flow (perm)	0	1129	1583	0	1373	1583	3433	5009	0	1770	5085	1583
Right Turn on Red			Yes			Yes						Yes
Satd. Flow (RTOR)			87			106						82
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		916			717			903			1485	
Travel Time (s)		20.8			16.3			20.5			33.8	

Intersection Summary

Area Type: Other

Lane Group	NWR	NWR2
Lane Configurations		
Ideal Flow (vphpl)	1900	1900
Lane Width (ft)	12	12
Grade (%)		
Storage Length (ft)	500	
Storage Lanes	1	
Taper Length (ft)		
Lane Util. Factor	0.88	1.00
Ped Bike Factor		
Frt	0.850	
Flt Protected		
Satd. Flow (prot)	2787	0
Flt Permitted		
Satd. Flow (perm)	2787	0
Right Turn on Red		No
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		

Intersection Summary



Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Volume (vph)	37	11	81	97	26	109	269	808	93	100	1259	111
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	40	12	87	104	28	117	289	869	100	108	1354	119
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	52	87	0	132	117	289	969	0	108	1354	119

Intersection Summary

Lane Group	NWR	NWR2
Volume (vph)	349	10
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor	0.93	0.93
Growth Factor	100%	100%
Heavy Vehicles (%)	2%	2%
Bus Blockages (#/hr)	0	0
Parking (#/hr)		
Mid-Block Traffic (%)		
Adj. Flow (vph)	375	11
Shared Lane Traffic (%)		
Lane Group Flow (vph)	386	0

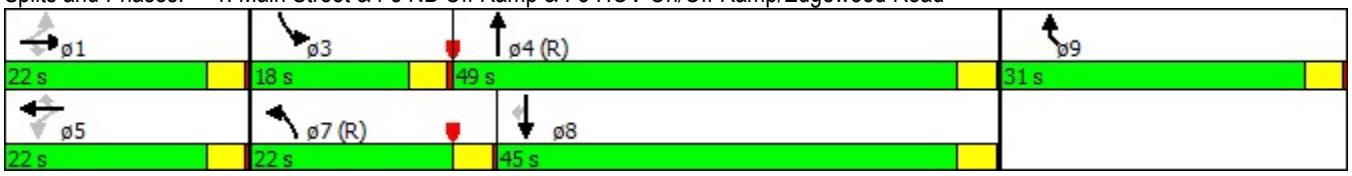
Intersection Summary

Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	SBL2	SBT	SBR	NWR
Lane Configurations												
Volume (vph)	37	11	81	97	26	109	269	808	100	1259	111	349
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA	Perm	Prot
Protected Phases		1			5		7	4	3	8		9
Permitted Phases	1		1	5		5					8	
Detector Phase	1	1	1	5	5	5	7	4	3	8	8	9
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	20.0	8.0	20.0	20.0	8.0
Total Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	49.0	18.0	45.0	45.0	31.0
Total Split (%)	18.3%	18.3%	18.3%	18.3%	18.3%	18.3%	18.3%	40.8%	15.0%	37.5%	37.5%	25.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag							Lead	Lag	Lead	Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	Max	Max	None
Act Effct Green (s)		15.7	15.7		15.7	15.7	25.6	54.7	11.9	41.0	41.0	21.7
Actuated g/C Ratio		0.13	0.13		0.13	0.13	0.21	0.46	0.10	0.34	0.34	0.18
v/c Ratio		0.35	0.31		0.73	0.39	0.39	0.42	0.62	0.78	0.20	0.77
Control Delay		53.1	12.2		73.1	14.6	49.8	34.4	66.7	39.3	11.2	57.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		53.1	12.2		73.1	14.6	49.8	34.4	66.7	39.3	11.2	57.1
LOS		D	B		E	B	D	C	E	D	B	E
Approach Delay		27.5			45.6			37.9		39.0		
Approach LOS		C			D			D		D		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 78 (65%), Referenced to phase 4:NBT and 7:NBL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 40.6 Intersection LOS: D
Intersection Capacity Utilization 62.5% ICU Level of Service B
Analysis Period (min) 15

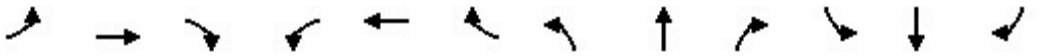
Splits and Phases: 1: Main Street & I-5 NB Off Ramp & I-5 HOV On/Off Ramp/Edgewood Road



Lane Group	EBT	EBR2	WBT	WBR	NBL	NBT	SBL2	SBT	SBR	NWR
Lane Group Flow (vph)	52	87	132	117	289	969	108	1354	119	386
v/c Ratio	0.35	0.31	0.73	0.39	0.39	0.42	0.62	0.78	0.20	0.77
Control Delay	53.1	12.2	73.1	14.6	49.8	34.4	66.7	39.3	11.2	57.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.1	12.2	73.1	14.6	49.8	34.4	66.7	39.3	11.2	57.1
Queue Length 50th (ft)	37	0	99	8	118	196	81	342	19	163
Queue Length 95th (ft)	77	47	#176	61	m163	m257	141	401	62	212
Internal Link Dist (ft)	836		637			823		1405		
Turn Bay Length (ft)		150		60	170		150		130	500
Base Capacity (vph)	172	315	209	331	732	2282	208	1737	594	627
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.28	0.63	0.35	0.39	0.42	0.52	0.78	0.20	0.62

Intersection Summary

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.



Movement	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Lane Configurations												
Volume (vph)	37	11	81	97	26	109	269	808	93	100	1259	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	0.97	0.91		1.00	0.91	1.00
Frt		1.00	0.85		1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1794	1583		1792	1583	3433	5007		1770	5085	1583
Flt Permitted		0.61	1.00		0.74	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1128	1583		1372	1583	3433	5007		1770	5085	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	40	12	87	104	28	117	289	869	100	108	1354	119
RTOR Reduction (vph)	0	0	76	0	0	92	0	0	0	0	0	54
Lane Group Flow (vph)	0	52	11	0	132	25	289	969	0	108	1354	65
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases		1			5		7	4		3	8	
Permitted Phases	1		1	5		5						8
Actuated Green, G (s)		15.7	15.7		15.7	15.7	25.6	54.7		11.9	41.0	41.0
Effective Green, g (s)		15.7	15.7		15.7	15.7	25.6	54.7		11.9	41.0	41.0
Actuated g/C Ratio		0.13	0.13		0.13	0.13	0.21	0.46		0.10	0.34	0.34
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		147	207		179	207	732	2282		175	1737	540
v/s Ratio Prot							c0.08	0.19		c0.06	c0.27	
v/s Ratio Perm		0.05	0.01		c0.10	0.02						0.04
v/c Ratio		0.35	0.05		0.74	0.12	0.39	0.42		0.62	0.78	0.12
Uniform Delay, d1		47.5	45.7		50.2	46.1	40.5	22.0		51.9	35.4	27.1
Progression Factor		1.00	1.00		1.00	1.00	1.13	1.42		1.00	1.00	1.00
Incremental Delay, d2		1.5	0.1		14.6	0.3	1.4	0.5		6.3	3.5	0.5
Delay (s)		49.0	45.8		64.8	46.3	47.2	31.9		58.2	39.0	27.6
Level of Service		D	D		E	D	D	C		E	D	C
Approach Delay (s)		47.0			56.1			35.4			39.4	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	41.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	NWR	NWR2
Lane Configurations		
Volume (vph)	349	10
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	
Lane Util. Factor	0.88	
Frt	0.85	
Flt Protected	1.00	
Satd. Flow (prot)	2787	
Flt Permitted	1.00	
Satd. Flow (perm)	2787	
Peak-hour factor, PHF	0.93	0.93
Adj. Flow (vph)	375	11
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	386	0
Turn Type	Prot	
Protected Phases	9	
Permitted Phases		
Actuated Green, G (s)	21.7	
Effective Green, g (s)	21.7	
Actuated g/C Ratio	0.18	
Clearance Time (s)	4.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	503	
v/s Ratio Prot	c0.14	
v/s Ratio Perm		
v/c Ratio	0.77	
Uniform Delay, d1	46.7	
Progression Factor	1.00	
Incremental Delay, d2	6.9	
Delay (s)	53.7	
Level of Service	D	
Approach Delay (s)		
Approach LOS		

Intersection Summary

Lane Group	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			
Storage Length (ft)	0		0			300	450		0	600	
Storage Lanes	1		0			1	2		0	1	
Taper Length (ft)	25						25				
Lane Util. Factor	0.91	0.91	0.95	0.97	0.91	1.00	0.97	0.91	0.91	0.88	1.00
Ped Bike Factor											
Frt		0.967				0.850		0.992		0.850	
Flt Protected	0.950	0.998		0.950			0.950				
Satd. Flow (prot)	1610	3272	0	3433	5085	1583	3433	5045	0	2787	0
Flt Permitted	0.950	0.998		0.950			0.950				
Satd. Flow (perm)	1610	3272	0	3433	5085	1583	3433	5045	0	2787	0
Right Turn on Red			Yes			Yes					No
Satd. Flow (RTOR)		26				454					
Link Speed (mph)		30			30			30			
Link Distance (ft)		645			468			903			
Travel Time (s)		14.7			10.6			20.5			

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Volume (vph)	236	479	143	13	921	700	149	1240	69	349	13
Confl. Peds. (#/hr)											
Confl. Bikes (#/hr)											
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)											
Mid-Block Traffic (%)		0%			0%			0%			
Adj. Flow (vph)	259	526	157	14	1012	769	164	1363	76	384	14
Shared Lane Traffic (%)	10%										
Lane Group Flow (vph)	233	709	0	14	1012	769	164	1439	0	398	0

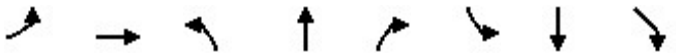
Intersection Summary

Lane Group	EBL	EBT	NBL2	NBT	NBR	SBL	SBT	SER
Lane Configurations								
Volume (vph)	236	479	13	921	700	149	1240	349
Turn Type	Perm	NA	Prot	NA	Perm	Prot	NA	Prot
Protected Phases		1	7	4		3	8	9
Permitted Phases	1				4			
Detector Phase	1	1	7	4	4	3	8	9
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	8.0	20.0	20.0	8.0	20.0	8.0
Total Split (s)	31.0	31.0	8.0	55.0	55.0	10.0	57.0	24.0
Total Split (%)	25.8%	25.8%	6.7%	45.8%	45.8%	8.3%	47.5%	20.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
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	Lag	Lead	Lag	
Lead-Lag Optimize?								
Recall Mode	None	None	None	C-Max	C-Max	None	C-Max	None
Act Effct Green (s)	27.1	27.1	4.3	51.0	51.0	6.5	58.3	19.5
Actuated g/C Ratio	0.23	0.23	0.04	0.42	0.42	0.05	0.49	0.16
v/c Ratio	0.64	0.94	0.11	0.47	0.82	0.89	0.59	0.88
Control Delay	51.4	64.6	81.7	9.2	11.7	109.6	4.3	70.6
Queue Delay	0.0	0.0	0.0	0.0	14.5	0.0	0.0	0.0
Total Delay	51.4	64.6	81.7	9.2	26.2	109.6	4.3	70.6
LOS	D	E	F	A	C	F	A	E
Approach Delay		61.3		17.1			15.1	
Approach LOS		E		B			B	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 94 (78%), Referenced to phase 4:NBT and 8:SBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 29.7 Intersection LOS: C
Intersection Capacity Utilization 74.0% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 2: Main Street & Santa Clara Avenue/I-5 NB On Ramp & I-5 SB Off Ramp



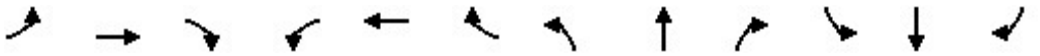
Lane Group	EBL	EBT	NBL2	NBT	NBR	SBL	SBT	SER
Lane Group Flow (vph)	233	709	14	1012	769	164	1439	398
v/c Ratio	0.64	0.94	0.11	0.47	0.82	0.89	0.59	0.88
Control Delay	51.4	64.6	81.7	9.2	11.7	109.6	4.3	70.6
Queue Delay	0.0	0.0	0.0	0.0	14.5	0.0	0.0	0.0
Total Delay	51.4	64.6	81.7	9.2	26.2	109.6	4.3	70.6
Queue Length 50th (ft)	181	289	6	48	85	70	47	172
Queue Length 95th (ft)	280	#413	m6	m55	m115	m#112	61	#263
Internal Link Dist (ft)		565		388			823	
Turn Bay Length (ft)			70		300	450		600
Base Capacity (vph)	363	758	123	2161	933	185	2450	464
Starvation Cap Reductn	0	0	0	0	162	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.94	0.11	0.47	1.00	0.89	0.59	0.86

Intersection Summary

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.

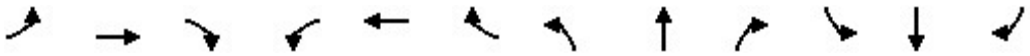
Movement	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Lane Configurations											
Volume (vph)	236	479	143	13	921	700	149	1240	69	349	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor	0.91	0.91		0.97	0.91	1.00	0.97	0.91		0.88	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.99		0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		1.00	
Satd. Flow (prot)	1610	3272		3433	5085	1583	3433	5045		2787	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		1.00	
Satd. Flow (perm)	1610	3272		3433	5085	1583	3433	5045		2787	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	259	526	157	14	1012	769	164	1363	76	384	14
RTOR Reduction (vph)	0	20	0	0	0	261	0	0	0	0	0
Lane Group Flow (vph)	233	689	0	14	1012	508	164	1439	0	398	0
Turn Type	Perm	NA		Prot	NA	Perm	Prot	NA		Prot	
Protected Phases		1		7	4		3	8		9	
Permitted Phases	1					4					
Actuated Green, G (s)	27.1	27.1		1.6	50.9	50.9	6.5	55.8		19.5	
Effective Green, g (s)	27.1	27.1		1.6	50.9	50.9	6.5	55.8		19.5	
Actuated g/C Ratio	0.23	0.23		0.01	0.42	0.42	0.05	0.46		0.16	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	363	738		45	2156	671	185	2345		452	
v/s Ratio Prot				0.00	0.20		c0.05	0.29		c0.14	
v/s Ratio Perm	0.14	0.21				c0.32					
v/c Ratio	0.64	0.93		0.31	0.47	0.76	0.89	0.61		0.88	
Uniform Delay, d1	42.1	45.6		58.7	24.8	29.3	56.4	24.0		49.1	
Progression Factor	1.00	1.00		1.43	0.36	0.60	1.42	0.16		1.00	
Incremental Delay, d2	3.9	18.7		1.9	0.4	3.9	27.4	0.8		17.8	
Delay (s)	45.9	64.3		85.7	9.2	21.4	107.5	4.6		66.9	
Level of Service	D	E		F	A	C	F	A		E	
Approach Delay (s)		59.7			15.0			15.1			
Approach LOS		E			B			B			

Intersection Summary			
HCM 2000 Control Delay	28.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	170		0
Storage Lanes	0		0	0		0	0		0	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.91	0.91	0.97	0.91	1.00
Ped Bike Factor												
Frt		0.975						0.996				
Flt Protected		0.973								0.950		
Satd. Flow (prot)	0	3358	0	0	0	0	0	5065	0	3433	5085	0
Flt Permitted		0.973								0.950		
Satd. Flow (perm)	0	3358	0	0	0	0	0	5065	0	3433	5085	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18						4				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		633			1129			308			468	
Travel Time (s)		14.4			25.7			7.0			10.6	

Intersection Summary	
Area Type:	Other



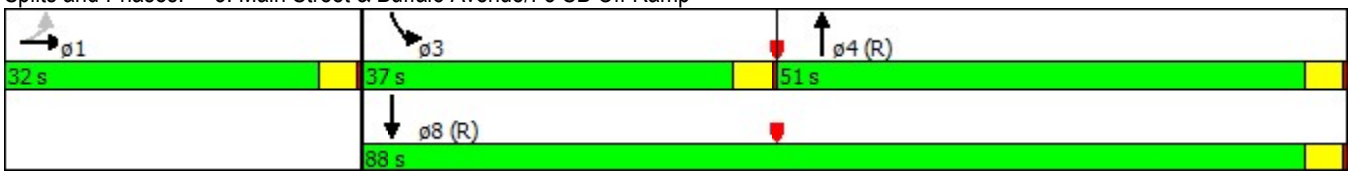
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	300	154	90	0	0	0	0	1590	46	640	1147	0
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	323	166	97	0	0	0	0	1710	49	688	1233	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	586	0	0	0	0	0	1759	0	688	1233	0

Intersection Summary

Lane Group	EBT	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	154	1590	640	1147
Turn Type	NA	NA	Prot	NA
Protected Phases	1	4	3	8
Permitted Phases				
Detector Phase	1	4	3	8
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0
Total Split (s)	32.0	51.0	37.0	88.0
Total Split (%)	26.7%	42.5%	30.8%	73.3%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?				
Recall Mode	None	C-Max	Max	C-Max
Act Effct Green (s)	25.2	47.0	35.8	86.8
Actuated g/C Ratio	0.21	0.39	0.30	0.72
v/c Ratio	0.82	0.89	0.67	0.34
Control Delay	53.5	40.5	44.6	8.7
Queue Delay	0.0	0.0	0.4	0.2
Total Delay	53.5	40.5	45.0	8.8
LOS	D	D	D	A
Approach Delay	53.5	40.5		21.8
Approach LOS	D	D		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 87 (73%), Referenced to phase 4:NBT and 8:SBT, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 33.9	Intersection LOS: C
Intersection Capacity Utilization 76.6%	ICU Level of Service D
Analysis Period (min) 15	

