



REDLANDS PASSENGER RAIL PROJECT
Traffic Report

San Bernardino, San Bernardino County, California

December 2013

Prepared for:

San Bernardino Associated Governments

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I certify that this REDLANDS PASSENGER RAIL PROJECT TRAFFIC REPORT has been prepared under my immediate supervision and that I have experience and training in the field of traffic and transportation engineering.

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1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION AND BACKGROUND

The FTA and San Bernardino Associated Governments (SANBAG) intend to prepare an EIS/EIR for the Redlands Passenger Rail Project (RPRP). This project will improve transit mobility, travel times, and corridor safety while minimizing adverse environmental impacts. The RPRP would provide travelers and commuters with a new mobility option that would achieve more-efficient travel times than automobiles or other transit alternatives within an existing corridor.

The RPRP would introduce passenger rail service along an existing railroad right-of-way (ROW) from the City of San Bernardino on the west to the City of Redlands on the east. This existing ROW is commonly referred to as the Redlands Corridor, an approximately 9-mile rail spur segment that extends east from E Street in the City of San Bernardino. Passenger rail service would serve passengers from five platforms located at E Street, Tippecanoe Avenue, New York Street, Orange Street, and University Street. Passenger rail operations would start in 2018.

The purpose of this report is to present existing condition methodology, findings and conclusions related to the traffic operations and impacts in the project study.

The traffic conditions are evaluated for each of the following scenarios:

1. Existing (2011) No Project Conditions;
2. Existing (2011) With Project Conditions;
3. Opening Year (2018) No Project Conditions;
4. Opening Year (2018) No Project Conditions with Central Avenue Closure;
5. Opening Year (2018) With Project Conditions;
6. Opening Year (2018) With Project Conditions with Central Avenue Closure;
7. Forecast Year (2038) No Project Conditions;
8. Forecast Year (2038) No Project Conditions with Central Avenue Closure;
9. Forecast Year (2038) With Project Conditions; and
10. Forecast Year (2038) With Project Conditions with Central Avenue Closure

Figure 1-1 depicts the regional location and project area.



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2.0 ANALYSIS METHODOLOGY

The study *Methodology and Assumptions Memorandum*, which included the definition of the study area, was presented at agency coordination meetings held with SANBAG, City of San Bernardino and City of Redlands in December 2011. The traffic count locations and methodology were approved by the agencies at that time.

The intersection analysis was conducted using Synchro 7.0 with Level of Service (LOS) calculations based on the 2000 Highway Capacity Manual (HCM) per the request of the City of Redlands. Calculation of influence zone queues, crossing spillback queues, and potential impact of traffic signal preemption on traffic progressions were based on the procedure in the *Metropolitan Transportation Authority (MTA) Grade Crossing Policy for Light Rail Transit*.

2.1 STUDY AREA AND ASSUMPTIONS

The traffic impact analysis evaluated areas of potential Project impacts to intersections in the vicinity of the grade crossings. Intersections were selected in accordance with *Appendix C: Guidelines for CMP Traffic Impact Analysis Reports in San Bernardino County from San Bernardino County CMP, 2005 Update*. The intersections analyzed were selected based on the following criteria:

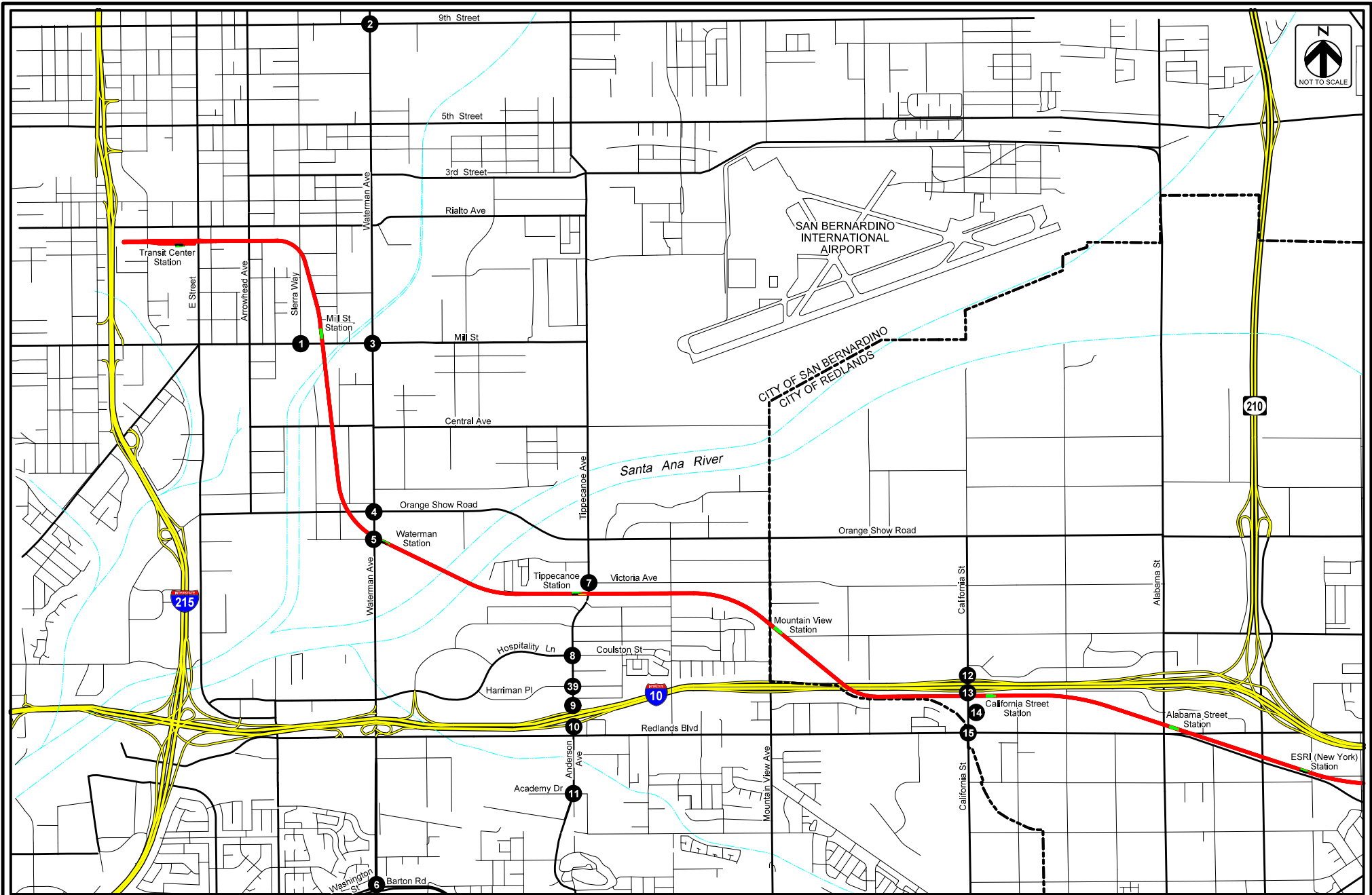
- Congestion Management Program (CMP) intersections that currently operate at Level of Service (LOS) D or below within a 1.5 mile radius of the transit stations,
- Section 8B.08 of the 2009 Manual on Uniform Traffic Control Devices (MUTCD) states that “*At a signalized intersection 200 feet from a highway-rail crossing where the intersection traffic control signals are preempted, all existing turning movements toward the grade crossing should be prohibited during preemption*”.
 - Signalized intersections for this project were selected using a distance of 350 feet from the grade crossing in order to include any signalized intersections that could potentially be preempted in future conditions.
- Per the recommendation of the City of San Bernardino and City of Redlands.

The analyzed intersections are listed in Table 2-1. The locations of the study intersections and future train stations are illustrated in Figures 2-1a and 2-1b. The intersection geometrics are illustrated in Figures 2-2a and 2-2b.

Table 2-1 Study Intersections

No.	Intersection	Jurisdiction
1	Sierra Way and Mill Street	City of San Bernardino
2	Waterman Avenue and 9th Street	City of San Bernardino*
3	Waterman Avenue and Mill Street	City of San Bernardino*
4	Waterman Avenue and Orange Show Road	City of San Bernardino
5	Waterman Avenue and Dumas Street	City of San Bernardino
6	Waterman Avenue and Washington Street	City of San Bernardino
7	Tippecanoe Avenue and Victoria Avenue	City of San Bernardino
8	Tippecanoe Avenue and Hospitality Lane	City of San Bernardino
9	Tippecanoe Avenue and I-10 West Ramps	Caltrans*
10	Anderson Avenue and I-10 East Ramps	Caltrans*
11	Anderson Avenue and Academy Drive	City of Loma Linda
12	California Street and I-10 West Ramps	Caltrans*
13	California Street and I-10 East Ramps	Caltrans*
14	California Street and Walmart Driveway	City of Redlands
15	California Street and Redlands Boulevard	City of Redlands*
16	Alabama Street and I-10 West Ramps	Caltrans*
17	Alabama Street and I-10 East Ramps	Caltrans*
18	Alabama Street and Industrial Avenue	City of Redlands
19	Alabama Street and Redlands Boulevard	City of Redlands*
20	Tennessee Street and Redlands Boulevard	City of Redlands*
21	Texas Street and Stuart Avenue	City of Redlands
22	Texas Street and Oriental Avenue	City of Redlands
23	Eureka Street and Pearl Avenue	Caltrans
24	Eureka Street and Stuart Avenue	City of Redlands
25	Eureka Street and Oriental Avenue	City of Redlands
26	Eureka Street and Redlands Boulevard	City of Redlands
27	Orange Street and Colton Avenue	Caltrans
28	Orange Street and Pearl Avenue	Caltrans
29	Orange Street and Stuart Avenue	City of Redlands
30	Orange Street and Oriental Avenue	City of Redlands
31	Orange Street and Redlands Boulevard	City of Redlands*
32	6th Street and I-10 West Ramps	City of Redlands
33	6th Street and Pearl Avenue	City of Redlands
34	6th Street and Stuart Avenue	City of Redlands
35	Redlands Boulevard and Citrus Avenue	City of Redlands*
36	Church Street and Stuart Avenue	City of Redlands
37	University Street and I-10 West Ramps	City of Redlands
38	University Street and I-10 East Ramps	City of Redlands
39	Tippecanoe Avenue and Harriman Place	City of San Bernardino

* CMP Intersection



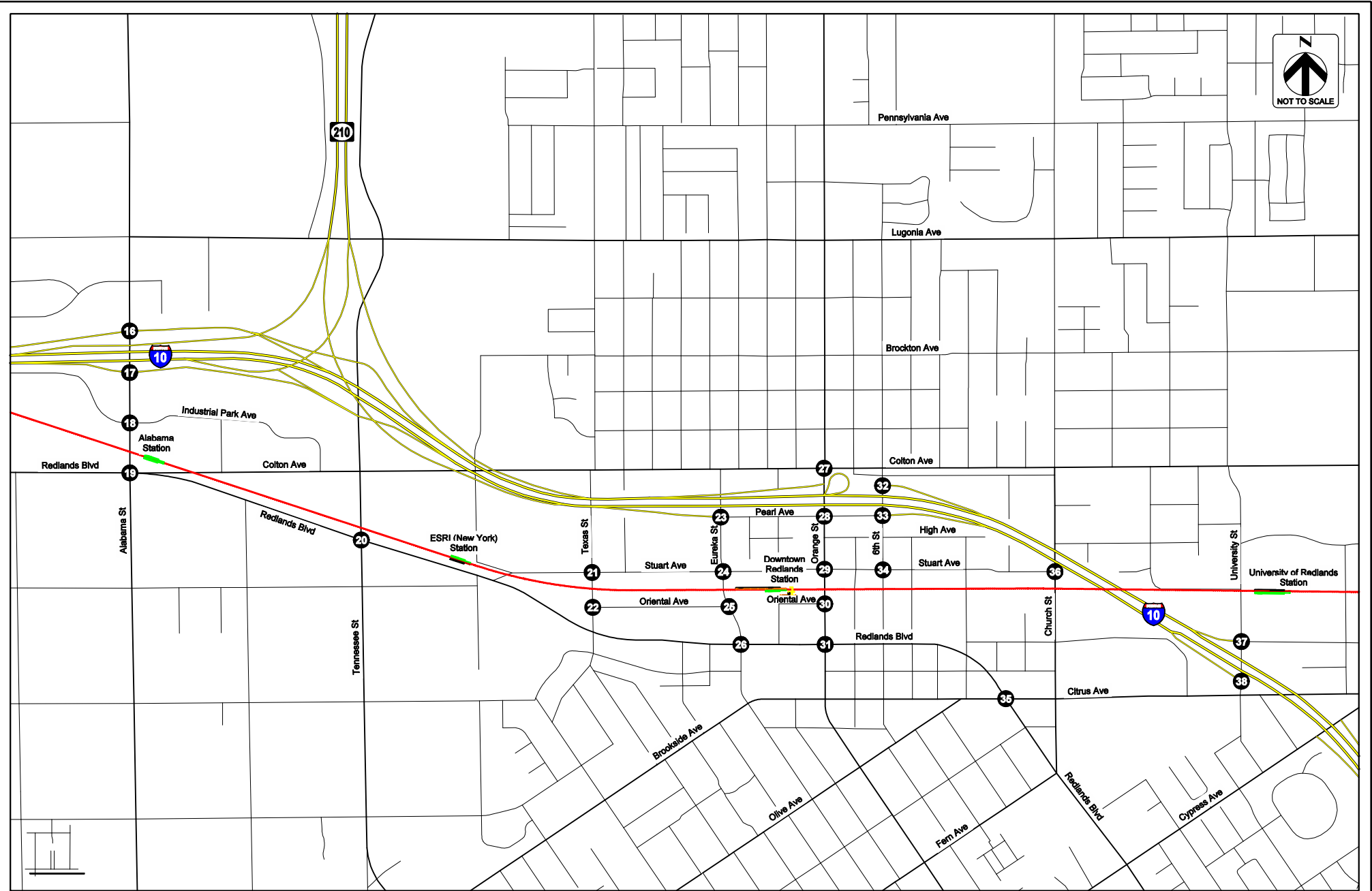
LEGEND:
 ● Existing Study Intersection
 — Proposed Railroad Alignment
 - - - City Boundaries

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**SAN BERNARDINO ASSOCIATED GOVERNMENTS
 REDLANDS PASSENGER RAIL PROJECT**
 STUDY INTERSECTIONS

FIGURE 2-1a



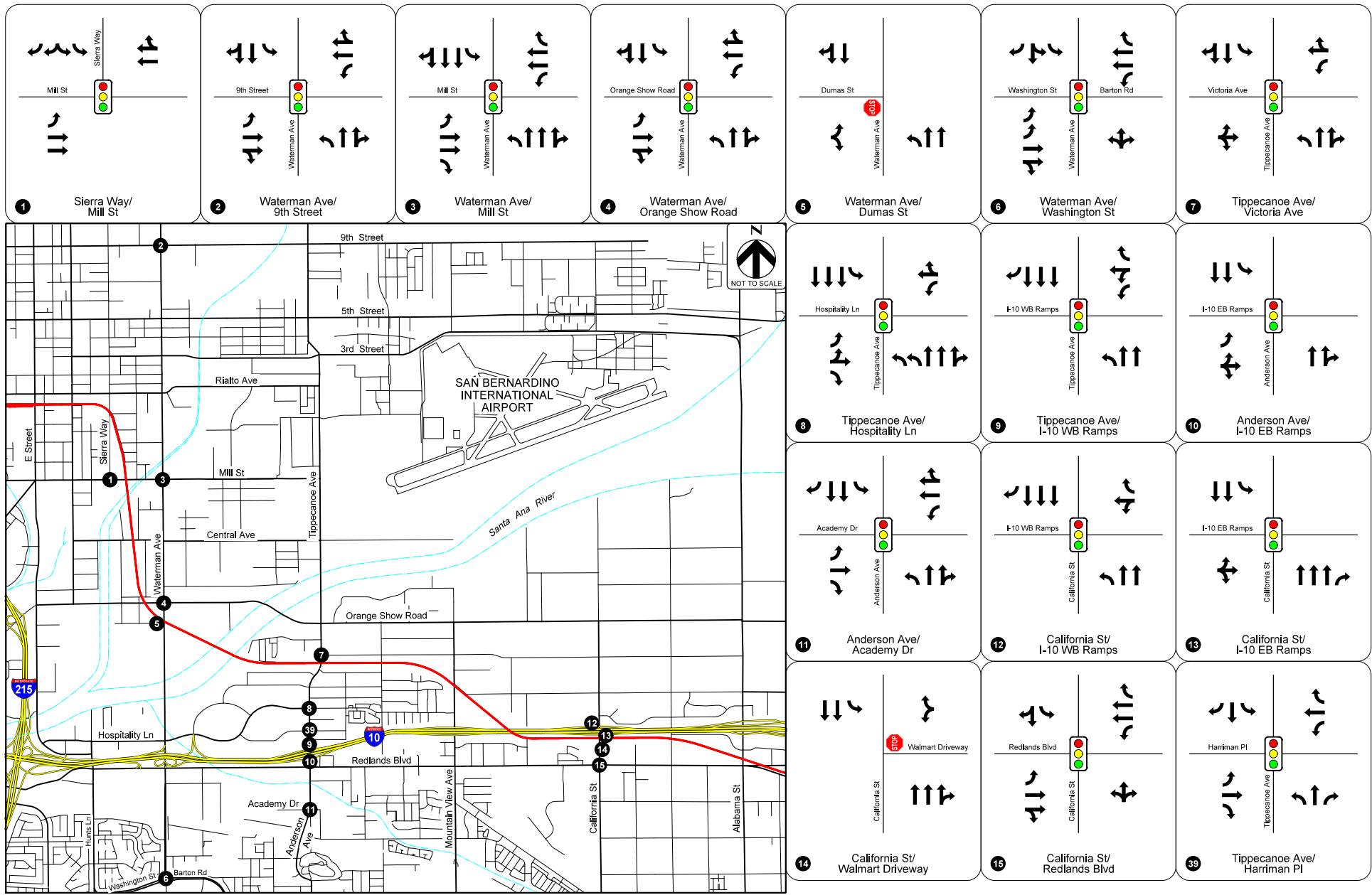
LEGEND:
 ● Existing Study Intersection
 — Proposed Railroad Alignment