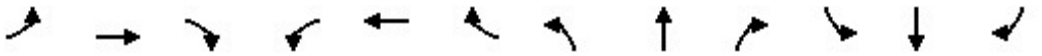
Splits and Phases: 3: Main Street & Buffalo Avenue/I-5 SB Off Ramp



Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	586	1759	688	1233
v/c Ratio	0.82	0.89	0.67	0.34
Control Delay	53.5	40.5	44.6	8.7
Queue Delay	0.0	0.0	0.4	0.2
Total Delay	53.5	40.5	45.0	8.8
Queue Length 50th (ft)	220	458	278	145
Queue Length 95th (ft)	282	527	m338	m204
Internal Link Dist (ft)	553	228		388
Turn Bay Length (ft)			170	
Base Capacity (vph)	797	1986	1025	3679
Starvation Cap Reductn	0	0	69	1269
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.74	0.89	0.72	0.51

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	154	90	0	0	0	0	1590	46	640	1147	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0		4.0	4.0	
Lane Util. Factor		0.95						0.91		0.97	0.91	
Frt		0.98						1.00		1.00	1.00	
Flt Protected		0.97						1.00		0.95	1.00	
Satd. Flow (prot)		3359						5064		3433	5085	
Flt Permitted		0.97						1.00		0.95	1.00	
Satd. Flow (perm)		3359						5064		3433	5085	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	323	166	97	0	0	0	0	1710	49	688	1233	0
RTOR Reduction (vph)	0	14	0	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	572	0	0	0	0	0	1757	0	688	1233	0
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		1						4		3	8	
Permitted Phases	1											
Actuated Green, G (s)		25.2						47.0		35.8	86.8	
Effective Green, g (s)		25.2						47.0		35.8	86.8	
Actuated g/C Ratio		0.21						0.39		0.30	0.72	
Clearance Time (s)		4.0						4.0		4.0	4.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		705						1983		1024	3678	
v/s Ratio Prot								c0.35		c0.20	0.24	
v/s Ratio Perm		0.17										
v/c Ratio		0.81						0.89		0.67	0.34	
Uniform Delay, d1		45.1						34.0		36.9	6.1	
Progression Factor		1.00						1.00		1.11	1.34	
Incremental Delay, d2		7.0						6.3		2.6	0.2	
Delay (s)		52.2						40.3		43.6	8.3	
Level of Service		D						D		D	A	
Approach Delay (s)		52.2			0.0			40.3			20.9	
Approach LOS		D			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	33.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

2129 NORTH MAIN ST TIA (JN:0016-2016-01)
EXISTING PLUS PROJECT CONDITION
PM PEAK HOUR

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #4 Main Street / 17th Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.722
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	40	Level Of Service:	C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2 0	2 0	1	2 0	1 1	0	2 0	2 1	0	2 0	2 1	0
Volume Module:												
Base Vol:	224	1049	155	197	809	140	236	1232	69	166	1025	74
Growth 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
Initial Bse:	224	1049	155	197	809	140	236	1232	69	166	1025	74
Added Vol:	0	0	0	4	0	0	0	0	0	0	0	4
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	224	1049	155	201	809	140	236	1232	69	166	1025	78
User 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
PHF 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
PHF Volume:	224	1049	155	201	809	140	236	1232	69	166	1025	78
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	224	1049	155	201	809	140	236	1232	69	166	1025	78
PCE 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
MLF 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
FinalVolume:	224	1049	155	201	809	140	236	1232	69	166	1025	78
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	1.70	0.30	2.00	2.84	0.16	2.00	2.79	0.21
Final Sat.:	3400	3400	1700	3400	2898	502	3400	4830	270	3400	4739	361
Capacity Analysis Module:												
Vol/Sat:	0.07	0.31	0.09	0.06	0.28	0.28	0.07	0.26	0.26	0.05	0.22	0.22
Crit Moves:		****			****			****			****	

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	50	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.91
Ped Bike Factor						
Frt		0.850				
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3539	0	1770	5085
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1583	3539	0	1770	5085
Link Speed (mph)	30		30			30
Link Distance (ft)	248		1710			308
Travel Time (s)	5.6		38.9			7.0

Intersection Summary	
Area Type:	Other

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Volume (vph)	4	36	1383	4	37	1200
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	4	39	1503	4	40	1304
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	39	1507	0	40	1304

Intersection Summary

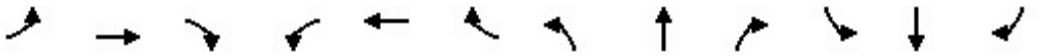
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	4	36	1383	4	37	1200
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	39	1503	4	40	1304
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						308
pX, platoon unblocked	0.92					
vC, conflicting volume	2021	754			1508	
vC1, stage 1 conf vol	1505					
vC2, stage 2 conf vol	515					
vCu, unblocked vol	1792	754			1508	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	89			91	
cM capacity (veh/h)	163	352			440	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3	SB 4
Volume Total	4	39	1002	505	40	435	435	435
Volume Left	4	0	0	0	40	0	0	0
Volume Right	0	39	0	4	0	0	0	0
cSH	163	352	1700	1700	440	1700	1700	1700
Volume to Capacity	0.03	0.11	0.59	0.30	0.09	0.26	0.26	0.26
Queue Length 95th (ft)	2	9	0	0	8	0	0	0
Control Delay (s)	27.6	16.5	0.0	0.0	14.0	0.0	0.0	0.0
Lane LOS	D	C			B			
Approach Delay (s)	17.6		0.0		0.4			
Approach LOS	C							

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix E

Project Completion (Year 2018) Without Project
Level of Service Analysis Worksheets

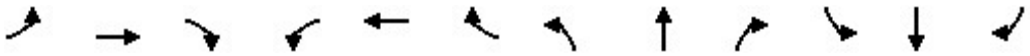


Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0			0		60	170		0			130
Storage Lanes	0			0		1	2		0			1
Taper Length (ft)	25			25			25					
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	1.00
Ped Bike Factor												
Frt			0.850			0.850		0.977				0.850
Flt Protected		0.966			0.957		0.950			0.950		
Satd. Flow (prot)	0	1799	1583	0	1783	1583	3433	4968	0	1770	5085	1583
Flt Permitted		0.797			0.733		0.950			0.950		
Satd. Flow (perm)	0	1485	1583	0	1365	1583	3433	4968	0	1770	5085	1583
Right Turn on Red			Yes			Yes						Yes
Satd. Flow (RTOR)			90			86						82
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		916			717			903			1485	
Travel Time (s)		20.8			16.3			20.5			33.8	

Intersection Summary	
Area Type:	Other

Lane Group	NWR	NWR2
Lane Configurations		
Ideal Flow (vphpl)	1900	1900
Lane Width (ft)	12	12
Grade (%)		
Storage Length (ft)	500	
Storage Lanes	1	
Taper Length (ft)		
Lane Util. Factor	0.88	1.00
Ped Bike Factor		
Frt	0.850	
Flt Protected		
Satd. Flow (prot)	2787	0
Flt Permitted		
Satd. Flow (perm)	2787	0
Right Turn on Red		No
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		

Intersection Summary



Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Volume (vph)	14	6	84	123	14	98	64	494	88	86	1488	19
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	15	6	90	132	15	105	69	531	95	92	1600	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	21	90	0	147	105	69	626	0	92	1600	20

Intersection Summary

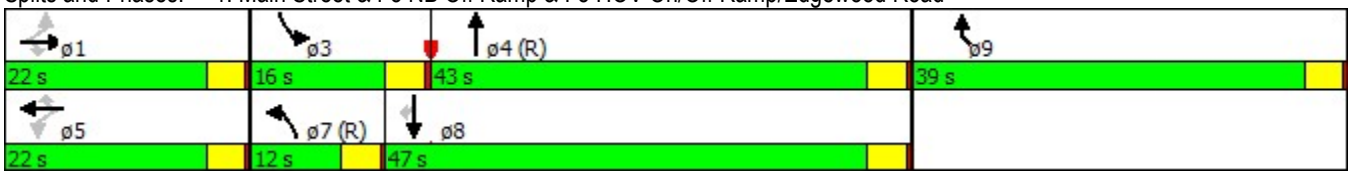
Lane Group	NWR	NWR2
Volume (vph)	603	12
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor	0.93	0.93
Growth Factor	100%	100%
Heavy Vehicles (%)	2%	2%
Bus Blockages (#/hr)	0	0
Parking (#/hr)		
Mid-Block Traffic (%)		
Adj. Flow (vph)	648	13
Shared Lane Traffic (%)		
Lane Group Flow (vph)	661	0

Intersection Summary

Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	SBL2	SBT	SBR	NWR
Lane Configurations												
Volume (vph)	14	6	84	123	14	98	64	494	86	1488	19	603
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA	Perm	Prot
Protected Phases		1			5		7	4	3	8		9
Permitted Phases	1		1	5		5					8	
Detector Phase	1	1	1	5	5	5	7	4	3	8	8	9
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	20.0	8.0	20.0	20.0	8.0
Total Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	12.0	43.0	16.0	47.0	47.0	39.0
Total Split (%)	18.3%	18.3%	18.3%	18.3%	18.3%	18.3%	10.0%	35.8%	13.3%	39.2%	39.2%	32.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag							Lead	Lag	Lead	Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	Max	Max	None
Act Effct Green (s)		16.4	16.4		16.4	16.4	12.5	45.0	10.5	43.0	43.0	32.2
Actuated g/C Ratio		0.14	0.14		0.14	0.14	0.10	0.38	0.09	0.36	0.36	0.27
v/c Ratio		0.10	0.31		0.79	0.36	0.19	0.34	0.60	0.88	0.03	0.89
Control Delay		45.5	12.1		78.7	17.2	76.1	9.3	68.6	42.7	0.1	56.7
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		45.5	12.1		78.7	17.2	76.1	9.3	68.6	42.7	0.1	56.7
LOS		D	B		E	B	E	A	E	D	A	E
Approach Delay		18.4			53.1			15.9		43.6		
Approach LOS		B			D			B		D		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 38 (32%), Referenced to phase 4:NBT and 7:NBL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 40.4	Intersection LOS: D
Intersection Capacity Utilization 65.3%	ICU Level of Service C
Analysis Period (min) 15	

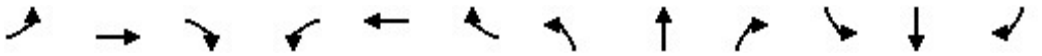
Splits and Phases: 1: Main Street & I-5 NB Off Ramp & I-5 HOV On/Off Ramp/Edgewood Road



Lane Group	EBT	EBR2	WBT	WBR	NBL	NBT	SBL2	SBT	SBR	NWR
Lane Group Flow (vph)	21	90	147	105	69	626	92	1600	20	661
v/c Ratio	0.10	0.31	0.79	0.36	0.19	0.34	0.60	0.88	0.03	0.89
Control Delay	45.5	12.1	78.7	17.2	76.1	9.3	68.6	42.7	0.1	56.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.5	12.1	78.7	17.2	76.1	9.3	68.6	42.7	0.1	56.7
Queue Length 50th (ft)	14	0	109	13	29	24	69	421	0	275
Queue Length 95th (ft)	39	47	#206	64	m55	m80	125	487	0	352
Internal Link Dist (ft)	836		637			823		1405		
Turn Bay Length (ft)		150		60	170		150		130	500
Base Capacity (vph)	224	315	206	312	356	1863	177	1822	619	812
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.29	0.71	0.34	0.19	0.34	0.52	0.88	0.03	0.81

Intersection Summary

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.



Movement	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Lane Configurations												
Volume (vph)	14	6	84	123	14	98	64	494	88	86	1488	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	0.97	0.91		1.00	0.91	1.00
Frt		1.00	0.85		1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected		0.97	1.00		0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1799	1583		1783	1583	3433	4970		1770	5085	1583
Flt Permitted		0.80	1.00		0.73	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1485	1583		1365	1583	3433	4970		1770	5085	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	15	6	90	132	15	105	69	531	95	92	1600	20
RTOR Reduction (vph)	0	0	78	0	0	74	0	0	0	0	0	13
Lane Group Flow (vph)	0	21	12	0	147	31	69	626	0	92	1600	7
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases		1			5		7	4		3	8	
Permitted Phases	1		1	5		5						8
Actuated Green, G (s)		16.4	16.4		16.4	16.4	12.4	44.9		10.5	43.0	43.0
Effective Green, g (s)		16.4	16.4		16.4	16.4	12.4	44.9		10.5	43.0	43.0
Actuated g/C Ratio		0.14	0.14		0.14	0.14	0.10	0.37		0.09	0.36	0.36
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		202	216		186	216	354	1859		154	1822	567
v/s Ratio Prot							0.02	0.13		c0.05	c0.31	
v/s Ratio Perm		0.01	0.01		c0.11	0.02						0.00
v/c Ratio		0.10	0.06		0.79	0.14	0.19	0.34		0.60	0.88	0.01
Uniform Delay, d1		45.4	45.1		50.1	45.6	49.2	26.9		52.7	36.0	24.8
Progression Factor		1.00	1.00		1.00	1.00	1.43	0.31		1.00	1.00	1.00
Incremental Delay, d2		0.2	0.1		20.0	0.3	1.2	0.5		6.1	6.4	0.0
Delay (s)		45.6	45.2		70.2	45.9	71.6	8.9		58.8	42.4	24.9
Level of Service		D	D		E	D	E	A		E	D	C
Approach Delay (s)		45.3			60.1			15.1			43.1	
Approach LOS		D			E			B			D	

Intersection Summary			
HCM 2000 Control Delay	40.9	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)	16.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NWR	NWR2
Lane Configurations		
Volume (vph)	603	12
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	
Lane Util. Factor	0.88	
Frt	0.85	
Flt Protected	1.00	
Satd. Flow (prot)	2787	
Flt Permitted	1.00	
Satd. Flow (perm)	2787	
Peak-hour factor, PHF	0.93	0.93
Adj. Flow (vph)	648	13
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	661	0
Turn Type	Prot	
Protected Phases	9	
Permitted Phases		
Actuated Green, G (s)	32.2	
Effective Green, g (s)	32.2	
Actuated g/C Ratio	0.27	
Clearance Time (s)	4.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	747	
v/s Ratio Prot	c0.24	
v/s Ratio Perm		
v/c Ratio	0.88	
Uniform Delay, d1	42.1	
Progression Factor	1.00	
Incremental Delay, d2	12.1	
Delay (s)	54.2	
Level of Service	D	
Approach Delay (s)		
Approach LOS		

Intersection Summary

Lane Group	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			
Storage Length (ft)	0		0			300	450		0	600	
Storage Lanes	1		0			1	2		0	1	
Taper Length (ft)	25						25				
Lane Util. Factor	0.91	0.91	0.95	0.97	0.91	1.00	0.97	0.91	0.91	0.88	1.00
Ped Bike Factor											
Frt		0.949				0.850		0.993		0.850	
Flt Protected	0.950	0.999		0.950			0.950				
Satd. Flow (prot)	1610	3214	0	3433	5085	1583	3433	5050	0	2787	0
Flt Permitted	0.950	0.999		0.950			0.950				
Satd. Flow (perm)	1610	3214	0	3433	5085	1583	3433	5050	0	2787	0
Right Turn on Red			Yes			Yes					No
Satd. Flow (RTOR)		59				610					
Link Speed (mph)		30			30			30			
Link Distance (ft)		645			468			903			
Travel Time (s)		14.7			10.6			20.5			

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Volume (vph)	99	385	201	15	505	672	66	1580	83	583	30
Confl. Peds. (#/hr)											
Confl. Bikes (#/hr)											
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)											
Mid-Block Traffic (%)		0%			0%			0%			
Adj. Flow (vph)	109	423	221	16	555	738	73	1736	91	641	33
Shared Lane Traffic (%)	10%										
Lane Group Flow (vph)	98	655	0	16	555	738	73	1827	0	674	0

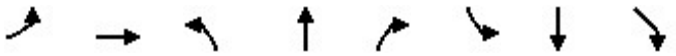
Intersection Summary

Lane Group	EBL	EBT	NBL2	NBT	NBR	SBL	SBT	SER
Lane Configurations								
Volume (vph)	99	385	15	505	672	66	1580	583
Turn Type	Perm	NA	Prot	NA	Perm	Prot	NA	Prot
Protected Phases		1	7	4		3	8	9
Permitted Phases	1				4			
Detector Phase	1	1	7	4	4	3	8	9
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	8.0	20.0	20.0	8.0	20.0	8.0
Total Split (s)	27.0	27.0	8.0	50.0	50.0	8.0	50.0	35.0
Total Split (%)	22.5%	22.5%	6.7%	41.7%	41.7%	6.7%	41.7%	29.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
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	Lag	Lead	Lag	
Lead-Lag Optimize?								
Recall Mode	None	None	None	C-Max	C-Max	None	C-Max	None
Act Effct Green (s)	23.4	23.4	4.0	47.6	47.6	4.0	50.8	30.6
Actuated g/C Ratio	0.20	0.20	0.03	0.40	0.40	0.03	0.42	0.26
v/c Ratio	0.31	0.97	0.14	0.28	0.74	0.64	0.85	0.95
Control Delay	44.9	72.2	39.3	44.7	41.2	90.0	13.6	68.0
Queue Delay	0.0	0.0	0.0	0.0	16.3	0.0	0.0	0.0
Total Delay	44.9	72.2	39.3	44.7	57.5	90.0	13.6	68.0
LOS	D	E	D	D	E	F	B	E
Approach Delay		68.7		51.9			16.5	
Approach LOS		E		D			B	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 44 (37%), Referenced to phase 4:NBT and 8:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 42.5 Intersection LOS: D
Intersection Capacity Utilization 77.1% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 2: Main Street & Santa Clara Avenue/I-5 NB On Ramp & I-5 SB Off Ramp



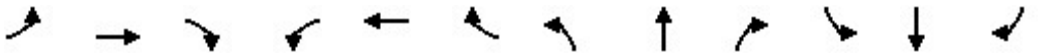
Lane Group	EBL	EBT	NBL2	NBT	NBR	SBL	SBT	SER
Lane Group Flow (vph)	98	655	16	555	738	73	1827	674
v/c Ratio	0.31	0.97	0.14	0.28	0.74	0.64	0.85	0.95
Control Delay	44.9	72.2	39.3	44.7	41.2	90.0	13.6	68.0
Queue Delay	0.0	0.0	0.0	0.0	16.3	0.0	0.0	0.0
Total Delay	44.9	72.2	39.3	44.7	57.5	90.0	13.6	68.0
Queue Length 50th (ft)	72	258	6	169	432	30	95	290
Queue Length 95th (ft)	130	#392	m9	210	555	m37	#189	#418
Internal Link Dist (ft)		565		388			823	
Turn Bay Length (ft)			70		300	450		600
Base Capacity (vph)	314	675	114	2017	995	114	2137	719
Starvation Cap Reductn	0	0	0	0	256	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.97	0.14	0.28	1.00	0.64	0.85	0.94

Intersection Summary

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.