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 STUDY INTERSECTIONS

FIGURE 2-1b

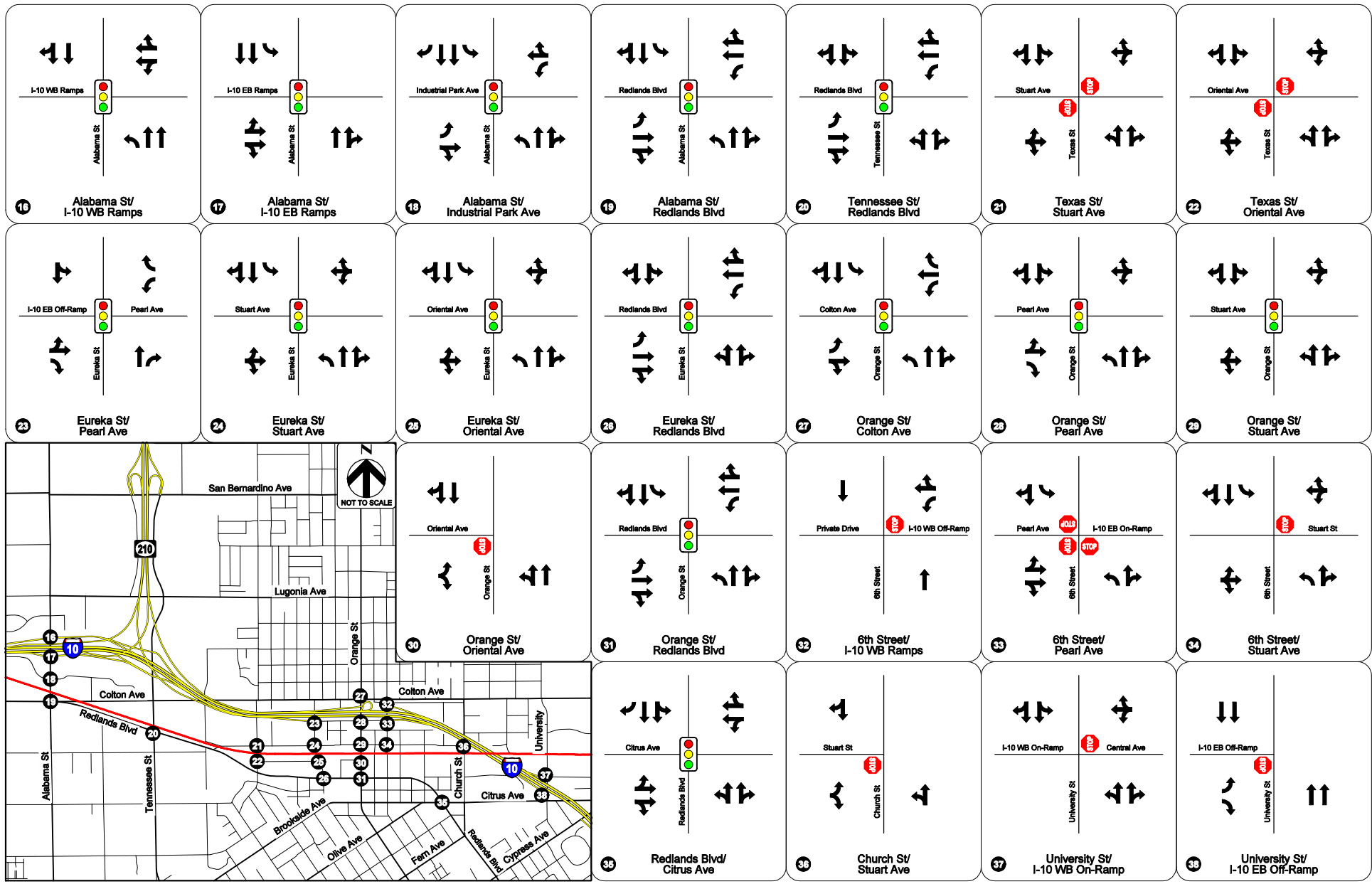


LEGEND:
 # Existing Study Intersection
 — Proposed Railroad Alignment



**SAN BERNARDINO ASSOCIATED GOVERNMENTS
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 EXISTING LANE GEOMETRY

FIGURE 2-2a



LEGEND:
 Existing Study Intersection
 Proposed Railroad Alignment

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 EXISTING LANE GEOMETRY

FIGURE 2-2b

2.2 EXISTING ROADWAY NETWORK

The project area is served by Interstate 10 (I-10) with freeway access provided at Tippecanoe Avenue/Anderson Avenue (eastbound and westbound on and off ramps), California Street (eastbound and westbound on and off ramps), Alabama Street (eastbound and westbound on and off ramps), Eureka Street (eastbound off-ramp), 6th Street (eastbound on-ramp and westbound off-ramp), and University Street (eastbound off-ramp and westbound on-ramp). The characteristics of the primary streets in the study area are as follows:

Waterman Avenue is a four-lane undivided roadway with a two-way left-turn lane between 40th Street and 5th Street. It widens to a six-lane undivided roadway with a two-way left-turn lane between 5th Street and E Mill Street with a portion being divided, narrows to four-lane divided roadway with two-way left-turn lanes between E Mill Street and E Vanderbilt Lane, and widens again to a 6-lane divided roadway between E Vanderbilt Lane and E Redlands Boulevard. Waterman Avenue runs from north to south, and is designated as a Main Arterial with a posted speed limit of 30 MPH at the grade crossing.

Mill Street is a four-lane undivided Minor Arterial with a school zone between S Arrowhead Avenue and S Sierra Way; it widens to a four-lane roadway with two-way left-turn lane and several concrete medians between S Sierra Way and S. Tippecanoe Avenue. Mill Street runs from west to east with a posted speed limit of 35 MPH at the grade crossing.

Sierra Way is a four-lane undivided roadway with a two-way left-turn lane between 7th Street and Mill Street. Sierra Way runs from north to south, and is designated as a Secondary Arterial with a posted speed limit of 35 MPH at the grade crossing.

Orange Show Road is a four-lane roadway with either a two-way left-turn lane or a raised landscaped center median divider. Orange Show Road runs from west to east, and is designated as a Major Arterial with a posted speed limit of 35 MPH at the grade crossing.

Dumas Street is a two-lane Local Street with no centerline markers. Dumas Street runs from west to east with a posted speed limit of 25 MPH.