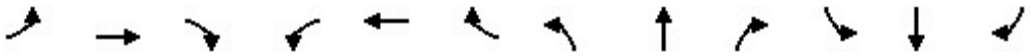
Movement	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Lane Configurations											
Volume (vph)	99	385	201	15	505	672	66	1580	83	583	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor	0.91	0.91		0.97	0.91	1.00	0.97	0.91		0.88	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.99		0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		1.00	
Satd. Flow (prot)	1610	3216		3433	5085	1583	3433	5047		2787	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		1.00	
Satd. Flow (perm)	1610	3216		3433	5085	1583	3433	5047		2787	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	109	423	221	16	555	738	73	1736	91	641	33
RTOR Reduction (vph)	0	47	0	0	0	372	0	0	0	0	0
Lane Group Flow (vph)	98	608	0	16	555	366	73	1827	0	674	0
Turn Type	Perm	NA		Prot	NA	Perm	Prot	NA		Prot	
Protected Phases		1		7	4		3	8		9	
Permitted Phases	1					4					
Actuated Green, G (s)	23.4	23.4		1.6	46.8	46.8	3.2	48.4		30.6	
Effective Green, g (s)	23.4	23.4		1.6	46.8	46.8	3.2	48.4		30.6	
Actuated g/C Ratio	0.19	0.19		0.01	0.39	0.39	0.03	0.40		0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	313	627		45	1983	617	91	2035		710	
v/s Ratio Prot				0.00	0.11		c0.02	c0.36		c0.24	
v/s Ratio Perm	0.06	0.19				0.23					
v/c Ratio	0.31	0.97		0.36	0.28	0.59	0.80	0.90		0.95	
Uniform Delay, d1	41.4	47.9		58.7	25.1	29.0	58.1	33.5		43.9	
Progression Factor	1.00	1.00		0.66	1.78	6.48	1.32	0.31		1.00	
Incremental Delay, d2	0.6	27.9		3.5	0.3	3.1	24.4	4.1		21.9	
Delay (s)	42.0	75.9		42.3	44.8	191.4	101.3	14.4		65.8	
Level of Service	D	E		D	D	F	F	B		E	
Approach Delay (s)		71.5			127.4			17.8			
Approach LOS		E			F			B			

Intersection Summary			
HCM 2000 Control Delay	64.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	170		0
Storage Lanes	0		0	0		0	0		0	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.91	0.91	0.97	0.91	1.00
Ped Bike Factor												
Frt		0.983						0.995				
Flt Protected		0.983								0.950		
Satd. Flow (prot)	0	3420	0	0	0	0	0	5060	0	3433	5085	0
Flt Permitted		0.983								0.950		
Satd. Flow (perm)	0	3420	0	0	0	0	0	5060	0	3433	5085	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10						5				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		633			1129			308			468	
Travel Time (s)		14.4			25.7			7.0			10.6	

Intersection Summary	
Area Type:	Other



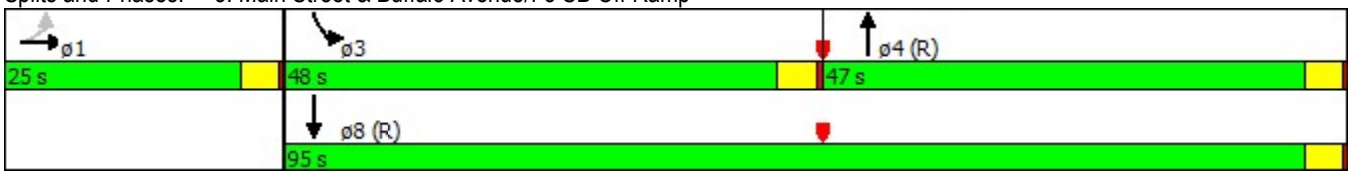
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	119	182	39	0	0	0	0	1104	39	805	1610	0
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	128	196	42	0	0	0	0	1187	42	866	1731	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	366	0	0	0	0	0	1229	0	866	1731	0

Intersection Summary

Lane Group	EBT	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	182	1104	805	1610
Turn Type	NA	NA	Prot	NA
Protected Phases	1	4	3	8
Permitted Phases				
Detector Phase	1	4	3	8
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0
Total Split (s)	25.0	47.0	48.0	95.0
Total Split (%)	20.8%	39.2%	40.0%	79.2%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?				
Recall Mode	None	C-Max	Max	C-Max
Act Effct Green (s)	17.4	43.0	47.6	94.6
Actuated g/C Ratio	0.14	0.36	0.40	0.79
v/c Ratio	0.72	0.68	0.64	0.43
Control Delay	56.1	34.8	26.2	1.4
Queue Delay	7.9	0.1	0.8	0.4
Total Delay	63.9	34.8	27.0	1.7
LOS	E	C	C	A
Approach Delay	63.9	34.8		10.2
Approach LOS	E	C		B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 95 (79%), Referenced to phase 4:NBT and 8:SBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 22.1	Intersection LOS: C
Intersection Capacity Utilization 64.9%	ICU Level of Service C
Analysis Period (min) 15	

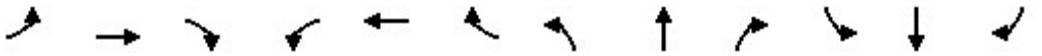
Splits and Phases: 3: Main Street & Buffalo Avenue/I-5 SB Off Ramp



Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	366	1229	866	1731
v/c Ratio	0.72	0.68	0.64	0.43
Control Delay	56.1	34.8	26.2	1.4
Queue Delay	7.9	0.1	0.8	0.4
Total Delay	63.9	34.8	27.0	1.7
Queue Length 50th (ft)	140	292	221	39
Queue Length 95th (ft)	187	345	m228	m45
Internal Link Dist (ft)	553	228		388
Turn Bay Length (ft)			170	
Base Capacity (vph)	606	1816	1360	4006
Starvation Cap Reductn	0	0	220	1509
Spillback Cap Reductn	196	43	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.89	0.69	0.76	0.69

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	119	182	39	0	0	0	0	1104	39	805	1610	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0		4.0	4.0	
Lane Util. Factor		0.95						0.91		0.97	0.91	
Frt		0.98						0.99		1.00	1.00	
Flt Protected		0.98						1.00		0.95	1.00	
Satd. Flow (prot)		3419						5059		3433	5085	
Flt Permitted		0.98						1.00		0.95	1.00	
Satd. Flow (perm)		3419						5059		3433	5085	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	128	196	42	0	0	0	0	1187	42	866	1731	0
RTOR Reduction (vph)	0	9	0	0	0	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	357	0	0	0	0	0	1226	0	866	1731	0
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		1						4		3	8	
Permitted Phases	1											
Actuated Green, G (s)		17.4						43.0		47.6	94.6	
Effective Green, g (s)		17.4						43.0		47.6	94.6	
Actuated g/C Ratio		0.14						0.36		0.40	0.79	
Clearance Time (s)		4.0						4.0		4.0	4.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		495						1812		1361	4008	
v/s Ratio Prot								c0.24		c0.25	0.34	
v/s Ratio Perm		0.10										
v/c Ratio		0.72						0.68		0.64	0.43	
Uniform Delay, d1		49.0						32.6		29.2	4.1	
Progression Factor		1.00						1.00		0.84	0.28	
Incremental Delay, d2		5.2						2.0		1.0	0.2	
Delay (s)		54.1						34.7		25.5	1.3	
Level of Service		D						C		C	A	
Approach Delay (s)		54.1			0.0			34.7			9.4	
Approach LOS		D			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

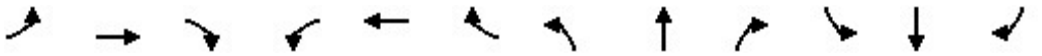
2129 NORTH MAIN ST TIA (JN:0016-2016-01)
OPENING YEAR CONDITION
AM PEAK HOUR

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #4 Main Street / 17th Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.865
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	70	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2 0	2 0	1	2 0	1 1	0	2 0	2 1	0	2 0	2 1	0
Volume Module:												
Base Vol:	149	747	172	169	1092	85	133	1083	76	311	1171	37
Growth Adj:	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Initial Bse:	150	754	174	171	1103	86	134	1094	77	314	1183	37
Added Vol:	27	84	27	23	174	24	4	53	46	46	60	-2
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	177	838	201	194	1277	110	138	1147	123	360	1243	35
User 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
PHF 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
PHF Volume:	177	838	201	194	1277	110	138	1147	123	360	1243	35
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	177	838	201	194	1277	110	138	1147	123	360	1243	35
PCE 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
MLF 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
FinalVolume:	177	838	201	194	1277	110	138	1147	123	360	1243	35
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	1.84	0.16	2.00	2.71	0.29	2.00	2.92	0.08
Final Sat.:	3400	3400	1700	3400	3131	269	3400	4607	493	3400	4959	141
Capacity Analysis Module:												
Vol/Sat:	0.05	0.25	0.12	0.06	0.41	0.41	0.04	0.25	0.25	0.11	0.25	0.25
Crit Moves:	****			****			****			****		

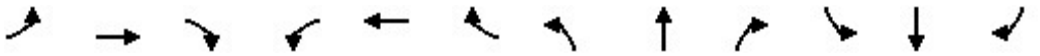


Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0			0		60	170		0			130
Storage Lanes	0			0		1	2		0			1
Taper Length (ft)	25			25			25					
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	1.00
Ped Bike Factor												
Frt			0.850			0.850		0.987				0.850
Flt Protected		0.963			0.962		0.950			0.950		
Satd. Flow (prot)	0	1794	1583	0	1792	1583	3433	5019	0	1770	5085	1583
Flt Permitted		0.589			0.736		0.950			0.950		
Satd. Flow (perm)	0	1097	1583	0	1371	1583	3433	5019	0	1770	5085	1583
Right Turn on Red			Yes			Yes						Yes
Satd. Flow (RTOR)			88			106						82
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		916			717			903			1485	
Travel Time (s)		20.8			16.3			20.5			33.8	

Intersection Summary	
Area Type:	Other

Lane Group	NWR	NWR2
Lane Configurations		
Ideal Flow (vphpl)	1900	1900
Lane Width (ft)	12	12
Grade (%)		
Storage Length (ft)	500	
Storage Lanes	1	
Taper Length (ft)		
Lane Util. Factor	0.88	1.00
Ped Bike Factor		
Frt	0.850	
Flt Protected		
Satd. Flow (prot)	2787	0
Flt Permitted		
Satd. Flow (perm)	2787	0
Right Turn on Red		No
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		

Intersection Summary



Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Volume (vph)	38	11	82	98	26	110	272	989	94	101	1361	115
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	41	12	88	105	28	118	292	1063	101	109	1463	124
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	53	88	0	133	118	292	1164	0	109	1463	124

Intersection Summary

Lane Group	NWR	NWR2
Volume (vph)	420	10
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor	0.93	0.93
Growth Factor	100%	100%
Heavy Vehicles (%)	2%	2%
Bus Blockages (#/hr)	0	0
Parking (#/hr)		
Mid-Block Traffic (%)		
Adj. Flow (vph)	452	11
Shared Lane Traffic (%)		
Lane Group Flow (vph)	463	0

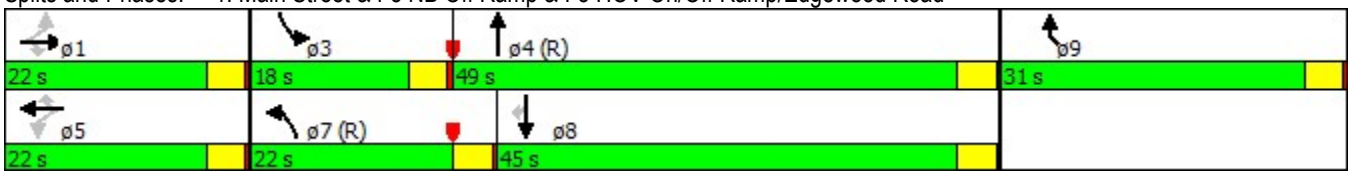
Intersection Summary

Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	SBL2	SBT	SBR	NWR
Lane Configurations												
Volume (vph)	38	11	82	98	26	110	272	989	101	1361	115	420
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA	Perm	Prot
Protected Phases		1			5		7	4	3	8		9
Permitted Phases	1		1	5		5					8	
Detector Phase	1	1	1	5	5	5	7	4	3	8	8	9
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	20.0	8.0	20.0	20.0	8.0
Total Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	49.0	18.0	45.0	45.0	31.0
Total Split (%)	18.3%	18.3%	18.3%	18.3%	18.3%	18.3%	18.3%	40.8%	15.0%	37.5%	37.5%	25.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag							Lead	Lag	Lead	Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	Max	Max	None
Act Effct Green (s)		15.5	15.5		15.5	15.5	23.5	52.7	11.8	41.0	41.0	24.0
Actuated g/C Ratio		0.13	0.13		0.13	0.13	0.20	0.44	0.10	0.34	0.34	0.20
v/c Ratio		0.38	0.31		0.76	0.40	0.43	0.53	0.63	0.84	0.21	0.83
Control Delay		54.7	12.4		75.8	15.0	51.6	38.1	67.5	42.0	11.8	59.3
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		54.7	12.4		75.8	15.0	51.6	38.1	67.5	42.0	11.8	59.3
LOS		D	B		E	B	D	D	E	D	B	E
Approach Delay		28.3			47.2			40.8		41.4		
Approach LOS		C			D			D		D		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 78 (65%), Referenced to phase 4:NBT and 7:NBL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 43.2 Intersection LOS: D
Intersection Capacity Utilization 68.6% ICU Level of Service C
Analysis Period (min) 15

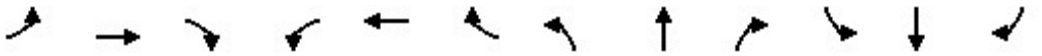
Splits and Phases: 1: Main Street & I-5 NB Off Ramp & I-5 HOV On/Off Ramp/Edgewood Road



Lane Group	EBT	EBR2	WBT	WBR	NBL	NBT	SBL2	SBT	SBR	NWR
Lane Group Flow (vph)	53	88	133	118	292	1164	109	1463	124	463
v/c Ratio	0.38	0.31	0.76	0.40	0.43	0.53	0.63	0.84	0.21	0.83
Control Delay	54.7	12.4	75.8	15.0	51.6	38.1	67.5	42.0	11.8	59.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.7	12.4	75.8	15.0	51.6	38.1	67.5	42.0	11.8	59.3
Queue Length 50th (ft)	38	0	99	8	119	270	82	381	22	194
Queue Length 95th (ft)	79	47	#178	62	m165	m314	142	444	66	257
Internal Link Dist (ft)	836		637			823		1405		
Turn Bay Length (ft)		150		60	170		150		130	500
Base Capacity (vph)	164	312	205	327	672	2203	206	1737	594	627
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.28	0.65	0.36	0.43	0.53	0.53	0.84	0.21	0.74

Intersection Summary

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.