S Tippecanoe Avenue is a two-lane roadway with two-way left-turn lane or a center median divider between Benedict Road and Gould Street. It widens to a six-lane roadway with two-way left-turn lane or a center median divider between Gould St and I-10. Tippecanoe Avenue runs from north to south, and is designated as a Major Arterial with a posted speed limit of 35 MPH at the grade crossing.

Hospitality Lane is a four-lane roadway with either a two-way left-turn lane or a center median divider west of Tippecanoe Avenue; it narrows to a two-lane undivided roadway named Coulston Street east of Tippecanoe Avenue. Hospitality Lane runs from west to east, and is designated as a Major Arterial with a posted speed limit of 35 MPH.

Harriman Place is a four-lane roadway, a center median divider west of S Tippecanoe Avenue. It narrows to two-lane roadway name Laurelwood Avenue west of S Tippecanoe Avenue. Harriman Place runs from west to east with a posted speed limit of 35 MPH.

California Street is a six-lane roadway, a center median divider between Orange Tree Lane and I-10; it narrows to a four-lane roadway with a center median divider between I-10 and Redlands Boulevard. California Street runs from north to south, and is designated as a Major Arterial with a posted speed limit of 35 MPH at the grade crossing.

Redlands Boulevard is a four-lane roadway with either a two-way left-turn lane or a center median divider. Redlands Boulevard runs from west to east, and is designated as a Major Arterial with a posted speed limit of 35 MPH.

Alabama Street is a four-lane roadway with either a two-way left-turn lane or a center median divider. Alabama Street runs from north to south, and is designated as a Major Arterial with a posted speed limit of 40 MPH at the grade crossing.

Industrial Park Avenue is a two-lane Local Road with either a two-way left-turn lane or a center median divider. Industrial Park Avenue runs from west to east with a posted speed limit of 25 MPH.

Tennessee Street is a four-lane Minor Arterial with either a two-way left-turn lane or a center median divider. Tennessee Street runs from north to south with a posted speed limit of 35 MPH at the grade crossing.

Texas Street is a four-lane undivided Minor Arterial. Texas Street runs from north to south with a posted speed limit of 35 MPH at the grade crossing.

Stuart Avenue is a two-lane undivided Collector Road. Stuart Avenue runs from west to east with a posted speed limit of 25 MPH.

Oriental Avenue is a two-lane undivided Local Road. Oriental Avenue runs from west to east with a posted speed limit of 25 MPH.

Pearl Avenue is a two-lane undivided roadway that becomes an on-ramp for eastbound I-10. Pearl Avenue runs from west to east, and is designated as a Local Road with a posted speed of 30 MPH.

Colton Avenue is a two-lane undivided Minor Arterial. Colton Avenue runs from west to east with a posted speed limit of 30 MPH.

6th Street is a two-lane undivided roadway north of Pearl Avenue. It widens to a roadway with two southbound lanes, a middle two-way left-turn lane, and one northbound lane between Pearl Avenue and Redlands Boulevard. 6th Street runs from north to south, and is designated partially as a Minor Arterial and partially as a Collector, with a posted speed limit of 25 MPH at the grade crossing.

Church Street is a two-lane undivided roadway. Church Avenue runs from north to south, and is designated as a Collector with a posted speed limit of 35 MPH at the grade crossing.

University Street is a four-lane undivided Major Collector. University Street runs from north to south, and is designated as a Minor Arterial with a posted speed limit of 35 MPH at the grade crossing.

2.2.1 Opening Year (2018) Roadway Network

The roadway is anticipated to remain the same as the existing condition except as described below for the following instances.

S Tippecanoe Avenue will add SBx signaling elements to the intersections of Brier Drive and Hospitality Place.

Hospitality Lane will add SBx exclusive center running lane in both the eastbound and westbound directions for its duration.

Intersection of Tippecanoe Avenue and Hospitality Lane will undergo striping changes and widening to accommodate a center running exclusive SBx lane in both the eastbound and westbound directions on the western quadrant of the intersection. Other than the addition of these BRT exclusive lanes, the number of lanes in each direction will remain the same.

Intersection of Tippecanoe Avenue and Harriman Place will undergo an extensive change as the eastern quadrant of the intersection will serve as the westbound exit for traffic from the I-10 Freeway and westbound entrance to the I-10 Freeway for northbound vehicles on Tippecanoe Avenue. E Laurelwood Avenue will be removed and replaced with by a 4 lane off-ramp (two exclusive left turn, one through-right, and one exclusive right turn lane) and single lane on-ramp. Westbound Harriman will drop an existing through lane and exclusive left turn and right turn lanes will be separated by a 12 foot wide striped median. Southbound traffic on S Tippecanoe Avenue will lose a left turn lane and add another through lane. Northbound turning movements at the intersection will be modified to two exclusive left turn lanes, three through lanes, and an exclusive right turn lane onto the westbound I-10 Freeway on-ramp that is separated by a striped median.

California Street will be widened from one to two lanes in each direction between Barton Road and Redlands Boulevard.

Intersection of California Street and Redlands Boulevard will be widened and will include installation of traffic signals, drainage and curb and gutters.

Alabama Street will be widened from a four lane divided highway to a six lane divided highway between Lugonia Avenue and Barton Road.

Intersection of Alabama Street and Redlands Boulevard will go through an extensive reconfiguration. For southbound movements an exclusive left turn lane and an exclusive right turn lane will be added. For northbound movements an additional exclusive left turn and through lane will be added. For eastbound movements an exclusive left turn lane, through lane and exclusive right turn lane will be added. For westbound movements an exclusive left turn lane, through lane and exclusive right turn lane will be added.

Church Street will be widened from one to two lanes in each direction between Colton Avenue and Redlands Boulevard.

2.2.2 Horizon Year (2038) Roadway Network

Roadway conditions are anticipated to remain the same as the existing and Opening Year (2018) except as described below for the following instances.

Tippecanoe Avenue will be widened from four to six lanes north of the I-10 Freeway.

California Street will be widened from five to six lanes between the I-10 Freeway and Redlands Boulevard.

2.3 DEVELOPMENT OF TRAFFIC VOLUMES

Two separate networks were developed, Without Project and With Project.

2.3.1 Existing (2011) No Project Traffic Volumes

Traffic counts were conducted on December 14 and 15, 2011 while school was still in session prior to the Christmas holidays. Detailed turning movement data is included in Appendix A. Vehicle classification counts (e.g., passenger vehicles, 2-axle trucks, 3-axle trucks, and 4+ axle trucks) were conducted at seven of the thirty-eight intersections, and are included in Appendix B. The traffic at these seven intersections were converted to passenger car equivalent (PCE) volumes using PCE factors of 1.5, 2.0, and 3.0 for 2-axle, 3-axle, and 4+ axle trucks, respectively, per *Appendix C of the San Bernardino County CMP*. PCE volumes at the remaining thirty-one intersections were calculated using an average PCE factor and truck

percentage based on the data at the seven intersections with classification counts. Volume development sheets are included in Appendix C. The peak hour volumes at the analysis intersections are presented in Appendix D.

2.3.2 Existing (2011), Opening Year (2018), and Horizon Year (2038) Traffic Forecast

The 2012 San Bernardino Valley Focus Model (SBVFM), derived from the Southern California Association of Governments (SCAG) Regional Travel Demand Model, was used to develop travel forecasts for year 2018 and 2038 No Project and With Project conditions to assess future year transit ridership sensitivity. The SBVFM uses the basic structure of the SCAG model, with the mode choice model derived from the Orange County Transportation Authority Model (OCTAM). The SBVFM employs the traditional 4-step modeling process used in the SCAG model and includes the following:

- All person trips are modeled (including nonmotorized)
- Vehicle trip data is split into four time periods and converted to origin-destination format using time-of-day models before traffic assignments are made to the network

The SBVFM model identifies all of the traffic related impacts of the transit alternatives, including mode shifts (e.g. from auto to transit), traffic diversions (e.g. from street closures), and traffic associated with drive access to transit stations. Detailed model information is provided in the *2012 Redlands Passenger Rail Project Travel Demand Model Methodology and Validation Technical Memorandum*.

Future Year 2018 and 2038 turning movement volumes at the study intersections were developed based on existing turning movement volumes and year 2018 and 2038 approach and departure volumes using the procedure described in the National Cooperative Highway Research Program Report (NCHRP) 255, *Highway Traffic Data for Urbanized Area Project Planning and Design* (Transportation Research Board, 1982).