Movement	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Lane Configurations												
Volume (vph)	38	11	82	98	26	110	272	989	94	101	1361	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	0.97	0.91		1.00	0.91	1.00
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1793	1583		1792	1583	3433	5019		1770	5085	1583
Flt Permitted		0.59	1.00		0.74	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1097	1583		1370	1583	3433	5019		1770	5085	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	41	12	88	105	28	118	292	1063	101	109	1463	124
RTOR Reduction (vph)	0	0	77	0	0	92	0	0	0	0	0	54
Lane Group Flow (vph)	0	53	11	0	133	26	292	1164	0	109	1463	70
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases		1			5		7	4		3	8	
Permitted Phases	1		1	5		5						8
Actuated Green, G (s)		15.5	15.5		15.5	15.5	23.5	52.7		11.8	41.0	41.0
Effective Green, g (s)		15.5	15.5		15.5	15.5	23.5	52.7		11.8	41.0	41.0
Actuated g/C Ratio		0.13	0.13		0.13	0.13	0.20	0.44		0.10	0.34	0.34
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		141	204		176	204	672	2204		174	1737	540
v/s Ratio Prot							0.09	c0.23		c0.06	c0.29	
v/s Ratio Perm		0.05	0.01		c0.10	0.02						0.04
v/c Ratio		0.38	0.06		0.76	0.13	0.43	0.53		0.63	0.84	0.13
Uniform Delay, d1		47.8	45.8		50.4	46.3	42.4	24.6		52.0	36.5	27.2
Progression Factor		1.00	1.00		1.00	1.00	1.12	1.43		1.00	1.00	1.00
Incremental Delay, d2		1.7	0.1		16.7	0.3	1.7	0.7		6.9	5.2	0.5
Delay (s)		49.5	45.9		67.2	46.5	49.4	35.8		58.8	41.7	27.7
Level of Service		D	D		E	D	D	D		E	D	C
Approach Delay (s)		47.3			57.5			38.5			41.8	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	43.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NWR	NWR2
Lane Configurations		
Volume (vph)	420	10
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	
Lane Util. Factor	0.88	
Frt	0.85	
Flt Protected	1.00	
Satd. Flow (prot)	2787	
Flt Permitted	1.00	
Satd. Flow (perm)	2787	
Peak-hour factor, PHF	0.93	0.93
Adj. Flow (vph)	452	11
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	463	0
Turn Type	Prot	
Protected Phases	9	
Permitted Phases		
Actuated Green, G (s)	24.0	
Effective Green, g (s)	24.0	
Actuated g/C Ratio	0.20	
Clearance Time (s)	4.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	557	
v/s Ratio Prot	c0.17	
v/s Ratio Perm		
v/c Ratio	0.83	
Uniform Delay, d1	46.1	
Progression Factor	1.00	
Incremental Delay, d2	10.2	
Delay (s)	56.3	
Level of Service	E	
Approach Delay (s)		
Approach LOS		

Intersection Summary

Lane Group	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			
Storage Length (ft)	0		0			300	450		0	600	
Storage Lanes	1		0			1	2		0	1	
Taper Length (ft)	25						25				
Lane Util. Factor	0.91	0.91	0.95	0.97	0.91	1.00	0.97	0.91	0.91	0.88	1.00
Ped Bike Factor											
Frt		0.967				0.850		0.993		0.850	
Flt Protected	0.950	0.998		0.950			0.950				
Satd. Flow (prot)	1610	3272	0	3433	5085	1583	3433	5050	0	2787	0
Flt Permitted	0.950	0.998		0.950			0.950				
Satd. Flow (perm)	1610	3272	0	3433	5085	1583	3433	5050	0	2787	0
Right Turn on Red			Yes			Yes					No
Satd. Flow (RTOR)		26				453					
Link Speed (mph)		30			30			30			
Link Distance (ft)		645			468			903			
Travel Time (s)		14.7			10.6			20.5			

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Volume (vph)	238	484	144	13	1103	739	150	1342	70	369	13
Confl. Peds. (#/hr)											
Confl. Bikes (#/hr)											
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)											
Mid-Block Traffic (%)		0%			0%			0%			
Adj. Flow (vph)	262	532	158	14	1212	812	165	1475	77	405	14
Shared Lane Traffic (%)	10%										
Lane Group Flow (vph)	236	716	0	14	1212	812	165	1552	0	419	0

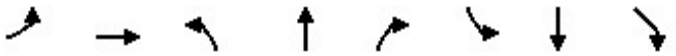
Intersection Summary

Lane Group	EBL	EBT	NBL2	NBT	NBR	SBL	SBT	SER
Lane Configurations								
Volume (vph)	238	484	13	1103	739	150	1342	369
Turn Type	Perm	NA	Prot	NA	Perm	Prot	NA	Prot
Protected Phases		1	7	4		3	8	9
Permitted Phases	1				4			
Detector Phase	1	1	7	4	4	3	8	9
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	8.0	20.0	20.0	8.0	20.0	8.0
Total Split (s)	31.0	31.0	8.0	55.0	55.0	10.0	57.0	24.0
Total Split (%)	25.8%	25.8%	6.7%	45.8%	45.8%	8.3%	47.5%	20.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
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	Lag	Lead	Lag	
Lead-Lag Optimize?								
Recall Mode	None	None	None	C-Max	C-Max	None	C-Max	None
Act Effct Green (s)	27.2	27.2	4.1	51.0	51.0	6.1	57.9	19.7
Actuated g/C Ratio	0.23	0.23	0.03	0.42	0.42	0.05	0.48	0.16
v/c Ratio	0.65	0.94	0.12	0.56	0.87	0.95	0.64	0.92
Control Delay	51.6	65.4	81.7	9.6	15.7	118.8	4.1	75.2
Queue Delay	0.0	0.0	0.0	0.3	30.1	0.0	0.0	0.0
Total Delay	51.6	65.4	81.7	9.8	45.8	118.8	4.1	75.2
LOS	D	E	F	A	D	F	A	E
Approach Delay		62.0		24.6			15.1	
Approach LOS		E		C			B	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 94 (78%), Referenced to phase 4:NBT and 8:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 32.5 Intersection LOS: C
Intersection Capacity Utilization 76.6% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 2: Main Street & Santa Clara Avenue/I-5 NB On Ramp & I-5 SB Off Ramp



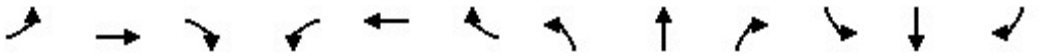
Lane Group	EBL	EBT	NBL2	NBT	NBR	SBL	SBT	SER
Lane Group Flow (vph)	236	716	14	1212	812	165	1552	419
v/c Ratio	0.65	0.94	0.12	0.56	0.87	0.95	0.64	0.92
Control Delay	51.6	65.4	81.7	9.6	15.7	118.8	4.1	75.2
Queue Delay	0.0	0.0	0.0	0.3	30.1	0.0	0.0	0.0
Total Delay	51.6	65.4	81.7	9.8	45.8	118.8	4.1	75.2
Queue Length 50th (ft)	183	292	6	58	138	70	48	182
Queue Length 95th (ft)	283	#419	m6	67	m159	m#101	62	#284
Internal Link Dist (ft)		565		388			823	
Turn Bay Length (ft)			70		300	450		600
Base Capacity (vph)	364	761	117	2161	933	174	2436	464
Starvation Cap Reductn	0	0	0	344	162	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.94	0.12	0.67	1.05	0.95	0.64	0.90

Intersection Summary

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.

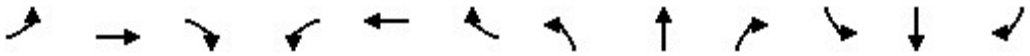
Movement	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Lane Configurations											
Volume (vph)	238	484	144	13	1103	739	150	1342	70	369	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor	0.91	0.91		0.97	0.91	1.00	0.97	0.91		0.88	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.99		0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		1.00	
Satd. Flow (prot)	1610	3272		3433	5085	1583	3433	5047		2787	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		1.00	
Satd. Flow (perm)	1610	3272		3433	5085	1583	3433	5047		2787	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	262	532	158	14	1212	812	165	1475	77	405	14
RTOR Reduction (vph)	0	20	0	0	0	260	0	0	0	0	0
Lane Group Flow (vph)	236	696	0	14	1212	552	165	1552	0	419	0
Turn Type	Perm	NA		Prot	NA	Perm	Prot	NA		Prot	
Protected Phases		1		7	4		3	8		9	
Permitted Phases	1					4					
Actuated Green, G (s)	27.2	27.2		1.6	51.0	51.0	6.1	55.5		19.7	
Effective Green, g (s)	27.2	27.2		1.6	51.0	51.0	6.1	55.5		19.7	
Actuated g/C Ratio	0.23	0.23		0.01	0.42	0.42	0.05	0.46		0.16	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	364	741		45	2161	672	174	2334		457	
v/s Ratio Prot				0.00	0.24		c0.05	0.31		c0.15	
v/s Ratio Perm	0.15	0.21				c0.35					
v/c Ratio	0.65	0.94		0.31	0.56	0.82	0.95	0.66		0.92	
Uniform Delay, d1	42.1	45.6		58.7	26.0	30.5	56.8	25.0		49.3	
Progression Factor	1.00	1.00		1.43	0.34	0.68	1.41	0.14		1.00	
Incremental Delay, d2	3.9	19.5		1.9	0.5	5.6	39.1	0.9		23.0	
Delay (s)	46.0	65.0		85.7	9.5	26.3	119.1	4.4		72.4	
Level of Service	D	E		F	A	C	F	A		E	
Approach Delay (s)		60.3			16.7			15.4			
Approach LOS		E			B			B			

Intersection Summary			
HCM 2000 Control Delay	28.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	170		0
Storage Lanes	0		0	0		0	0		0	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.91	0.91	0.97	0.91	1.00
Ped Bike Factor												
Frt		0.975						0.997				
Flt Protected		0.973								0.950		
Satd. Flow (prot)	0	3358	0	0	0	0	0	5070	0	3433	5085	0
Flt Permitted		0.973								0.950		
Satd. Flow (perm)	0	3358	0	0	0	0	0	5070	0	3433	5085	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18						3				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		633			1129			308			468	
Travel Time (s)		14.4			25.7			7.0			10.6	

Intersection Summary	
Area Type:	Other



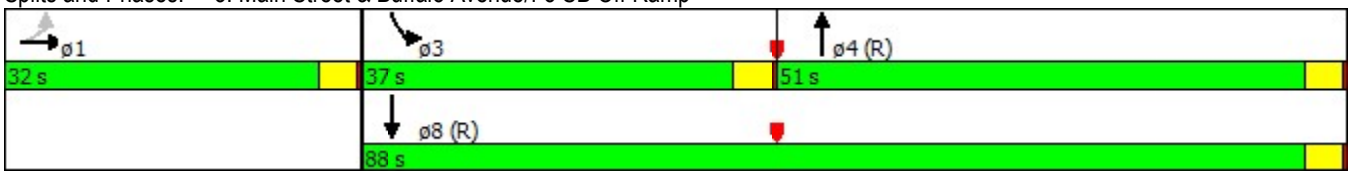
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	303	156	91	0	0	0	0	1590	34	663	1247	0
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	326	168	98	0	0	0	0	1710	37	713	1341	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	592	0	0	0	0	0	1747	0	713	1341	0

Intersection Summary

Lane Group	EBT	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	156	1590	663	1247
Turn Type	NA	NA	Prot	NA
Protected Phases	1	4	3	8
Permitted Phases				
Detector Phase	1	4	3	8
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0
Total Split (s)	32.0	51.0	37.0	88.0
Total Split (%)	26.7%	42.5%	30.8%	73.3%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?				
Recall Mode	None	C-Max	Max	C-Max
Act Effct Green (s)	25.3	47.0	35.7	86.7
Actuated g/C Ratio	0.21	0.39	0.30	0.72
v/c Ratio	0.82	0.88	0.70	0.36
Control Delay	53.8	40.1	44.7	10.0
Queue Delay	0.0	0.0	0.4	0.2
Total Delay	53.8	40.1	45.1	10.2
LOS	D	D	D	B
Approach Delay	53.8	40.1		22.3
Approach LOS	D	D		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 87 (73%), Referenced to phase 4:NBT and 8:SBT, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 33.6	Intersection LOS: C
Intersection Capacity Utilization 77.2%	ICU Level of Service D
Analysis Period (min) 15	

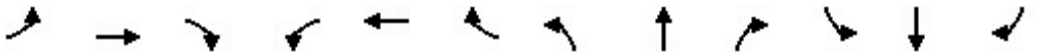
Splits and Phases: 3: Main Street & Buffalo Avenue/I-5 SB Off Ramp



Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	592	1747	713	1341
v/c Ratio	0.82	0.88	0.70	0.36
Control Delay	53.8	40.1	44.7	10.0
Queue Delay	0.0	0.0	0.4	0.2
Total Delay	53.8	40.1	45.1	10.2
Queue Length 50th (ft)	222	453	291	180
Queue Length 95th (ft)	285	522	m349	m232
Internal Link Dist (ft)	553	228		388
Turn Bay Length (ft)			170	
Base Capacity (vph)	797	1987	1022	3675
Starvation Cap Reductn	0	0	65	1244
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.74	0.88	0.75	0.55

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	303	156	91	0	0	0	0	1590	34	663	1247	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0		4.0	4.0	
Lane Util. Factor		0.95						0.91		0.97	0.91	
Frt		0.98						1.00		1.00	1.00	
Flt Protected		0.97						1.00		0.95	1.00	
Satd. Flow (prot)		3359						5069		3433	5085	
Flt Permitted		0.97						1.00		0.95	1.00	
Satd. Flow (perm)		3359						5069		3433	5085	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	326	168	98	0	0	0	0	1710	37	713	1341	0
RTOR Reduction (vph)	0	14	0	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	578	0	0	0	0	0	1745	0	713	1341	0
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		1						4		3	8	
Permitted Phases	1											
Actuated Green, G (s)		25.3						47.0		35.7	86.7	
Effective Green, g (s)		25.3						47.0		35.7	86.7	
Actuated g/C Ratio		0.21						0.39		0.30	0.72	
Clearance Time (s)		4.0						4.0		4.0	4.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		708						1985		1021	3673	
v/s Ratio Prot								c0.34		c0.21	0.26	
v/s Ratio Perm		0.17										
v/c Ratio		0.82						0.88		0.70	0.37	
Uniform Delay, d1		45.1						33.9		37.4	6.3	
Progression Factor		1.00						1.00		1.09	1.50	
Incremental Delay, d2		7.2						5.9		2.8	0.2	
Delay (s)		52.4						39.8		43.7	9.6	
Level of Service		D						D		D	A	
Approach Delay (s)		52.4			0.0			39.8			21.4	
Approach LOS		D			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	32.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

2129 NORTH MAIN ST TIA (JN:0016-2016-01)
OPENING YEAR CONDITION
PM PEAK HOUR

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #4 Main Street / 17th Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.804
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	53	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2 0	2 0	1	2 0	1 1	0	2 0	2 1	0	2 0	2 1	0
Volume Module:												
Base Vol:	224	1049	155	197	809	140	236	1232	69	166	1025	74
Growth Adj:	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Initial Bse:	226	1059	157	199	817	141	238	1244	70	168	1035	75
Added Vol:	48	180	48	5	110	11	26	37	32	32	51	23
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	274	1239	205	204	927	152	264	1281	102	200	1086	98
User 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
PHF 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
PHF Volume:	274	1239	205	204	927	152	264	1281	102	200	1086	98
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	274	1239	205	204	927	152	264	1281	102	200	1086	98
PCE 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
MLF 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
FinalVolume:	274	1239	205	204	927	152	264	1281	102	200	1086	98
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	1.72	0.28	2.00	2.78	0.22	2.00	2.75	0.25
Final Sat.:	3400	3400	1700	3400	2920	480	3400	4725	375	3400	4679	421
Capacity Analysis Module:												
Vol/Sat:	0.08	0.36	0.12	0.06	0.32	0.32	0.08	0.27	0.27	0.06	0.23	0.23
Crit Moves:		****			****			****			****	

Appendix F

Project Completion (Year 2018) With Project
Level of Service Analysis Worksheets

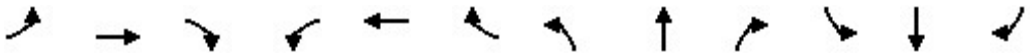
Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0			0		60	170		0			130
Storage Lanes	0			0		1	2		0			1
Taper Length (ft)	25			25			25					
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	1.00
Ped Bike Factor												
Frt			0.850			0.850		0.977				0.850
Flt Protected		0.966			0.957		0.950			0.950		
Satd. Flow (prot)	0	1799	1583	0	1783	1583	3433	4968	0	1770	5085	1583
Flt Permitted		0.797			0.733		0.950			0.950		
Satd. Flow (perm)	0	1485	1583	0	1365	1583	3433	4968	0	1770	5085	1583
Right Turn on Red			Yes			Yes						Yes
Satd. Flow (RTOR)			118			118						82
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		916			717			903			1485	
Travel Time (s)		20.8			16.3			20.5			33.8	

Intersection Summary

Area Type: Other

Lane Group	NWR	NWR2
Lane Configurations		
Ideal Flow (vphpl)	1900	1900
Lane Width (ft)	12	12
Grade (%)		
Storage Length (ft)	500	
Storage Lanes	1	
Taper Length (ft)		
Lane Util. Factor	0.88	1.00
Ped Bike Factor		
Frt	0.850	
Flt Protected		
Satd. Flow (prot)	2787	0
Flt Permitted		
Satd. Flow (perm)	2787	0
Right Turn on Red		No
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		

Intersection Summary



Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Volume (vph)	14	6	84	123	14	98	64	498	88	86	1507	19
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	15	6	90	132	15	105	69	535	95	92	1620	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	21	90	0	147	105	69	630	0	92	1620	20