PCE volumes for future traffic were calculated based on the average PCE factors and truck percentages developed from the existing traffic counts. Volume development sheets are included in Appendix C. The forecasted peak hour volumes at the study intersections along with the volume difference between With and Without Project scenarios are presented in Appendix D. Detailed methodology and calculations for the traffic forecasting is provided in Appendix E.

The locations of the Park and Ride lots that were incorporated into the model are as follows:

- E Street Station
- Tippecanoe Station
- New York Street Station.
- Downtown Redlands Station
- University Station

The street closures incorporated into the model are as follows:

- D Street
- Stuart Avenue
- 7th Street
- 9th Street
- W Hilda Street at S Arrowhead Avenue

2.3.3 Existing (2011), Opening Year (2018), and Horizon Year (2038) Traffic Forecast With Central Avenue Closure

The Central Avenue street closure was not incorporated into the model described in the previous section, therefore traffic was redistributed manually. The rerouting of traffic would have potential traffic impacts on the following adjacent intersections:

- Mill Street at Sierra Way
- Waterman Avenue at Mill Street
- Waterman Avenue at Orange Show Road
- Waterman Avenue at Dumas Street

Central Avenue currently has low daily traffic volumes. It is assumed that after the closure of Central Avenue, traffic will primarily use parallel east-west routes of Mill Street and Orange Show Road. Traffic turning movements at the above mentioned four intersections were estimated from the 2012 San Bernardino Valley Focus Model as described in the previous section.

The traffic volumes traveling along Central Avenue were redistributed based on the model estimated traffic flow pattern for years 2011, 2018 and 2038. The diverted turning traffic volumes at Central Avenue/Waterman Avenue were added to the model estimated intersection traffic turning movements of the adjacent four intersections.

2.3.4 Existing (2011), Opening Year (2018), and Horizon Year (2038) Traffic Forecast With Harriman Place at Tippecanoe Avenue

The initially estimated peak period intersection turning movements did not account for this proposed improvement. Therefore, traffic operation assessment of the intersections along Tippecanoe Avenue at the I-10 Westbound Ramp, Harriman Place-Laurelwood Drive and Hospitality Lane-Coulston Street were revisited to reflect the changes above. Traffic flow pattern was revised per the methodology described in the “Supplement to Traffic Operations Analysis, August 2009” study. The peak hour traffic volume estimate was conducted for With and Without Project conditions.

The traffic interchange at Interstate 10 (I-10) and Tippecanoe Avenue is proposed to be reconstructed by 2015. The reconstruction of the interchange includes the widening of Tippecanoe Avenue/Anderson Street between Redlands Boulevard and Laurelwood Drive, construction of additional turning lanes, and addition of a new westbound loop on-ramp connection to Laurelwood Drive in the northeast quadrant of the interchange. The study of “Supplement to Traffic Operations Analysis- Interstate 10/Tippecanoe Avenue Interchange Improvement Project, August 2009” was reviewed. The study documented the following changes with the reconstruction of the traffic interchange:

- Tippecanoe Avenue/Harriman Place-Laurelwood Drive: Laurelwood Drive would be realigned to connect to Coulston Street. The westbound off-ramp and loop on-ramp would align with Harriman Place. The existing eastbound through lane from Harriman Place would be eliminated. The westbound off-ramp would have two left-turn lanes, one shared through-right-turn lane and a dedicated right-turn lane. A dedicated northbound right-turn lane would be added at this intersection.
- Tippecanoe Avenue/I-10 Westbound Ramps: The westbound off-ramp would be realigned with Harriman Place. The existing westbound on-ramp would only be used by vehicles traveling

southbound on Tippecanoe Avenue. All conflicting turn movements at this intersection would be eliminated.

- Anderson Street/I-10 Eastbound Ramps: A second southbound left-turn lane and a dedicated northbound right-turn lane would be constructed. The off-ramp would be widened to provide two left-turn lanes, a shared through-right-turn lane and a dedicated right-turn lane.
- Anderson Street/Baker's Driveway: The driveway to Baker's Restaurant would be modified to only allow the northbound right-turn movement. In addition, due to the lengthening of the left and right-turn pockets at the intersection of Anderson Street/Redlands Boulevard, the southbound approach at this intersection would have five through lanes. All conflicting turning movements at this intersection would be eliminated.
- Anderson Street/Redlands Boulevard: A second southbound left-turn lane and a dedicated southbound right-turn lane would be constructed. The north leg of the intersection would be widened to provide a dedicated right-turn lane onto the eastbound on-ramp. In addition, dual left turn lanes and dedicated right-turn lanes would be constructed on the northbound, eastbound, and westbound approaches.

2.4 INTERSECTION LEVEL OF SERVICE AND V/C

Level of Service (LOS) is a quantitative measurement of operational characteristics of traffic and the perception of the traffic conditions by both motorists and passengers. There are six levels of service defined by the Highway Capacity Manual, published by the Transportation Research Board (TRB). Each level of service is given a letter designation from A to F, with A representing the optimal or best condition and F the worst.

The traffic operations analysis was conducted according to the 2000 Highway Capacity Manual (HCM) delay methodology. The HCM defines urban arterial level of service in terms of the average delay experienced by vehicles traveling through an intersection. Table 2-2 presents LOS and the ranges of delay per vehicle for signalized and unsignalized intersections.

Table 2-2 Intersection Level of Service Criteria

LOS	Control Delay Per Vehicle (seconds per vehicle)	Unsignalized Delay Per Vehicle (seconds per vehicle)	Description
A	≤ 10	≤ 10	Best, very low delay at signalized intersections.
B	> 10 and ≤ 20	> 10 and ≤ 15	More vehicles stop than with LOS A, causing higher levels of delay.
C	> 20 and ≤ 35	> 15 and ≤ 25	The number of vehicles stopping is significant, yet many still pass through the intersection without stopping.
D	> 35 and ≤ 55	> 25 and ≤ 35	Influence of congestion more noticeable. Many vehicles stop, and the proportion of vehicles not stopping declines. Cycle failure, where a vehicle has to wait through one or more cycles to pass through the intersection, occurs more frequently.
E	> 55 and ≤ 80	> 35 and ≤ 50	Individual cycle failures are frequent.
F	> 80	> 50	Unacceptable to most drivers; arrival flow rates exceed capacity.

Source: HCM 2000, Transportation Research Board

V/C or Volume to Capacity Ratio indicates the amount of congestion for the intersection; any value greater than or equal to 1 indicates that the intersection is operating above capacity. This is a good indication of whether the physical geometry and signal timing provide sufficient capacity for the intersection.

2.5 LEVEL OF SERVICE STANDARD

The intersections listed in Table 2-1 fall under the jurisdiction of Caltrans, City of Redlands, or City of San Bernardino with a number of the intersections being part of the San Bernardino County Congestion Management Plan (CMP) intersections. The following paragraphs outline the LOS standards for each jurisdiction.

Caltrans

Per the 2002 *Caltrans Guide for the Preparation of Traffic Impact Studies*, Caltrans requires LOS C approaching D at the ramp terminals; if currently less than the target LOS, the existing LOS should be maintained.

City of Redlands

Per the 1995 *City of Redlands General Plan*, City of Redlands requires LOS C with intersections operating at LOS D, E, or F considered unsatisfactory. Any increase in V/C greater than 0.01 is considered a significant impact.

City of San Bernardino

Per the 2004 *City of San Bernardino Traffic Impact Study Guidelines*, the City of San Bernardino requires intersections to operate at LOS D or better. A significant project impact would occur when intersection operations change between the “without project” and “with project” conditions as shown below.