Intersection Summary

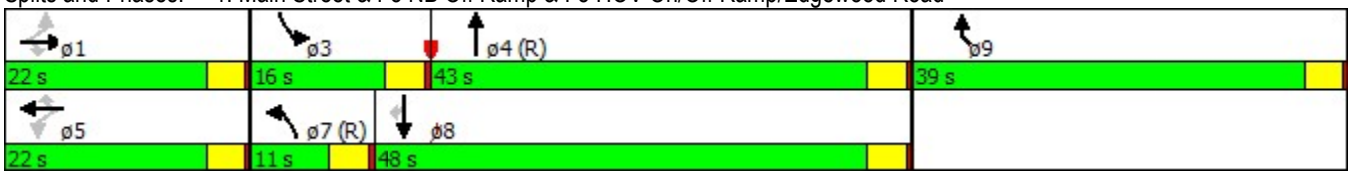
Lane Group	NWR	NWR2
Volume (vph)	603	12
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor	0.93	0.93
Growth Factor	100%	100%
Heavy Vehicles (%)	2%	2%
Bus Blockages (#/hr)	0	0
Parking (#/hr)		
Mid-Block Traffic (%)		
Adj. Flow (vph)	648	13
Shared Lane Traffic (%)		
Lane Group Flow (vph)	661	0

Intersection Summary

Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	SBL2	SBT	SBR	NWR
Lane Configurations												
Volume (vph)	14	6	84	123	14	98	64	498	86	1507	19	603
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA	Perm	Prot
Protected Phases		1			5		7	4	3	8		9
Permitted Phases	1		1	5		5					8	
Detector Phase	1	1	1	5	5	5	7	4	3	8	8	9
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	20.0	8.0	20.0	20.0	8.0
Total Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	11.0	43.0	16.0	48.0	48.0	39.0
Total Split (%)	18.3%	18.3%	18.3%	18.3%	18.3%	18.3%	9.2%	35.8%	13.3%	40.0%	40.0%	32.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag							Lead	Lag	Lead	Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	Max	Max	None
Act Effct Green (s)		16.4	16.4		16.4	16.4	11.5	45.0	10.5	44.0	44.0	32.2
Actuated g/C Ratio		0.14	0.14		0.14	0.14	0.10	0.38	0.09	0.37	0.37	0.27
v/c Ratio		0.10	0.28		0.79	0.33	0.21	0.34	0.60	0.87	0.03	0.89
Control Delay		45.5	6.1		78.7	9.2	78.4	7.0	68.6	41.5	0.1	56.7
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		45.5	6.1		78.7	9.2	78.4	7.0	68.6	41.5	0.1	56.7
LOS		D	A		E	A	E	A	E	D	A	E
Approach Delay		13.5			49.7			14.0		42.4		
Approach LOS		B			D			B		D		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 39 (33%), Referenced to phase 4:NBT and 7:NBL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 39.0	Intersection LOS: D
Intersection Capacity Utilization 65.4%	ICU Level of Service C
Analysis Period (min) 15	

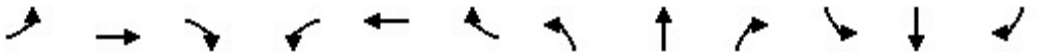
Splits and Phases: 1: Main Street & I-5 NB Off Ramp & I-5 HOV On/Off Ramp/Edgewood Road



Lane Group	EBT	EBR2	WBT	WBR	NBL	NBT	SBL2	SBT	SBR	NWR
Lane Group Flow (vph)	21	90	147	105	69	630	92	1620	20	661
v/c Ratio	0.10	0.28	0.79	0.33	0.21	0.34	0.60	0.87	0.03	0.89
Control Delay	45.5	6.1	78.7	9.2	78.4	7.0	68.6	41.5	0.1	56.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.5	6.1	78.7	9.2	78.4	7.0	68.6	41.5	0.1	56.7
Queue Length 50th (ft)	14	0	109	0	29	16	69	423	0	275
Queue Length 95th (ft)	39	27	#206	41	m55	m68	125	490	0	352
Internal Link Dist (ft)	836		637			823		1405		
Turn Bay Length (ft)		150		60	170		150		130	500
Base Capacity (vph)	224	339	206	339	328	1863	177	1864	632	812
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.27	0.71	0.31	0.21	0.34	0.52	0.87	0.03	0.81

Intersection Summary

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.



Movement	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Lane Configurations												
Volume (vph)	14	6	84	123	14	98	64	498	88	86	1507	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	0.97	0.91		1.00	0.91	1.00
Frt		1.00	0.85		1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected		0.97	1.00		0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1799	1583		1783	1583	3433	4970		1770	5085	1583
Flt Permitted		0.80	1.00		0.73	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1485	1583		1365	1583	3433	4970		1770	5085	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	15	6	90	132	15	105	69	535	95	92	1620	20
RTOR Reduction (vph)	0	0	78	0	0	91	0	0	0	0	0	13
Lane Group Flow (vph)	0	21	12	0	147	14	69	630	0	92	1620	7
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases		1			5		7	4		3	8	
Permitted Phases	1		1	5		5						8
Actuated Green, G (s)		16.4	16.4		16.4	16.4	11.4	44.9		10.5	44.0	44.0
Effective Green, g (s)		16.4	16.4		16.4	16.4	11.4	44.9		10.5	44.0	44.0
Actuated g/C Ratio		0.14	0.14		0.14	0.14	0.10	0.37		0.09	0.37	0.37
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		202	216		186	216	326	1859		154	1864	580
v/s Ratio Prot							0.02	0.13		c0.05	c0.32	
v/s Ratio Perm		0.01	0.01		c0.11	0.01						0.00
v/c Ratio		0.10	0.06		0.79	0.07	0.21	0.34		0.60	0.87	0.01
Uniform Delay, d1		45.4	45.1		50.1	45.1	50.1	26.9		52.7	35.3	24.2
Progression Factor		1.00	1.00		1.00	1.00	1.44	0.23		1.00	1.00	1.00
Incremental Delay, d2		0.2	0.1		20.0	0.1	1.4	0.5		6.1	5.8	0.0
Delay (s)		45.6	45.2		70.2	45.3	73.8	6.6		58.8	41.2	24.2
Level of Service		D	D		E	D	E	A		E	D	C
Approach Delay (s)		45.3			59.8			13.3			41.9	
Approach LOS		D			E			B			D	

Intersection Summary			
HCM 2000 Control Delay	39.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NWR	NWR2
Lane Configurations		
Volume (vph)	603	12
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	
Lane Util. Factor	0.88	
Frt	0.85	
Flt Protected	1.00	
Satd. Flow (prot)	2787	
Flt Permitted	1.00	
Satd. Flow (perm)	2787	
Peak-hour factor, PHF	0.93	0.93
Adj. Flow (vph)	648	13
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	661	0
Turn Type	Prot	
Protected Phases	9	
Permitted Phases		
Actuated Green, G (s)	32.2	
Effective Green, g (s)	32.2	
Actuated g/C Ratio	0.27	
Clearance Time (s)	4.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	747	
v/s Ratio Prot	c0.24	
v/s Ratio Perm		
v/c Ratio	0.88	
Uniform Delay, d1	42.1	
Progression Factor	1.00	
Incremental Delay, d2	12.1	
Delay (s)	54.2	
Level of Service	D	
Approach Delay (s)		
Approach LOS		

Intersection Summary

Lane Group	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			
Storage Length (ft)	0		0			300	450		0	600	
Storage Lanes	1		0			1	2		0	1	
Taper Length (ft)	25						25				
Lane Util. Factor	0.91	0.91	0.95	0.97	0.91	1.00	0.97	0.91	0.91	0.88	1.00
Ped Bike Factor											
Frt		0.949				0.850		0.993		0.850	
Flt Protected	0.950	0.999		0.950			0.950				
Satd. Flow (prot)	1610	3214	0	3433	5085	1583	3433	5050	0	2787	0
Flt Permitted	0.950	0.999		0.950			0.950				
Satd. Flow (perm)	1610	3214	0	3433	5085	1583	3433	5050	0	2787	0
Right Turn on Red			Yes			Yes					No
Satd. Flow (RTOR)		58				608					
Link Speed (mph)		30			30			30			
Link Distance (ft)		645			468			903			
Travel Time (s)		14.7			10.6			20.5			

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Volume (vph)	99	385	201	15	509	685	66	1599	83	602	30
Confl. Peds. (#/hr)											
Confl. Bikes (#/hr)											
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)											
Mid-Block Traffic (%)		0%			0%			0%			
Adj. Flow (vph)	109	423	221	16	559	753	73	1757	91	662	33
Shared Lane Traffic (%)	10%										
Lane Group Flow (vph)	98	655	0	16	559	753	73	1848	0	695	0

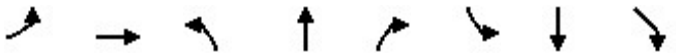
Intersection Summary

Lane Group	EBL	EBT	NBL2	NBT	NBR	SBL	SBT	SER
Lane Configurations								
Volume (vph)	99	385	15	509	685	66	1599	602
Turn Type	Perm	NA	Prot	NA	Perm	Prot	NA	Prot
Protected Phases		1	7	4		3	8	9
Permitted Phases	1				4			
Detector Phase	1	1	7	4	4	3	8	9
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	8.0	20.0	20.0	8.0	20.0	8.0
Total Split (s)	26.0	26.0	8.0	52.0	52.0	8.0	52.0	34.0
Total Split (%)	21.7%	21.7%	6.7%	43.3%	43.3%	6.7%	43.3%	28.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
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	Lag	Lead	Lag	
Lead-Lag Optimize?								
Recall Mode	None	None	None	C-Max	C-Max	None	C-Max	None
Act Effct Green (s)	22.0	22.0	4.0	49.6	49.6	4.0	52.8	30.0
Actuated g/C Ratio	0.18	0.18	0.03	0.41	0.41	0.03	0.44	0.25
v/c Ratio	0.33	1.03	0.14	0.27	0.74	0.64	0.83	1.00
Control Delay	46.3	87.4	39.1	45.5	42.0	90.2	11.2	79.0
Queue Delay	0.0	0.0	0.0	0.0	19.6	0.0	0.0	0.0
Total Delay	46.3	87.4	39.1	45.5	61.6	90.2	11.2	79.0
LOS	D	F	D	D	E	F	B	E
Approach Delay		82.0		54.6			14.2	
Approach LOS		F		D			B	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 44 (37%), Referenced to phase 4:NBT and 8:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.03
Intersection Signal Delay: 46.1 Intersection LOS: D
Intersection Capacity Utilization 78.2% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 2: Main Street & Santa Clara Avenue/I-5 NB On Ramp & I-5 SB Off Ramp



Lane Group	EBL	EBT	NBL2	NBT	NBR	SBL	SBT	SER
Lane Group Flow (vph)	98	655	16	559	753	73	1848	695
v/c Ratio	0.33	1.03	0.14	0.27	0.74	0.64	0.83	1.00
Control Delay	46.3	87.4	39.1	45.5	42.0	90.2	11.2	79.0
Queue Delay	0.0	0.0	0.0	0.0	19.6	0.0	0.0	0.0
Total Delay	46.3	87.4	39.1	45.5	61.6	90.2	11.2	79.0
Queue Length 50th (ft)	73	~276	6	169	444	30	91	306
Queue Length 95th (ft)	131	#404	m9	212	568	m37	156	#450
Internal Link Dist (ft)		565		388			823	
Turn Bay Length (ft)			70		300	450		600
Base Capacity (vph)	295	636	114	2102	1011	114	2222	696
Starvation Cap Reductn	0	0	0	0	267	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	1.03	0.14	0.27	1.01	0.64	0.83	1.00

Intersection Summary

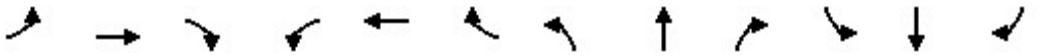
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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.

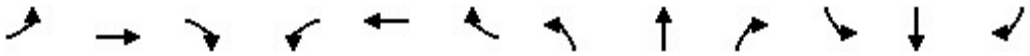
Movement	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Lane Configurations											
Volume (vph)	99	385	201	15	509	685	66	1599	83	602	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor	0.91	0.91		0.97	0.91	1.00	0.97	0.91		0.88	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.99		0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		1.00	
Satd. Flow (prot)	1610	3216		3433	5085	1583	3433	5048		2787	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		1.00	
Satd. Flow (perm)	1610	3216		3433	5085	1583	3433	5048		2787	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	109	423	221	16	559	753	73	1757	91	662	33
RTOR Reduction (vph)	0	47	0	0	0	361	0	0	0	0	0
Lane Group Flow (vph)	98	608	0	16	559	392	73	1848	0	695	0
Turn Type	Perm	NA		Prot	NA	Perm	Prot	NA		Prot	
Protected Phases		1		7	4		3	8		9	
Permitted Phases	1					4					
Actuated Green, G (s)	22.0	22.0		1.6	48.8	48.8	3.2	50.4		30.0	
Effective Green, g (s)	22.0	22.0		1.6	48.8	48.8	3.2	50.4		30.0	
Actuated g/C Ratio	0.18	0.18		0.01	0.41	0.41	0.03	0.42		0.25	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	295	589		45	2067	643	91	2120		696	
v/s Ratio Prot				0.00	0.11		c0.02	c0.37		c0.25	
v/s Ratio Perm	0.06	0.19				0.25					
v/c Ratio	0.33	1.03		0.36	0.27	0.61	0.80	0.87		1.00	
Uniform Delay, d1	42.6	49.0		58.7	23.7	28.1	58.1	31.8		45.0	
Progression Factor	1.00	1.00		0.66	1.91	6.39	1.32	0.27		1.00	
Incremental Delay, d2	0.7	45.5		3.5	0.2	3.1	24.8	3.2		33.5	
Delay (s)	43.3	94.5		42.1	45.6	182.5	101.6	11.8		78.5	
Level of Service	D	F		D	D	F	F	B		E	
Approach Delay (s)		87.8			123.2			15.2			
Approach LOS		F			F			B			

Intersection Summary			
HCM 2000 Control Delay	66.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	170		0
Storage Lanes	0		0	0		0	0		0	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.91	0.91	0.97	0.91	1.00
Ped Bike Factor												
Frt		0.983						0.994				
Flt Protected		0.983								0.950		
Satd. Flow (prot)	0	3420	0	0	0	0	0	5055	0	3433	5085	0
Flt Permitted		0.983								0.950		
Satd. Flow (perm)	0	3420	0	0	0	0	0	5055	0	3433	5085	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10						6				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		633			1129			308			468	
Travel Time (s)		14.4			25.7			7.0			10.6	

Intersection Summary	
Area Type:	Other



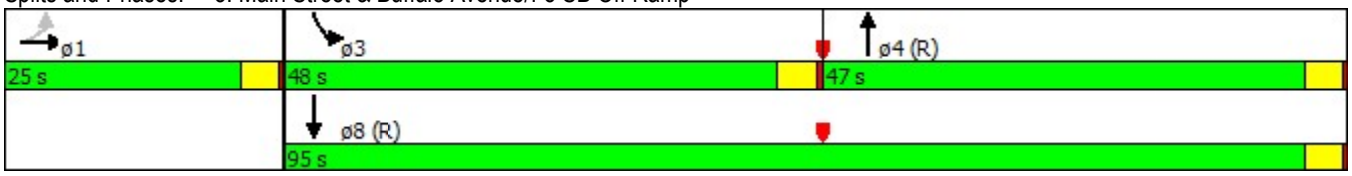
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	119	182	39	0	0	0	0	1121	48	805	1648	0
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	128	196	42	0	0	0	0	1205	52	866	1772	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	366	0	0	0	0	0	1257	0	866	1772	0

Intersection Summary

Lane Group	EBT	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	182	1121	805	1648
Turn Type	NA	NA	Prot	NA
Protected Phases	1	4	3	8
Permitted Phases				
Detector Phase	1	4	3	8
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0
Total Split (s)	25.0	47.0	48.0	95.0
Total Split (%)	20.8%	39.2%	40.0%	79.2%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?				
Recall Mode	None	C-Max	Max	C-Max
Act Effct Green (s)	17.4	43.0	47.6	94.6
Actuated g/C Ratio	0.14	0.36	0.40	0.79
v/c Ratio	0.72	0.69	0.64	0.44
Control Delay	56.1	35.1	28.0	1.2
Queue Delay	8.4	0.1	0.8	0.4
Total Delay	64.5	35.2	28.8	1.6
LOS	E	D	C	A
Approach Delay	64.5	35.2		10.5
Approach LOS	E	D		B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 94 (78%), Referenced to phase 4:NBT and 8:SBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 22.4	Intersection LOS: C
Intersection Capacity Utilization 65.4%	ICU Level of Service C
Analysis Period (min) 15	

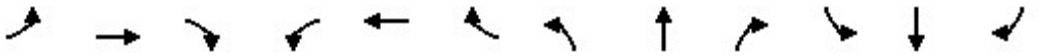
Splits and Phases: 3: Main Street & Buffalo Avenue/I-5 SB Off Ramp



Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	366	1257	866	1772
v/c Ratio	0.72	0.69	0.64	0.44
Control Delay	56.1	35.1	28.0	1.2
Queue Delay	8.4	0.1	0.8	0.4
Total Delay	64.5	35.2	28.8	1.6
Queue Length 50th (ft)	140	300	228	36
Queue Length 95th (ft)	187	354	m238	m44
Internal Link Dist (ft)	553	228		388
Turn Bay Length (ft)			170	
Base Capacity (vph)	606	1815	1360	4006
Starvation Cap Reductn	0	0	223	1434
Spillback Cap Reductn	199	65	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.90	0.72	0.76	0.69

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	119	182	39	0	0	0	0	1121	48	805	1648	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0		4.0	4.0	
Lane Util. Factor		0.95						0.91		0.97	0.91	
Frt		0.98						0.99		1.00	1.00	
Flt Protected		0.98						1.00		0.95	1.00	
Satd. Flow (prot)		3419						5054		3433	5085	
Flt Permitted		0.98						1.00		0.95	1.00	
Satd. Flow (perm)		3419						5054		3433	5085	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	128	196	42	0	0	0	0	1205	52	866	1772	0
RTOR Reduction (vph)	0	9	0	0	0	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	357	0	0	0	0	0	1253	0	866	1772	0
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		1						4		3	8	
Permitted Phases	1											
Actuated Green, G (s)		17.4						43.0		47.6	94.6	
Effective Green, g (s)		17.4						43.0		47.6	94.6	
Actuated g/C Ratio		0.14						0.36		0.40	0.79	
Clearance Time (s)		4.0						4.0		4.0	4.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		495						1811		1361	4008	
v/s Ratio Prot								c0.25		c0.25	0.35	
v/s Ratio Perm		0.10										
v/c Ratio		0.72						0.69		0.64	0.44	
Uniform Delay, d1		49.0						32.8		29.2	4.1	
Progression Factor		1.00						1.00		0.90	0.24	
Incremental Delay, d2		5.2						2.2		1.0	0.2	
Delay (s)		54.1						35.0		27.2	1.1	
Level of Service		D						D		C	A	
Approach Delay (s)		54.1			0.0			35.0			9.7	
Approach LOS		D			A			D			A	

Intersection Summary			
HCM 2000 Control Delay	21.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

2129 NORTH MAIN ST TIA (JN:0016-2016-01)
OPENING YEAR PLUS PROJECT CONDITION
AM PEAK HOUR

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #4 Main Street / 17th Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.865
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	70	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2 0	2 0	1	2 0	1 1	0	2 0	2 1	0	2 0	2 1	0
Volume Module:												
Base Vol:	149	747	172	169	1092	85	133	1083	76	311	1171	37
Growth Adj:	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Initial Bse:	150	754	174	171	1103	86	134	1094	77	314	1183	37
Added Vol:	27	84	27	26	174	24	4	53	46	46	60	2
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	177	838	201	197	1277	110	138	1147	123	360	1243	39
User 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
PHF 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
PHF Volume:	177	838	201	197	1277	110	138	1147	123	360	1243	39
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	177	838	201	197	1277	110	138	1147	123	360	1243	39
PCE 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
MLF 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
FinalVolume:	177	838	201	197	1277	110	138	1147	123	360	1243	39
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	1.84	0.16	2.00	2.71	0.29	2.00	2.91	0.09
Final Sat.:	3400	3400	1700	3400	3131	269	3400	4607	493	3400	4943	157
Capacity Analysis Module:												
Vol/Sat:	0.05	0.25	0.12	0.06	0.41	0.41	0.04	0.25	0.25	0.11	0.25	0.25
Crit Moves:	****			****			****			****		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	50	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.91
Ped Bike Factor						
Frt		0.850				
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3539	0	1770	5085
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1583	3539	0	1770	5085
Link Speed (mph)	30		30			30
Link Distance (ft)	248		1710			308
Travel Time (s)	5.6		38.9			7.0

Intersection Summary	
Area Type:	Other

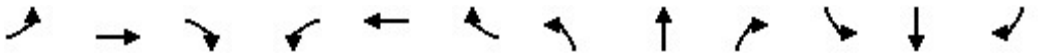
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Volume (vph)	3	26	1143	4	38	1649
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	3	28	1242	4	41	1792
Shared Lane Traffic (%)						
Lane Group Flow (vph)	3	28	1246	0	41	1792

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	3	26	1143	4	38	1649
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	28	1242	4	41	1792
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						308
pX, platoon unblocked	0.89					
vC, conflicting volume	1925	623			1247	
vC1, stage 1 conf vol	1245					
vC2, stage 2 conf vol	680					
vCu, unblocked vol	1595	623			1247	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	93			93	
cM capacity (veh/h)	222	429			554	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3	SB 4
Volume Total	3	28	828	418	41	597	597	597
Volume Left	3	0	0	0	41	0	0	0
Volume Right	0	28	0	4	0	0	0	0
cSH	222	429	1700	1700	554	1700	1700	1700
Volume to Capacity	0.01	0.07	0.49	0.25	0.07	0.35	0.35	0.35
Queue Length 95th (ft)	1	5	0	0	6	0	0	0
Control Delay (s)	21.5	14.0	0.0	0.0	12.0	0.0	0.0	0.0
Lane LOS	C	B			B			
Approach Delay (s)	14.8		0.0		0.3			
Approach LOS	B							

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		

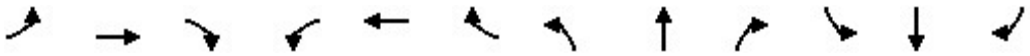


Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0			0		60	170		0			130
Storage Lanes	0			0		1	2		0			1
Taper Length (ft)	25			25			25					
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.91	1.00	0.91	1.00
Ped Bike Factor												
Frt			0.850			0.850		0.987				0.850
Flt Protected		0.963			0.962		0.950			0.950		
Satd. Flow (prot)	0	1794	1583	0	1792	1583	3433	5019	0	1770	5085	1583
Flt Permitted		0.608			0.736		0.950			0.950		
Satd. Flow (perm)	0	1133	1583	0	1371	1583	3433	5019	0	1770	5085	1583
Right Turn on Red			Yes			Yes						Yes
Satd. Flow (RTOR)			118			118						118
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		916			717			903			1485	
Travel Time (s)		20.8			16.3			20.5			33.8	

Intersection Summary	
Area Type:	Other

Lane Group	NWR	NWR2
Lane Configurations		
Ideal Flow (vphpl)	1900	1900
Lane Width (ft)	12	12
Grade (%)		
Storage Length (ft)	500	
Storage Lanes	1	
Taper Length (ft)		
Lane Util. Factor	0.88	1.00
Ped Bike Factor		
Frt	0.850	
Flt Protected		
Satd. Flow (prot)	2787	0
Flt Permitted		
Satd. Flow (perm)	2787	0
Right Turn on Red		No
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		

Intersection Summary



Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Volume (vph)	38	11	82	98	26	110	272	995	94	101	1379	115
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	41	12	88	105	28	118	292	1070	101	109	1483	124
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	53	88	0	133	118	292	1171	0	109	1483	124

Intersection Summary

Lane Group	NWR	NWR2
Volume (vph)	420	10
Confl. Peds. (#/hr)		
Confl. Bikes (#/hr)		
Peak Hour Factor	0.93	0.93
Growth Factor	100%	100%
Heavy Vehicles (%)	2%	2%
Bus Blockages (#/hr)	0	0
Parking (#/hr)		
Mid-Block Traffic (%)		
Adj. Flow (vph)	452	11
Shared Lane Traffic (%)		
Lane Group Flow (vph)	463	0

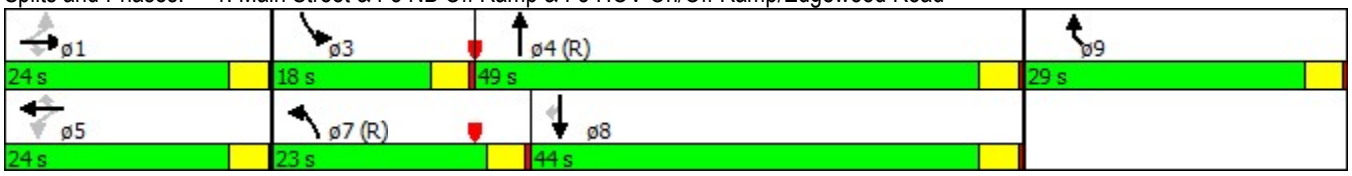
Intersection Summary

Lane Group	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	SBL2	SBT	SBR	NWR
Lane Configurations												
Volume (vph)	38	11	82	98	26	110	272	995	101	1379	115	420
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA	Perm	Prot
Protected Phases		1			5		7	4	3	8		9
Permitted Phases	1		1	5		5					8	
Detector Phase	1	1	1	5	5	5	7	4	3	8	8	9
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	20.0	8.0	20.0	20.0	8.0
Total Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	23.0	49.0	18.0	44.0	44.0	29.0
Total Split (%)	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	19.2%	40.8%	15.0%	36.7%	36.7%	24.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag							Lead	Lag	Lead	Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	None	Max	Max	None
Act Effct Green (s)		16.1	16.1		16.1	16.1	24.6	52.7	11.9	40.0	40.0	23.3
Actuated g/C Ratio		0.13	0.13		0.13	0.13	0.20	0.44	0.10	0.33	0.33	0.19
v/c Ratio		0.35	0.28		0.73	0.38	0.41	0.53	0.62	0.87	0.20	0.85
Control Delay		52.3	5.7		71.6	11.3	48.4	38.4	67.0	44.6	6.5	62.5
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		52.3	5.7		71.6	11.3	48.4	38.4	67.0	44.6	6.5	62.5
LOS		D	A		E	B	D	D	E	D	A	E
Approach Delay		23.2			43.3			40.4		43.3		
Approach LOS		C			D			D		D		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 78 (65%), Referenced to phase 4:NBT and 7:NBL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 43.7 Intersection LOS: D
Intersection Capacity Utilization 68.8% ICU Level of Service C
Analysis Period (min) 15

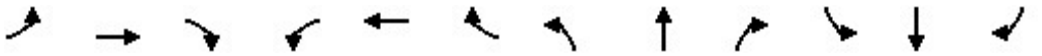
Splits and Phases: 1: Main Street & I-5 NB Off Ramp & I-5 HOV On/Off Ramp/Edgewood Road



Lane Group	EBT	EBR2	WBT	WBR	NBL	NBT	SBL2	SBT	SBR	NWR
Lane Group Flow (vph)	53	88	133	118	292	1171	109	1483	124	463
v/c Ratio	0.35	0.28	0.73	0.38	0.41	0.53	0.62	0.87	0.20	0.85
Control Delay	52.3	5.7	71.6	11.3	48.4	38.4	67.0	44.6	6.5	62.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.3	5.7	71.6	11.3	48.4	38.4	67.0	44.6	6.5	62.5
Queue Length 50th (ft)	38	0	99	0	114	271	82	394	3	194
Queue Length 95th (ft)	77	25	165	52	m161	m323	142	458	46	#275
Internal Link Dist (ft)	836		637			823		1405		
Turn Bay Length (ft)		150		60	170		150		130	500
Base Capacity (vph)	188	362	228	362	704	2203	207	1695	606	580
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.24	0.58	0.33	0.41	0.53	0.53	0.87	0.20	0.80

Intersection Summary

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.



Movement	EBL	EBT	EBR2	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBT	SBR
Lane Configurations												
Volume (vph)	38	11	82	98	26	110	272	995	94	101	1379	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	0.97	0.91		1.00	0.91	1.00
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1793	1583		1792	1583	3433	5020		1770	5085	1583
Flt Permitted		0.61	1.00		0.74	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1133	1583		1370	1583	3433	5020		1770	5085	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	41	12	88	105	28	118	292	1070	101	109	1483	124
RTOR Reduction (vph)	0	0	76	0	0	102	0	0	0	0	0	79
Lane Group Flow (vph)	0	53	12	0	133	16	292	1171	0	109	1483	45
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases		1			5		7	4		3	8	
Permitted Phases	1		1	5		5						8
Actuated Green, G (s)		16.1	16.1		16.1	16.1	24.6	52.7		11.9	40.0	40.0
Effective Green, g (s)		16.1	16.1		16.1	16.1	24.6	52.7		11.9	40.0	40.0
Actuated g/C Ratio		0.13	0.13		0.13	0.13	0.21	0.44		0.10	0.33	0.33
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		152	212		183	212	703	2204		175	1695	527
v/s Ratio Prot							0.09	c0.23		c0.06	c0.29	
v/s Ratio Perm		0.05	0.01		c0.10	0.01						0.03
v/c Ratio		0.35	0.06		0.73	0.07	0.42	0.53		0.62	0.87	0.09
Uniform Delay, d1		47.2	45.3		49.8	45.4	41.5	24.6		51.9	37.6	27.5
Progression Factor		1.00	1.00		1.00	1.00	1.08	1.44		1.00	1.00	1.00
Incremental Delay, d2		1.4	0.1		13.4	0.2	1.4	0.7		6.7	6.6	0.3
Delay (s)		48.6	45.4		63.2	45.6	46.3	36.1		58.6	44.3	27.8
Level of Service		D	D		E	D	D	D		E	D	C
Approach Delay (s)		46.6			54.9			38.2			44.0	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	44.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NWR	NWR2
Lane Configurations		
Volume (vph)	420	10
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.0	
Lane Util. Factor	0.88	
Frt	0.85	
Flt Protected	1.00	
Satd. Flow (prot)	2787	
Flt Permitted	1.00	
Satd. Flow (perm)	2787	
Peak-hour factor, PHF	0.93	0.93
Adj. Flow (vph)	452	11
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	463	0
Turn Type	Prot	
Protected Phases	9	
Permitted Phases		
Actuated Green, G (s)	23.3	
Effective Green, g (s)	23.3	
Actuated g/C Ratio	0.19	
Clearance Time (s)	4.0	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	541	
v/s Ratio Prot	c0.17	
v/s Ratio Perm		
v/c Ratio	0.86	
Uniform Delay, d1	46.7	
Progression Factor	1.00	
Incremental Delay, d2	12.6	
Delay (s)	59.3	
Level of Service	E	
Approach Delay (s)		
Approach LOS		

Intersection Summary

Lane Group	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			
Storage Length (ft)	0		0			300	450		0	600	
Storage Lanes	1		0			1	2		0	1	
Taper Length (ft)	25						25				
Lane Util. Factor	0.91	0.91	0.95	0.97	0.91	1.00	0.97	0.91	0.91	0.88	1.00
Ped Bike Factor											
Frt		0.967				0.850		0.993		0.850	
Flt Protected	0.950	0.998		0.950			0.950				
Satd. Flow (prot)	1610	3272	0	3433	5085	1583	3433	5050	0	2787	0
Flt Permitted	0.950	0.998		0.950			0.950				
Satd. Flow (perm)	1610	3272	0	3433	5085	1583	3433	5050	0	2787	0
Right Turn on Red			Yes			Yes					No
Satd. Flow (RTOR)		26				450					
Link Speed (mph)		30			30			30			
Link Distance (ft)		645			468			903			
Travel Time (s)		14.7			10.6			20.5			

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Volume (vph)	238	484	144	13	1109	757	150	1360	70	387	13
Confl. Peds. (#/hr)											
Confl. Bikes (#/hr)											
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)											
Mid-Block Traffic (%)		0%			0%			0%			
Adj. Flow (vph)	262	532	158	14	1219	832	165	1495	77	425	14
Shared Lane Traffic (%)	10%										
Lane Group Flow (vph)	236	716	0	14	1219	832	165	1572	0	439	0

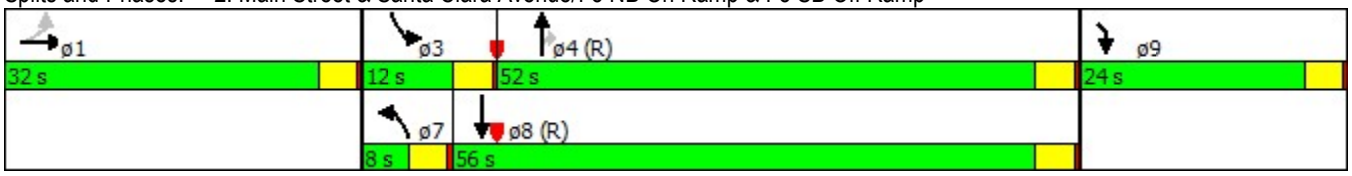
Intersection Summary

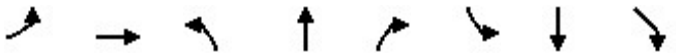
Lane Group	EBL	EBT	NBL2	NBT	NBR	SBL	SBT	SER
Lane Configurations								
Volume (vph)	238	484	13	1109	757	150	1360	387
Turn Type	Perm	NA	Prot	NA	Perm	Prot	NA	Prot
Protected Phases		1	7	4		3	8	9
Permitted Phases	1				4			
Detector Phase	1	1	7	4	4	3	8	9
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	8.0	8.0	20.0	20.0	8.0	20.0	8.0
Total Split (s)	32.0	32.0	8.0	52.0	52.0	12.0	56.0	24.0
Total Split (%)	26.7%	26.7%	6.7%	43.3%	43.3%	10.0%	46.7%	20.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
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	Lag	Lead	Lag	
Lead-Lag Optimize?								
Recall Mode	None	None	None	C-Max	C-Max	None	C-Max	None
Act Effct Green (s)	27.8	27.8	4.2	48.2	48.2	8.0	57.0	20.0
Actuated g/C Ratio	0.23	0.23	0.04	0.40	0.40	0.07	0.48	0.17
v/c Ratio	0.63	0.92	0.12	0.60	0.92	0.72	0.66	0.95
Control Delay	50.2	61.7	79.4	11.5	20.7	87.5	5.1	80.1
Queue Delay	0.0	0.0	0.0	0.3	46.0	0.0	0.0	0.0
Total Delay	50.2	61.7	79.4	11.8	66.7	87.5	5.1	80.1
LOS	D	E	E	B	E	F	A	F
Approach Delay		58.9		34.4			12.9	
Approach LOS		E		C			B	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 94 (78%), Referenced to phase 4:NBT and 8:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 35.5 Intersection LOS: D
Intersection Capacity Utilization 77.7% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 2: Main Street & Santa Clara Avenue/I-5 NB On Ramp & I-5 SB Off Ramp





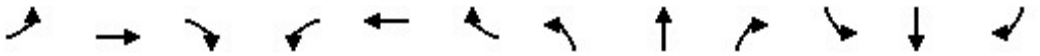
Lane Group	EBL	EBT	NBL2	NBT	NBR	SBL	SBT	SER
Lane Group Flow (vph)	236	716	14	1219	832	165	1572	439
v/c Ratio	0.63	0.92	0.12	0.60	0.92	0.72	0.66	0.95
Control Delay	50.2	61.7	79.4	11.5	20.7	87.5	5.1	80.1
Queue Delay	0.0	0.0	0.0	0.3	46.0	0.0	0.0	0.0
Total Delay	50.2	61.7	79.4	11.8	66.7	87.5	5.1	80.1
Queue Length 50th (ft)	181	289	6	65	149	70	54	193
Queue Length 95th (ft)	280	#407	m6	m84	m#241	m85	77	#304
Internal Link Dist (ft)		565		388			823	
Turn Bay Length (ft)			70		300	450		600
Base Capacity (vph)	375	783	120	2042	905	229	2399	464
Starvation Cap Reductn	0	0	0	287	156	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.91	0.12	0.69	1.11	0.72	0.66	0.95

Intersection Summary

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.