<u>LOS Without Project</u>	<u>V/C Difference</u>
C	> 0.04
D	> 0.02
E, F	> 0.01

CMP

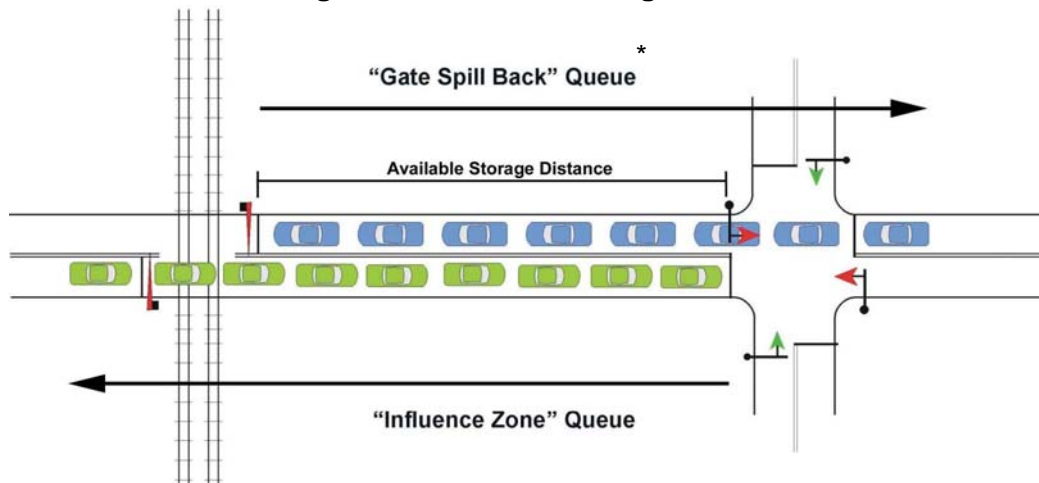
Per the 2005 *Congestion Management Program*, the LOS should not be below E or the current level, whichever is lower, with the exception of intersections designated as LOS F in Table 2-1. The intersections of California Street and Redlands Boulevard and Alabama Street and Redlands Boulevard are two such intersections. Additionally, any intersections with V/C greater than 1 are designated as LOS F.

2.6 QUEUING ANALYSIS

Based on the procedure in the Los Angeles *Metropolitan Transportation Authority (MTA) Grade Crossing Policy for Light Rail Transit*, the queuing analysis consists of two parts as illustrated in Figure 2-3:

1. Influence Zone Queue, which builds from an adjacent signalized intersection towards the grade crossing.
2. Crossing Spill Back Queue, which builds from the gate crossing towards an adjacent roadway intersection.

Figure 2-3 Grade Crossing Queues



Source: Figure 4 of *MTA Grade Crossing Policy for Light Rail Transit*

* "Gate Spill Back" Queue is also called "Crossing Spill Back" Queue

For existing conditions only the influence zone was considered since the grade crossing is not in service for a majority of the intersections (e.g. Tippecanoe Ave and all locations to the east). The average queue was calculated using Webster's formula per Appendix A of the *MTA Grade Crossing Policy*.

$$N = q * R \quad \text{OR} \quad N = q * (R/2 + d) \quad (\text{use greater result})$$

Where:

N = Average number of vehicles in queue

q = Peak period vehicle arrival rate (vehicles/second)

R = Signal red time (seconds)

d = Average delay (seconds)

The following assumptions were applied to the above formula.

- Average number of vehicles in queue was based on the vehicles in the through/shared lanes
- Peak period arrival rate was calculated per lane
- Red time and average delay was used for the through/shared lanes. Red time was calculated as Cycle Length – [(green + yellow) time for the through phase].
 - Gate down time was considered in place of the traffic signal red time. Per the *MTA Grade Crossing Policy* typical gate blockage time will be 34 to 45 seconds; the conservative value of 45 seconds was assumed for this analysis.
- Average peaking factor of 1.75

3.0 EXISTING (2011) TRAFFIC CONDITIONS

This section presents the results of the traffic analysis during existing conditions under No Project and With Project conditions. The traffic volumes were developed as described in Section 2.3.1. The intersections are illustrated in Figure 2-1a and 2-1b.

3.1 EXISTING (2011) NO PROJECT CONDITIONS

3.1.1 Intersection Level of Service

Level of service analysis was conducted to evaluate existing intersection operations and is included in Appendix F. Table 3-1 provides a summary of the existing level of service at the study intersections. Results show that the following intersections do not operate at satisfactory levels of service per the Level of Service standards discussed in Section 2.5. There is one intersection in the AM peak hour and ten intersections in the PM peak hour that do not operate within the Level of Service or V/C standards.

AM Peak Hour

California Street and I-10 East Ramps	LOS F
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PM Peak Hour

Waterman Avenue and Orange Show Road	LOS E
Anderson Avenue and I-10 East Ramps	1.09 V/C
California Street and I-10 West Ramps	1.04 V/C
California Street and I-10 East Ramps	LOS F
Alabama Street and I-10 West Ramps	1.04 V/C
Alabama Street and I-10 East Ramps	1.05 V/C
Alabama Street and Industrial Boulevard	LOS D
Alabama Street and Redlands Boulevard	1.07 V/C
Eureka Street and Pearl Avenue	LOS E
Orange Street and Pearl Avenue	LOS E

Table 3-1 Existing (2011) No Project Peak Hour Levels of Service

No.	Intersection	Jurisdiction	LOS Standard	Control	AM Peak Hour			PM Peak Hour		
					Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C
1	Sierra Way and Mill Street	City of San Bernardino	D	Signalized	6.3	A	0.30	6.7	A	0.38
2	Waterman Avenue and 9th Street	City of San Bernardino*	E	Signalized	21.8	C	0.52	31.9	C	0.67
3	Waterman Avenue and Mill Street	City of San Bernardino*	E	Signalized	22.2	C	0.38	28.1	C	0.56
4	Waterman Avenue and Orange Show Road	City of San Bernardino	D	Signalized	24.7	C	0.58	55.4	E	0.96
5	Waterman Avenue and Dumas Street	City of San Bernardino	D	OWSC	0.1	A	-	0.2	A	-
6	Waterman Avenue and Washington Street	City of San Bernardino	D	Signalized	30.6	C	0.80	41.8	D	0.71
7	Tippecanoe Avenue and Victoria Avenue	City of San Bernardino	D	Signalized	7.5	A	0.41	7.3	A	0.49
8	Tippecanoe Avenue and Hospitality Lane	City of San Bernardino	D	Signalized	49.6	D	0.64	25.6	C	0.82
9	Tippecanoe Avenue and I-10 West Ramps	Caltrans*	E	Signalized	29.0	C	0.57	48.1	D	0.88
10	Anderson Avenue and I-10 East Ramps	Caltrans*	E	Signalized	25.7	C	0.7	78.1	E	1.09
11	Anderson Avenue and Academy Drive	City of Loma Linda	D	Signalized	38.8	D	0.85	13.5	B	0.51
12	California Street and I-10 West Ramps	Caltrans*	E	Signalized	53.2	D	1.02	62.8	E	1.04
13	California Street and I-10 East Ramps	Caltrans*	E	Signalized	344.7	F	0.90	186.1	F	0.96
14	California Street and Walmart Driveway	City of Redlands	C	OWSC	1.7	A	-	3.5	A	-
15	California Street and Redlands Boulevard	City of Redlands*	F	Signalized	60.8	E	0.98	107.0	F	0.98
16	Alabama Street and I-10 West Ramps	Caltrans*	E	Signalized	60.9	E	0.82	74.6	E	1.04
17	Alabama Street and I-10 East Ramps	Caltrans*	E	Signalized	23.2	C	0.6	66.5	E	1.05
18	Alabama Street and Industrial Avenue	City of Redlands	C	Signalized	12.6	B	0.46	38.2	D	0.97
19	Alabama Street and Redlands Boulevard	City of Redlands*	F	Signalized	52.1	D	0.75	88.4	F	1.07
20	Tennessee Street and Redlands Boulevard	City of Redlands*	E	Signalized	42.5	D	0.73	65.8	E	0.90
21	Texas Street and Stuart Avenue	City of Redlands	C	TWSC	3.5	A	-	2.2	A	-
22	Texas Street and Oriental Avenue	City of Redlands	C	TWSC	0.9	A	-	0.7	A	-
23	Eureka Street and Pearl Avenue	Caltrans	C	Signalized	33.5	C	0.52	72.0	E	0.77
24	Eureka Street and Stuart Avenue	City of Redlands	C	Signalized	6.6	A	0.39	8.9	A	0.24
25	Eureka Street and Oriental Avenue	City of Redlands	C	Signalized	5.3	A	0.27	5.6	A	0.30
26	Eureka Street and Redlands Boulevard	City of Redlands	C	Signalized	14.9	B	0.38	22.2	C	0.63
27	Orange Street and Colton Avenue	Caltrans	C	Signalized	17.7	B	0.51	12.4	B	0.63
28	Orange Street and Pearl Avenue	Caltrans	C	Signalized	15.7	B	0.73	76.9	E	1.04
29	Orange Street and Stuart Avenue	City of Redlands	C	Signalized	7.5	A	0.48	12.0	B	0.70
30	Orange Street and Oriental Avenue	City of Redlands	C	OWSC	0.1	A	-	0.9	A	-
31	Orange Street and Redlands Boulevard	City of Redlands*	E	Signalized	22.2	C	0.53	33.8	C	0.86
32	6th Street and I-10 West Ramps	City of Redlands	C	TWSC	6.1	A	-	8.0	A	-
33	6th Street and Pearl Avenue	City of Redlands	C	AWSC	14.9	B	-	20.5	C	-
34	6th Street and Stuart Avenue	City of Redlands	C	TWSC	3.1	A	-	4.0	A	-
35	Redlands Boulevard and Citrus Avenue	City of Redlands*	E	Signalized	48.9	D	0.92	26.3	C	0.69
36	Church Street and Stuart Avenue	City of Redlands	C	OWSC	1.7	A	-	2.0	A	-
37	University Street and I-10 West Ramps	City of Redlands	C	OWSC	14.1	B	-	5.6	A	-
38	University Street and I-10 East Ramps	City of Redlands	C	OWSC	9.3	A	-	15.0	C	-
39	Tippecanoe Avenue and Harriman Place	City of San Bernardino	D	Signalized	5.6	A	0.31	11.8	B	0.87