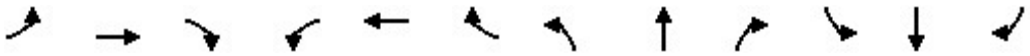
Movement	EBL	EBT	EBR	NBL2	NBT	NBR	SBL	SBT	SBR	SER	SER2
Lane Configurations											
Volume (vph)	238	484	144	13	1109	757	150	1360	70	387	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor	0.91	0.91		0.97	0.91	1.00	0.97	0.91		0.88	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.99		0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		1.00	
Satd. Flow (prot)	1610	3272		3433	5085	1583	3433	5048		2787	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		1.00	
Satd. Flow (perm)	1610	3272		3433	5085	1583	3433	5048		2787	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	262	532	158	14	1219	832	165	1495	77	425	14
RTOR Reduction (vph)	0	20	0	0	0	269	0	0	0	0	0
Lane Group Flow (vph)	236	696	0	14	1219	563	165	1572	0	439	0
Turn Type	Perm	NA		Prot	NA	Perm	Prot	NA		Prot	
Protected Phases		1		7	4		3	8		9	
Permitted Phases	1					4					
Actuated Green, G (s)	27.8	27.8		1.6	48.2	48.2	8.0	54.6		20.0	
Effective Green, g (s)	27.8	27.8		1.6	48.2	48.2	8.0	54.6		20.0	
Actuated g/C Ratio	0.23	0.23		0.01	0.40	0.40	0.07	0.46		0.17	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	372	758		45	2042	635	228	2296		464	
v/s Ratio Prot				0.00	0.24		c0.05	0.31		c0.16	
v/s Ratio Perm	0.15	0.21				c0.36					
v/c Ratio	0.63	0.92		0.31	0.60	0.89	0.72	0.68		0.95	
Uniform Delay, d1	41.5	45.0		58.7	28.3	33.4	54.9	25.9		49.5	
Progression Factor	1.00	1.00		1.39	0.38	0.72	1.40	0.17		1.00	
Incremental Delay, d2	3.5	15.9		1.8	0.6	8.7	6.5	1.0		28.4	
Delay (s)	45.0	60.9		83.2	11.4	32.7	83.5	5.4		77.8	
Level of Service	D	E		F	B	C	F	A		E	
Approach Delay (s)		57.0			20.5			12.8			
Approach LOS		E			C			B			

Intersection Summary			
HCM 2000 Control Delay	29.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	170		0
Storage Lanes	0		0	0		0	0		0	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.91	0.91	0.97	0.91	1.00
Ped Bike Factor												
Frt		0.975						0.996				
Flt Protected		0.973								0.950		
Satd. Flow (prot)	0	3358	0	0	0	0	0	5065	0	3433	5085	0
Flt Permitted		0.973								0.950		
Satd. Flow (perm)	0	3358	0	0	0	0	0	5065	0	3433	5085	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18						4				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		633			1129			308			468	
Travel Time (s)		14.4			25.7			7.0			10.6	

Intersection Summary	
Area Type:	Other



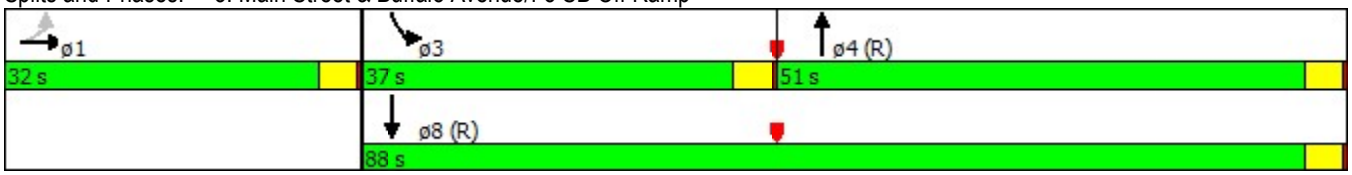
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	303	156	91	0	0	0	0	1614	46	663	1284	0
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	326	168	98	0	0	0	0	1735	49	713	1381	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	592	0	0	0	0	0	1784	0	713	1381	0

Intersection Summary

Lane Group	EBT	NBT	SBL	SBT
Lane Configurations				
Volume (vph)	156	1614	663	1284
Turn Type	NA	NA	Prot	NA
Protected Phases	1	4	3	8
Permitted Phases				
Detector Phase	1	4	3	8
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0
Total Split (s)	32.0	51.0	37.0	88.0
Total Split (%)	26.7%	42.5%	30.8%	73.3%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0
Lead/Lag		Lag	Lead	
Lead-Lag Optimize?				
Recall Mode	None	C-Max	Max	C-Max
Act Effct Green (s)	25.3	47.0	35.7	86.7
Actuated g/C Ratio	0.21	0.39	0.30	0.72
v/c Ratio	0.82	0.90	0.70	0.38
Control Delay	53.8	41.5	44.6	11.1
Queue Delay	0.0	0.0	0.4	0.2
Total Delay	53.8	41.5	45.0	11.3
LOS	D	D	D	B
Approach Delay	53.8	41.5		22.8
Approach LOS	D	D		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 87 (73%), Referenced to phase 4:NBT and 8:SBT, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 34.4	Intersection LOS: C
Intersection Capacity Utilization 77.9%	ICU Level of Service D
Analysis Period (min) 15	

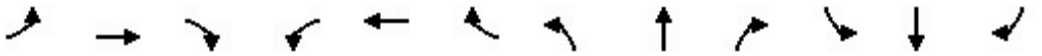
Splits and Phases: 3: Main Street & Buffalo Avenue/I-5 SB Off Ramp



Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	592	1784	713	1381
v/c Ratio	0.82	0.90	0.70	0.38
Control Delay	53.8	41.5	44.6	11.1
Queue Delay	0.0	0.0	0.4	0.2
Total Delay	53.8	41.5	45.0	11.3
Queue Length 50th (ft)	222	468	291	198
Queue Length 95th (ft)	285	538	m346	m234
Internal Link Dist (ft)	553	228		388
Turn Bay Length (ft)			170	
Base Capacity (vph)	797	1986	1022	3675
Starvation Cap Reductn	0	0	65	1188
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.74	0.90	0.75	0.56

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	303	156	91	0	0	0	0	1614	46	663	1284	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0						4.0		4.0	4.0	
Lane Util. Factor		0.95						0.91		0.97	0.91	
Frt		0.98						1.00		1.00	1.00	
Flt Protected		0.97						1.00		0.95	1.00	
Satd. Flow (prot)		3359						5064		3433	5085	
Flt Permitted		0.97						1.00		0.95	1.00	
Satd. Flow (perm)		3359						5064		3433	5085	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	326	168	98	0	0	0	0	1735	49	713	1381	0
RTOR Reduction (vph)	0	14	0	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	578	0	0	0	0	0	1782	0	713	1381	0
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		1						4		3	8	
Permitted Phases	1											
Actuated Green, G (s)		25.3						47.0		35.7	86.7	
Effective Green, g (s)		25.3						47.0		35.7	86.7	
Actuated g/C Ratio		0.21						0.39		0.30	0.72	
Clearance Time (s)		4.0						4.0		4.0	4.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		708						1983		1021	3673	
v/s Ratio Prot								c0.35		c0.21	0.27	
v/s Ratio Perm		0.17										
v/c Ratio		0.82						0.90		0.70	0.38	
Uniform Delay, d1		45.1						34.3		37.4	6.3	
Progression Factor		1.00						1.00		1.09	1.65	
Incremental Delay, d2		7.2						7.0		2.7	0.2	
Delay (s)		52.4						41.2		43.6	10.7	
Level of Service		D						D		D	B	
Approach Delay (s)		52.4			0.0			41.2			21.9	
Approach LOS		D			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	33.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

2129 NORTH MAIN ST TIA (JN:0016-2016-01)
OPENING YEAR PLUS PROJECT CONDITION
PM PEAK HOUR

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Future Volume Alternative)

Intersection #4 Main Street / 17th Street

Cycle (sec):	100	Critical Vol./Cap.(X):	0.806
Loss Time (sec):	5	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	53	Level Of Service:	D

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	2 0	2 0	1	2 0	1 1	0	2 0	2 1	0	2 0	2 1	0
Volume Module:												
Base Vol:	224	1049	155	197	809	140	236	1232	69	166	1025	74
Growth Adj:	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Initial Bse:	226	1059	157	199	817	141	238	1244	70	168	1035	75
Added Vol:	48	180	48	9	110	11	26	37	32	32	51	27
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	274	1239	205	208	927	152	264	1281	102	200	1086	102
User 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
PHF 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
PHF Volume:	274	1239	205	208	927	152	264	1281	102	200	1086	102
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	274	1239	205	208	927	152	264	1281	102	200	1086	102
PCE 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
MLF 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
FinalVolume:	274	1239	205	208	927	152	264	1281	102	200	1086	102
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	2.00	1.00	2.00	1.72	0.28	2.00	2.78	0.22	2.00	2.74	0.26
Final Sat.:	3400	3400	1700	3400	2920	480	3400	4725	375	3400	4663	437
Capacity Analysis Module:												
Vol/Sat:	0.08	0.36	0.12	0.06	0.32	0.32	0.08	0.27	0.27	0.06	0.23	0.23
Crit Moves:		****			****			****			****	

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	0	0		0	50	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.91
Ped Bike Factor						
Frt		0.850				
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1770	1583	3539	0	1770	5085
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1770	1583	3539	0	1770	5085
Link Speed (mph)	30		30			30
Link Distance (ft)	248		1710			308
Travel Time (s)	5.6		38.9			7.0

Intersection Summary	
Area Type:	Other

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Volume (vph)	4	36	1625	4	37	1338
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	4	39	1766	4	40	1454
Shared Lane Traffic (%)						
Lane Group Flow (vph)	4	39	1770	0	40	1454

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	4	36	1625	4	37	1338
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	39	1766	4	40	1454
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						308
pX, platoon unblocked	0.90					
vC, conflicting volume	2334	885			1771	
vC1, stage 1 conf vol	1768					
vC2, stage 2 conf vol	565					
vCu, unblocked vol	2092	885			1771	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	86			88	
cM capacity (veh/h)	118	288			348	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3	SB 4
Volume Total	4	39	1178	593	40	485	485	485
Volume Left	4	0	0	0	40	0	0	0
Volume Right	0	39	0	4	0	0	0	0
cSH	118	288	1700	1700	348	1700	1700	1700
Volume to Capacity	0.04	0.14	0.69	0.35	0.12	0.29	0.29	0.29
Queue Length 95th (ft)	3	12	0	0	10	0	0	0
Control Delay (s)	36.7	19.5	0.0	0.0	16.7	0.0	0.0	0.0
Lane LOS	E	C			C			
Approach Delay (s)	21.2		0.0		0.4			
Approach LOS	C							

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	55.0%	ICU Level of Service	B
Analysis Period (min)	15		

Appendix G

Crommelin Gate Stacking Methodology

Retyped Verbatim From the Original

ENTRANCE-EXIT DESIGN AND CONTROL FOR MAJOR PARKING FACILITIES

Robert W. Crommelin, P.E., President
Robert Crommelin and Associates, Inc.
Encino, California

Prepared for Presentation at:

"SEMINAR '72" Los Angeles Parking Association, Biltmore Hotel
Los Angeles, California, October 5, 1972

It hasn't been too many years since a 500-space garage was thought of as a large parking facility. In recent years, garages with over 4,000 spaces have been placed in operation and larger ones are on the drawing boards. Success in the operation of these major parking facilities is dependent upon proper design of access to the facility, in addition to efficient management. Provision of adequate access design and control is a significant item which must be considered as part of the first design concept. The traffic engineer, teamed with the owner's representatives, the architect, and the future parking operator, must work together to develop a proper access and control plan. I have recently read a statement by a nationwide garage design consultant that reservoir space for entrances to garages is no longer an important consideration because of the capacity of ticket dispensers with gates. This is completely untrue as will be brought out later. Thinking of this type can lead to ineffective design which causes backup onto public streets with the accompanying potential hazards and congestion.

This paper covers three principal areas of concern: (1) determination of the number of entrance and exit lanes required based upon the parking control strategy and type of parker served; (2) data to allow comparison of the capacities of the various types of control strategies to allow selection of the one appropriate for each facility, and; (3) determination of needed reservoir space based upon the control strategy selected.

Typical capacity values for the various methods of parking control are included in this paper. A word of caution is necessary since there is much variation in capacity values due to physical conditions present as well as the familiarity of the parker with the parking facility itself. Each major facility requires detailed analysis of its needs and generalized factors are not always adequate.

Design Methodology

In order to provide adequate access design and control for major parking facilities, it is necessary to identify the probable characteristics of the future users of the facility. In this paper it is assumed that the size of the garage has been determined based upon a comprehensive parking study (general public facilities), or the amount necessary to serve a given land use (single purpose facility).

The first step is to determine directional peak hour volumes as related to the total size of the parking garage. Based upon the principal land use served, tables are included in this paper which allow the designer to prepare an estimate of peak hour volumes. In general, our research has found that it is adequate to assume for design purposes that the morning inbound peak flows are approximately equal to the evening outbound peak flows. After determining the peak volumes, a control strategy must be selected which would be appropriate for the intended operation of the garage. Selection of whether it would be best to allow parkers to enter without charge and pay as they leave or to pay a flat fee on the way in and have no control upon exiting will have a significant impact upon traffic capacity. Whether to use no fee, a flat fee, a variable fee, or a combination of fees must be determined as well as whether it is possible to receive the payment in advance, or to collect individual payment of the fee. All of these alternatives should be considered for each individual parking facility in order to determine its proper control strategy.

When the peak hour volumes and control strategy have been determined, it is then possible to determine the number of lanes which will be required to adequately serve inbound and outbound traffic to the parking facility. This requires knowledge of typical service rates of various methods of parking control. The next step is to determine the amount of reservoir space required to serve the parking control location. Following all of these steps will lead to an efficient, well-working garage which will have minimum impact upon the surrounding street system.

Determination of Peak-Hour Volumes

Comprehensive parking studies have provided much information concerning the characteristics of the users of major parking facilities. In general, it may be stated that the traffic characteristics of a garage will be principally related to the trip purpose of the user and the type of land use served by the facility. Both of these items relate to the length of time the parker is in the facility and the time of day during which major traffic flows occur.

Table 1 was prepared which compares the trip purpose of the parker with the length of time which he parks as observed in the Los Angeles Central Business District. Employees are considered long-term parkers since 80 percent parked three hours or longer; at the peak time of day, 84 percent of the daily employee parkers were present; and, their average parking duration was 5.6 hours.

A garage, which serves employees primarily, would tend to have higher peak hour volumes than would one which serves the other uses shown in the table. As an example, 85 percent of the shoppers had a parking duration of less than three hours with an average duration of 1.6 hours. More importantly, only 26 percent of the total daily parkers with a shopping trip purpose were present at the time of peak accumulation. This indicates that the peak hour inbound or outbound volume will be less for a garage serving principally shopper parkers than for a similar sized facility serving only employees.

Table 1

TRIP PURPOSE VS. LENGTH OF TIME PARKED

TRIP PURPOSE	PERCENT OF DAILY PARKERS WITH DURATION SHOWN		RATIO OF PEAK ACCUMULATION TO TOTAL DAILY PARKERS	AVERAGE DURATION
	SHORT-TERM (less than 3 hrs.)	LONG-TERM (3 hrs. or longer)		
	(percent)	(percent)		(hours)
Work	20	80	0.84	5.6
Shopping	85	15	0.26	1.6
Commercial Business	86	14	0.25	1.5
Social-Recreational	91	9	0.24	1.2
Personal Business	94	6	0.21	1.0
Eat Meal	97	3	0.22	0.9

Source: Los Angeles CBD Parking Study, 1967

In order to relate the type of land use served with peak hour volumes, the term entering-leaving ratio has been used. This term represents the volume of cars entering or leaving during a peak hour divided by the maximum accumulation of cars in the parking facility (taken as the size of the facility). If the inbound morning or outbound evening peak hour is equal to half the number of spaces in the garage, the entering-leaving ratio is 0.50. Using data obtained by special counts taken by personnel of my firm, as well as information reported in various parking studies, Table 2 was prepared which shows the range of values of the entering-leaving ratio for various land uses served. It may be seen in the table that the range of values for an individual parking facility may vary considerably. This variation may be explained by the typical length of time parked as well as the variation in the times when employees must start work or are let out of work. In locations where there is some staggering of employment hours, the entering-leaving ratio tends to be lower. The characteristics of the potential users of the parking facility must be studied in detail to arrive at the proper entering ratio.

Once the entering-leaving ratio has been selected, it is possible to determine the actual peak hour design volumes to be used in determining the parking control strategy and the design of access lanes.

Table 2

LAND USE SERVED VS. ENTERING-LEAVING RATIO

PRINCIPAL LAND USE SERVED	ENTERING-LEAVING RATIO [a] (Range of Values)
Hotel-Motel	0.25-0.35
College-University	0.40-0.60
Retail Commercial	0.45-0.65
Public Office Building	0.45-0.65
Private Offices-Multiple Tenant	0.45-0.60
Private Offices-Single Tenant	0.55-0.75
Hospital	0.60-0.70
Medical Offices	0.70-0.85
Airport (public parking)	0.70-0.85
Manufacturing Plant	0.70-0.90
Restaurant (sit-down)	0.80-0.95
Branch Bank	0.90-1.20

[a] Volume of cars entering and leaving in peak hour divided by maximum accumulation of cars (capacity of facility)

Source: Special counts by RC and A; various parking studies by others

Parking Control Strategy Selection

Selection of the proper type of parking control strategy is exceedingly important in the successful operation of a major parking facility. The strategy involves the method of parking control, the charge which will be placed upon the user, and the type of payment to be collected from the user. Table 3 shows the application of various control strategies as related to the type of parking facility used as well as to the type of parking control equipment. For shopper and business parkers, it is normal to allow free entry with payment of a variable fee on an individual basis as they exit the garage. In the case of employees, it is more normal to allow them to enter freely and have a prepaid monthly charge which could be checked through the use of parking permits, coded cards, tokens, or other means as they exit. Parkers at sports events exhibit high peak volumes but have a length of time parked which can be estimated. For this type of condition, it is much more appropriate to collect a flat fee inbound and to have no control outbound. This latter type of control was the one which we recommended for use at the Los Angeles Convention Center.

Table 3

APPLICATION OF VARIOUS CONTROL STRATEGIES

ITEM	CONTROL STRATEGY APPLICABILITY					
	CONTROL METHOD		TYPE CHARGE		TYPE PAYMENT	
	Free-In Pay-Out	Pay-In Free-Out	Flat Fee	Variable Fee	Pre-Paid	Individual Payment
Preferred Method to Serve:						
Employee	X	X	X		X	
Office Building Visitor	X			X		X
Sports Event		X	X			X
Shopper	X			X		X
Student	X		X		X	
Air Traveler	X			X		X
Control Type:						
Ticket Spitter	X			X		X
Cashier/Attendant	X	X	X	X	X	X
Time Stamp Ticket Manually	X			X		X
Coded Card	X	X	X		X	
Coin-Operated Gate	X		X			X
Token-Operated Gate	X	X	X	X	X	
Parking Meter	-	-	X	X		X

Parking Control Operating Characteristics

Table 4 indicates our findings concerning the service rates for various types of parking controls. We have taken the design service rate as being equal to 80 percent of the maximum service rate. There is considerable variation in service rates and careful study must be given to the probable characteristics of the users of the parking facility as well as the experience of the personnel operating the facility.

For the control measures normally used in entering a facility, the average headways vary from 3.6 seconds per vehicle for a clear aisle with no control to 20.4 seconds per vehicle for a coin-operated gate. In terms of design hourly capacities, the rates would be 800 per hour per lane for clear aisles and only 140 per hour per lane for coin-operated gates. The most common type of control used at major parking facilities is the ticket dispenser with a gate. Research in England identified the fact that there is a significant difference in the capacity of this equipment depending upon whether the parker has an easy direct approach or if a sharp turn is required to approach the equipment. This is obvious since a straight approach allows a parker to position himself in a reasonable location to pull the ticket to open the gate. Thus, the design of the approach to a ticket dispenser can cause the hourly capacities to vary between 305 and 520 vehicles per hour.

Internally, the circulation pattern can affect the capacity of the inbound approach. It is very important to have a minimum of interference within the parking facility so that once

a driver leaves the entrance parking control, he can do so without delaying the next inbound parker immediately behind him. This can be accomplished by avoiding situations where outbound parkers queued up from the exit control block parkers entering the facility.

The capacity of exits from a major parking facility are dependent upon adequate space approaching the exit control location as well as adequate reservoir between that location and the driveway to the public street. Analysis must be conducted on both of these reservoir needs and sufficient lanes as well as sufficient reservoir length provided to allow proper operation. The emphasis of this paper will be upon the capacity of the exiting parking control itself. The most common type of operation involves use of a cashier collecting a variable fee from a parker based upon length of time parked. This type of control has a capacity of approximately 150 vehicles per hour. Another approach might be to have the parker pay his fee to the cashier before entering his car and then utilize a token operated gate as a means of exit control. This control strategy would have over twice the capacity of a cashier lane itself and could have application where there is insufficient space to provide an adequate number of cashier lanes.

Table 4

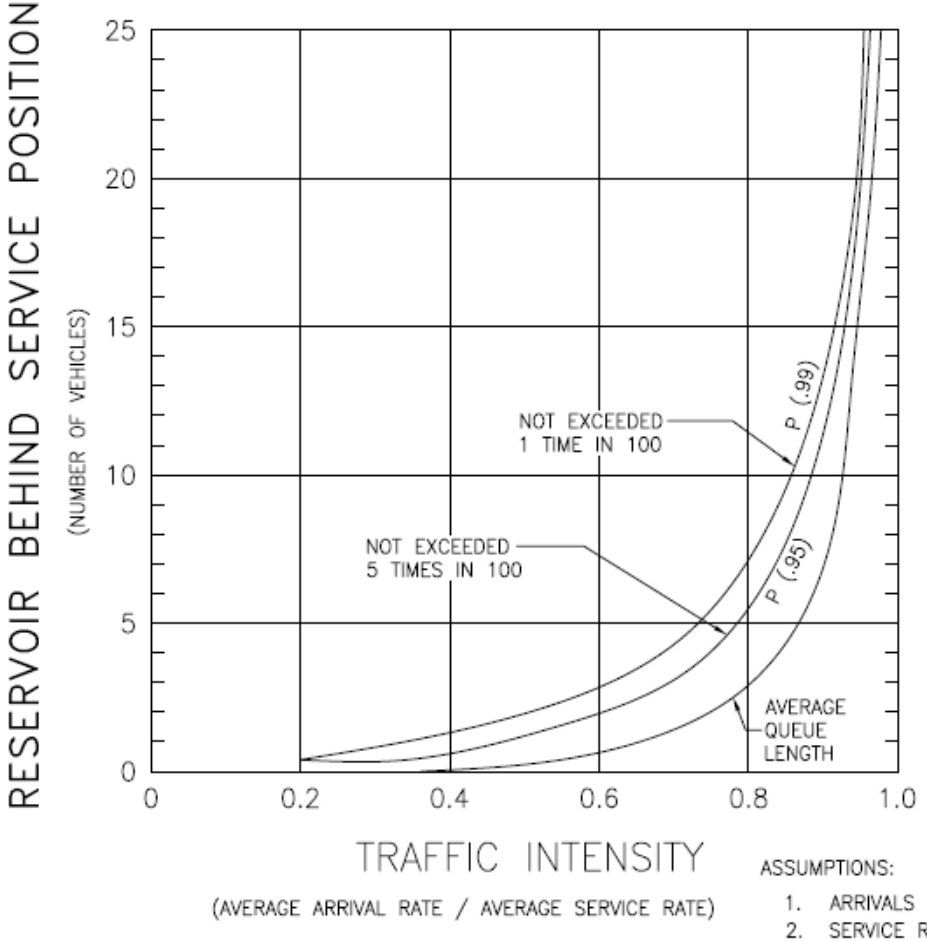
PARKING CONTROL SERVICE RATE

TYPE OF CONTROL	TYPICAL SERVICES RATES PER LANE [a] AVERAGE HEADWAY (Sec/Veh)	HOURLY CAPACITY Design [b] (Veh/Hr)	HOURLY CAPACITY Maximum (Veh/Hr)
Entering:			
Clear Aisle, no control	3.6	800	1,000
Ticket dispenser, no gate	5.0	575	720
Time Stamp and hand to driver	8.5	340	425
Coded-card operated gate	8.9	340	425
Cashier, flat fee, no gate			
No information given	9.2	310	390
Direction-info needed	14.8	195	250
Ticket Dispenser w/gate			
Sharp turn at approach	9.5	305	380
Easy direct approach	5.5	520	650
Coin operated gate	20.4	140	175
Internal:			
Clear aisle or ramp, no parking	2.0	1,200	1,800
Straight ramp w/bend at end	2.2	1,000	1,610
Circular ramp, 30’ R at C/L	2.2	840	1,650
Aisle with adjacent 9 x 18’ stalls			
Inbound	3.5	830	1,040
Outbound	8.6	335	420
Exiting:			
Light street congestion	7.2	400	500
Moderate street congestion	9.0	320	400
Coded-card/token-operated gate	9.0	320	400
Cashier, flat fee w/gate	13.4	215	270
Casher, variable fee w/gate	19.5	150	185
Coin operated gate	20.4	140	175

[a] Assumes no significant interference by pedestrians, other traffic, etc.

[b] Taken as 80% of maximum rate; require 6 car lengths reservoir in advance of control points.

RESERVOIR NEEDS VS TRAFFIC INTENSITY



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ASSUMPTIONS:

1. ARRIVALS FOLLOW A POISSON DISTRIBUTION
2. SERVICE RATE CAN BE REPRESENTED BY AN EXPONENTIAL PROBABILITY FUNCTION.
3. FLOW IS EQUALLY DIVIDED BETWEEN EACH LANE IF MORE THAN ONE IS AVAILABLE.

Reservoir Needs

If you have ever watched cars approaching any type of parking control, you know that they do not come at an even rate. Even though there may be nearby traffic signals which may cause the approaching parkers to arrive in groups or platoons, random arrival is the normal approach characteristic assumed. Research has shown that random arrivals or events in a traffic stream tend to follow the Poisson mathematical distribution. This distribution provides a means that, if the average rate is known, the probability of exceeding a given volume in a unit of time may be calculated. Thus, if you know the average volume, you may calculate the surges in volume to allow design of reservoir space. As an example, if the average number of cars in a five-minute interval is 10, use of Poisson statistical techniques will yield the fact that no more than 18 cars will arrive in the five-minute interval within a probability that this amount will be exceeded only one time in 100 five-minute intervals. Use of these calculation techniques allow the determination of the amount of reservoir required to serve a given type of parking control.

The relationship between the arrival of vehicles and the ability of the parking control equipment or strategy to handle these vehicles are the most important items in determining reservoir space. If the average number of arrivals per unit of time is called "v" and "s" is the average rate of service (discharge) per unit of time, the ratio of v/s is used to determine the amount of reservoir space. This ratio is called traffic intensity ("i"). The average length of the queue ($\bar{q}$) behind the vehicle being serviced is equal to $\bar{q} = \frac{i^2}{(1-i)}$. This formula assumes that the arrival of vehicles at the service point follows a random distribution, the servicing time for vehicles can be represented by an exponential probability function, and that the flow is equally divided among service facilities if there is more than one lane serving a given area of the garage.

Knowing the average queue length and selecting a probability value which represents the frequency that the design length will be exceeded, will allow the designer to determine the amount of reservoir required behind the service position. These formulas and probabilities were utilized to prepare Figure 1 which compares traffic intensity with required reservoir for common probabilities used in design. The mathematics are such that, as the average volume approaches the average service rate, the amount of backup will be infinite. In addition, the probability that the amount of reservoir space for a given volume will never be exceeded also is infinite. In actuality, these conditions do not occur but the general relationships hold true based on our field observations.

As may be noted in the figure, an insignificant amount of reservoir is required when the average arrival rate is 50 percent or less of the average service rate of the parking control device. At this level, only a two-car reservoir would be required. As the ratio of traffic intensity increases above 0.7, the amount of reservoir space increases rapidly. We have selected a traffic intensity of 0.8 as appropriate for design and a probability that the determined reservoir would be exceeded only five times in 100. Thus, if the average service rate for a given type of parking control is known and sufficient lanes are provided

so that the average arrival rate during the peak hour is 0.8 times the average service rate, a reservoir of six car lengths behind each service position would be adequate to meet the needs of the facility. If this is physically impossible, a traffic intensity of 0.6 should be used to determine the number of lanes requiring only a two-car reservoir.

Summary

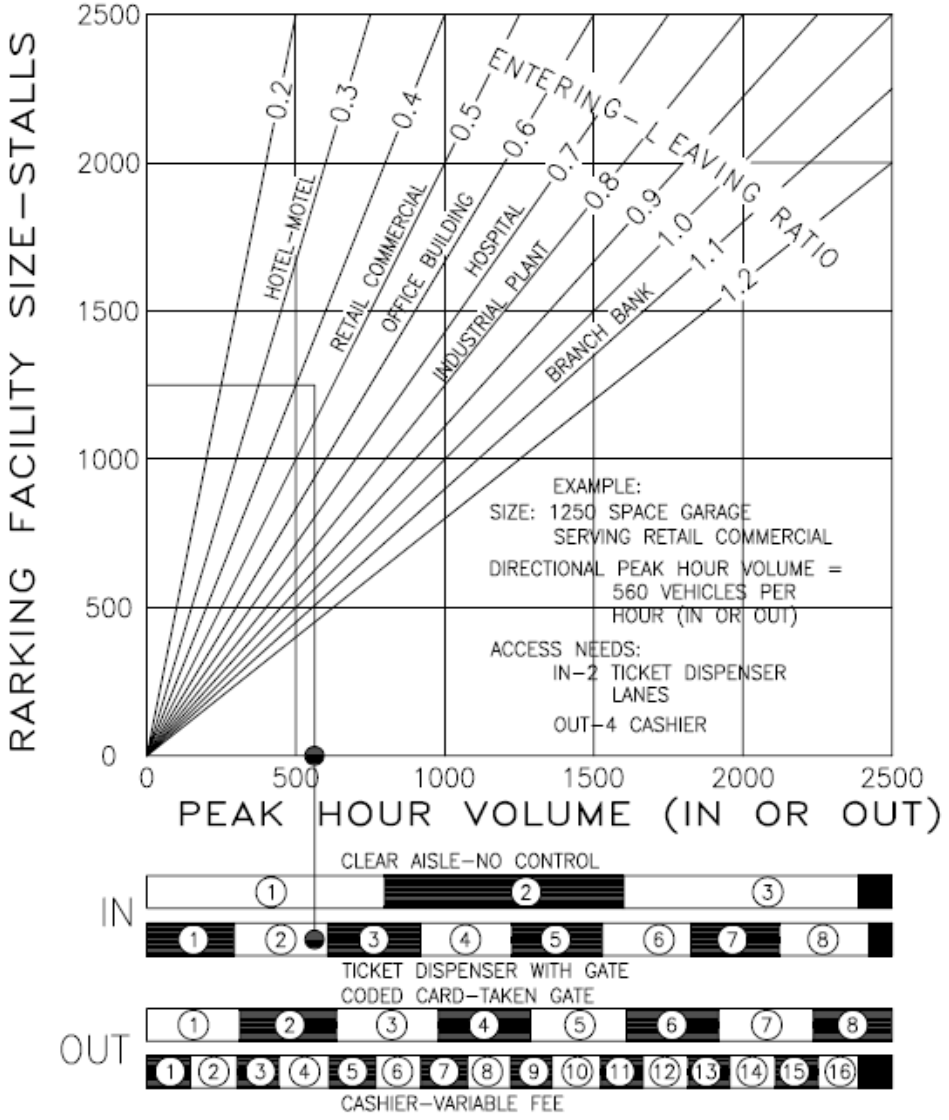
Having determined the peak hour volumes, the parking control strategy, the number of lanes, and the reservoir length to adequately serve the peak-hour volumes, the physical design of the facilities then may be made. As noted previously, having an inadequate capacity to serve the traffic volumes approaching the control means can have a very drastic effect upon the backup which will occur. This backup creates adverse operating characteristics in and around the facility and also causes the length of time that a parker is involved in entering or leaving a garage to grow significantly. Thus, the design features of the facility can have an impact on the attitudes of the users and indirectly affect the success or failure of the parking facility in attracting customers or users.

To provide a means of easily determining the number of lanes necessary for various types of parking garages, Figure 2 was prepared which allows the designer to directly translate the size of the garage and the type of land use served into the number of necessary access lanes for the parking control strategy assumed. The example shows that a 1,250-space garage serving a retail commercial facility will normally have a directional peak hour volume of 560 vehicles per hour. If inbound ticket dispensers with gates are used, two lanes will be adequate to serve this garage. If cashiers collect variable fees, a total of four exit cashier lanes will be required. Normally these four lanes will not be provided all in the same location and, of course, it could be necessary to operate all four only during peak hours.

In the case of an office building rather than a retail facility, it would be possible to use coded card exit gates for monthly parkers. This would significantly reduce the required number of exit lanes since transient visitors are a much lower percentage of the peak hour volumes for an office building than they are in a garage serving a retail facility. The reduction in construction and operating cost would be significant.

A warning is necessary concerning the use of Figure 2 since it was based upon very generalized information. Each individual major parking facility must be considered on its own and its access needs determined in light of the characteristics of the probable users of the facility itself. In order to have satisfied customers and users of a major parking facility, thorough investigation and determination of access needs must be accomplished.

PARKING FACILITY SIZE VS ACCESS NEEDS



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