* CMP Intersection

Red values indicate the LOS or V/C threshold has been exceeded.

3.2 EXISTING (2011) WITH PROJECT CONDITIONS

3.2.1 Intersection Level of Service

Level of service analysis was conducted to evaluate existing intersection operations and is included in Appendix F. Table 3-2 on the following page provides a summary of the existing level of service at the study intersections. There is one intersection in the AM and PM peak hour that does not operate within the Level of Service or V/C standards.

AM and PM Peak Hour

California Street and I-10 East Ramps	LOS F
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Table 3-2 Existing (2011) With Project Peak Hour Levels of Service

No.	Intersection	Jurisdiction	LOS Standard	Control	AM Peak Hour			PM Peak Hour		
					Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C
1	Sierra Way and Mill Street	City of San Bernardino	D	Signalized	6.0	A	0.27	6.2	A	0.33
2	Waterman Avenue and 9th Street	City of San Bernardino*	E	Signalized	10.8	B	0.52	14.4	B	0.61
3	Waterman Avenue and Mill Street	City of San Bernardino*	E	Signalized	19.3	B	0.47	29.8	C	0.68
4	Waterman Avenue and Orange Show Road	City of San Bernardino	D	Signalized	22.6	C	0.55	41.0	D	0.85
5	Waterman Avenue and Dumas Street	City of San Bernardino	D	OWSC	0.1	A	-	0.1	A	-
6	Waterman Avenue and Washington Street	City of San Bernardino	D	Signalized	29.6	C	0.84	40.8	D	0.66
7	Tippecanoe Avenue and Victoria Avenue	City of San Bernardino	D	Signalized	7.1	A	0.44	6.1	A	0.53
8	Tippecanoe Avenue and Hospitality Lane	City of San Bernardino	D	Signalized	16.2	B	0.45	28.3	C	0.73
9	Tippecanoe Avenue and I-10 West Ramps	Caltrans*	E	Signalized	16.6	C	0.71	39.5	D	0.85
10	Anderson Avenue and I-10 East Ramps	Caltrans*	E	Signalized	19.3	B	0.76	53.0	D	1.03
11	Anderson Avenue and Academy Drive	City of Loma Linda	D	Signalized	26.9	C	0.88	10.0	B	0.48
12	California Street and I-10 West Ramps	Caltrans*	E	Signalized	43.2	D	0.96	38.9	D	0.98
13	California Street and I-10 East Ramps	Caltrans*	E	Signalized	305.7	F	0.79	179.7	F	0.93
14	California Street and Walmart Driveway	City of Redlands	C	OWSC	1.6	A	-	3.3	A	-
15	California Street and Redlands Boulevard	City of Redlands*	F	Signalized	21.9	C	0.60	60.8	E	0.95
16	Alabama Street and I-10 West Ramps	Caltrans*	E	Signalized	24.4	C	0.80	35.7	D	0.91
17	Alabama Street and I-10 East Ramps	Caltrans*	E	Signalized	17.3	B	0.68	35.9	D	0.90
18	Alabama Street and Industrial Avenue	City of Redlands	C	Signalized	11.2	B	0.48	24.1	C	0.82
19	Alabama Street and Redlands Boulevard	City of Redlands*	F	Signalized	19.5	B	0.55	24.8	C	0.87
20	Tennessee Street and Redlands Boulevard	City of Redlands*	E	Signalized	13.9	B	0.67	22.1	C	0.76
21	Texas Street and Stuart Avenue	City of Redlands	C	TWSC	3.7	A	-	1.9	A	-
22	Texas Street and Oriental Avenue	City of Redlands	C	TWSC	3.7	A	-	3.2	A	-
23	Eureka Street and Pearl Avenue	Caltrans	C	Signalized	19.6	B	0.44	25.4	C	0.68
24	Eureka Street and Stuart Avenue	City of Redlands	C	Signalized	6.6	A	0.38	8.9	A	0.23
25	Eureka Street and Oriental Avenue	City of Redlands	C	Signalized	5.2	A	0.26	6.1	A	0.32
26	Eureka Street and Redlands Boulevard	City of Redlands	C	Signalized	8.6	A	0.46	23.3	C	0.64
27	Orange Street and Colton Avenue	Caltrans	C	Signalized	14.2	B	0.50	12.0	B	0.66
28	Orange Street and Pearl Avenue	Caltrans	C	Signalized	14.4	B	0.73	33.6	C	0.97
29	Orange Street and Stuart Avenue	City of Redlands	C	Signalized	7.5	A	0.47	12.3	B	0.70
30	Orange Street and Oriental Avenue	City of Redlands	C	OWSC	0.0	A	-	1.1	A	-
31	Orange Street and Redlands Boulevard	City of Redlands*	E	Signalized	8.0	A	0.46	23.0	C	0.75
32	6th Street and I-10 West Ramps	City of Redlands	C	TWSC	6.1	A	-	7.8	A	-
33	6th Street and Pearl Avenue	City of Redlands	C	AWSC	14.7	B	-	19.8	C	-
34	6th Street and Stuart Avenue	City of Redlands	C	TWSC	2.9	A	-	3.0	A	-
35	Redlands Boulevard and Citrus Avenue	City of Redlands*	E	Signalized	41.5	D	0.88	23.7	C	0.70
36	Church Street and Stuart Avenue	City of Redlands	C	OWSC	1.9	A	-	1.5	A	-
37	University Street and I-10 West Ramps	City of Redlands	C	OWSC	12.2	B	-	4.2	A	-
38	University Street and I-10 East Ramps	City of Redlands	C	OWSC	9.1	A	-	15.4	C	-
39	Tippecanoe Avenue and Harriman Place	City of San Bernardino	D	Signalized	5.4	A	0.30	13.5	B	0.81

*CMP Intersection

Red values indicate the LOS or V/C threshold has been exceeded.

3.2.2 Queuing Analysis

A summary of the grade crossing influence zone queue analysis is provided in Table 3-3. The results show that the queues from the following intersections are expected to exceed the available storage distance between the signalized intersection and the grade crossing and could potentially block the grade crossing.

AM Peak Hour

Redlands Boulevard and the Tennessee Street crossing

PM Peak Hour

EB I-10 Ramps and the California Street crossing
Industrial Park Avenue and the Alabama Street crossing
Redlands Boulevard and the Alabama Street crossing
Redlands Boulevard and the Tennessee Street crossing

Table 3-4 provides a summary of the crossing spillback queue analysis. The results indicate that the queues from the following grade crossing locations exceed the available storage between the grade crossing and the signalized intersection and could potentially block the intersection.

AM Peak Hour

Dumas Street and the Waterman Avenue grade crossing
EB I-10 Ramps and the California Street crossing
Redlands Boulevard and the Alabama Street crossing
Redlands Boulevard and the Tennessee Street crossing
Redlands Boulevard and the Orange Street crossing

PM Peak Hour

Dumas Street and the Waterman Avenue grade crossing
EB I-10 Ramps and the California Street crossing
Redlands Boulevard and the Alabama Street crossing
Redlands Boulevard and the Tennessee Street crossing
Redlands Boulevard and the Orange Street crossing

Table 3-3 Existing (2011) With Project Grade Crossing Influence Zone Queue

Grade Crossing Location	Adjacent Intersection	Available Storage (ft)	AM Peak					PM Peak					
			q	R	d	Avg # Veh in Queue	Queue Length	q	R	d	Avg # Veh in Queue	Queue Length	
South E Street	W Rialto Avenue	390	-	-	-	-	-	-	-	-	-	-	-
D Street	W Rialto Avenue	410	-	-	-	-	-	-	-	-	-	-	-
South Arrowhead Avenue	W Rialto Avenue	395	-	-	-	-	-	-	-	-	-	-	-
South Sierra Way	W Rialto Avenue	700	-	-	-	-	-	-	-	-	-	-	-
East Mill St	S Sierra Way	610	0.08	27	4.6	2	57	0.14	27	4.8	4	92	
	S Waterman Ave	1330	0.07	41	28.1	4	88	0.81	36	24.4	34	858	
East Central Avenue	S Waterman Ave	1060	-	-	-	-	-	-	-	-	-	-	
Orange Show Road	S Waterman Ave	650	0.11	58	26.0	7	166	0.14	59	45.4	11	270	
Waterman Avenue	Orange Show Road	660	0.15	55	20.0	8	206	0.21	52	32.6	12	301	
	Dumas St	35	-	-	-	-	-	-	-	-	-	-	
Tippecanoe Avenue	E Victoria Ave	285	0.13	31	6.3	4	98	0.23	30.6	6.7	7	174	
	Hospitality Ln	1790	-	-	-	-	-	-	-	-	-	-	
	WB I-10 Ramp	3290	-	-	-	-	-	-	-	-	-	-	
	EB I-10 Ramp	3630	-	-	-	-	-	-	-	-	-	-	
Richardson Street	N/A	-	-	-	-	-	-	-	-	-	-	-	
Mountain View Avenue	E Victoria Ave	1150	-	-	-	-	-	-	-	-	-	-	
California Street	WB I-10 Ramp	380	-	-	-	-	-	-	-	-	-	-	
	EB I-10 Ramp	80	0.12	23	5.8	3	67	0.15	38	13.8	6	146	
	Shopping Center	320	-	-	-	-	-	-	-	-	-	-	
	Redlands Blvd	1040	0.16	44	14.2	7	180	0.17	42.8	77.5	17	431	
Nevada Street	Redlands Blvd	1000	-	-	-	-	-	-	-	-	-	-	
Alabama Street	WB I-10 Ramp	1525	-	-	-	-	-	-	-	-	-	-	
	EB I-10 Ramp	870	-	-	-	-	-	-	-	-	-	-	
	Industrial Park Ave	280	0.15	39.2	11.3	6	151	0.24	49.2	28.8	13	324	
	Redlands Blvd	150	0.16	36	13.6	6	144	0.17	40	18.6	7	167	
Colton Avenue	Alabama St	825	-	-	-	-	-	-	-	-	-	-	
Tennessee Street	Redlands Blvd	36	0.17	34	12.4	6	142	0.16	43	25.6	8	193	
Caliber Auto Body	N/A	-	-	-	-	-	-	-	-	-	-	-	
Texas Street	Stuart Ave	190	-	-	-	-	-	-	-	-	-	-	
	Oriental Ave	220	-	-	-	-	-	-	-	-	-	-	
	Redlands Blvd	495	-	-	-	-	-	-	-	-	-	-	
North Eureka Street	Stuart Ave	260	0.02	20	5.4	0	10	0.09	20	2.2	2	47	
	Oriental Ave	155	0.12	14	5.2	2	43	0.13	16	6.0	2	51	
	Redlands Blvd	605	-	-	-	-	-	-	-	-	-	-	
Orange Street	Stuart Ave	280	0.17	27.2	7.7	5	114	0.22	27.2	12.0	6	149	
	Oriental Ave	150	-	-	-	-	-	-	-	-	-	-	
	Redlands Blvd	575	0.07	24	6.8	2	43	0.12	39.8	19.9	5	117	
6th Street	Stuart Ave	275	-	-	-	-	-	-	-	-	-	-	
7th Street	N/A	-	-	-	-	-	-	-	-	-	-	-	
9th Street	N/A	-	-	-	-	-	-	-	-	-	-	-	
Church Street	Stuart Ave	265	-	-	-	-	-	-	-	-	-	-	
N University Street	EB I-10 Ramp	1000	-	-	-	-	-	-	-	-	-	-	
	WB I-10 Ramp	555	-	-	-	-	-	-	-	-	-	-	

Red values indicate queue length that is greater than available storage

Table 3-4 Existing (2011) With Project Crossing Spillback Queue

Grade Crossing Location	Adjacent Intersection	Available Storage (ft)	AM Peak					PM Peak					
			q	R	d	Avg # Veh in Queue	Queue Length	q	R	d	Avg # Veh in Queue	Queue Length	
South E Street	W Rialto Avenue	390	-	-	-	-	-	-	-	-	-	-	-
D Street	W Rialto Avenue	410	-	-	-	-	-	-	-	-	-	-	-
South Arrowhead Avenue	W Rialto Avenue	395	-	-	-	-	-	-	-	-	-	-	-
South Sierra Way	W Rialto Avenue	700	-	-	-	-	-	-	-	-	-	-	-
East Mill St	S Sierra Way	610	0.12	45	1.6	5	131	0.14	45	1.7	6	160	
	S Waterman Ave	1330	0.09	45	1.5	4	100	0.15	45	1.8	7	164	
East Central Avenue	S Waterman Ave	1060	-	-	-	-	-	-	-	-	-	-	-
Orange Show Road	S Waterman Ave	650	0.14	45	1.5	6	161	0.18	45	1.9	8	197	
Waterman Avenue	Orange Show Road	660	0.22	45	1.9	10	243	0.27	45	2.3	12	306	
	Dumas St	35	0.17	45	1.7	8	190	0.25	45	2.1	11	280	
Tippecanoe Avenue	E Victoria Ave	285	0.21	45	1.9	10	241	0.22	45	1.9	10	248	
	Hospitality Ln	1790	0.08	45	1.6	4	95	0.15	45	2	7	171	
	WB I-10 Ramp	3290	-	-	-	-	-	-	-	-	-	-	
	EB I-10 Ramp	3630	-	-	-	-	-	-	-	-	-	-	
Richardson Street	N/A	-	-	-	-	-	-	-	-	-	-	-	
Mountain View Avenue	E Victoria Ave	1150	-	-	-	-	-	-	-	-	-	-	
California Street	WB I-10 Ramp	380	-	-	-	-	-	-	-	-	-	-	
	EB I-10 Ramp	80	0.11	45	2.0	5	129	0.14	45	2.2	6	156	
	Shopping Center	320	-	-	-	-	-	-	-	-	-	-	
	Redlands Blvd	1040	0.23	45	1.5	10	261	0.31	45	1.7	14	346	
Nevada Street	Redlands Blvd	1000	-	-	-	-	-	-	-	-	-	-	
Alabama Street	WB I-10 Ramp	1525	-	-	-	-	-	-	-	-	-	-	
	EB I-10 Ramp	870	-	-	-	-	-	-	-	-	-	-	
	Industrial Park Ave	280	0.18	45	1.8	8	201	0.20	45	1.9	9	226	
	Redlands Blvd	150	0.15	45	1.7	7	174	0.26	45	2.1	12	294	
Colton Avenue	Alabama St	825	-	-	-	-	-	-	-	-	-	-	
Tennessee Street	Redlands Blvd	36	0.17	45	1.7	8	188	0.24	45	2.0	11	275	
Caliber Auto Body	N/A	-	-	-	-	-	-	-	-	-	-	-	
Texas Street	Stuart Ave	190	0.11	45	1.5	5	120	0.08	45	1.4	4	94	
	Oriental Ave	220	0.15	45	1.6	7	163	0.14	45	1.6	6	161	
	Redlands Blvd	495	-	-	-	-	-	-	-	-	-	-	
North Eureka Street	Stuart Ave	260	0.12	45	1.6	6	139	0.13	45	1.6	6	151	
	Oriental Ave	155	0.02	45	1.3	1	25	0.10	45	1.5	4	109	
	Redlands Blvd	605	-	-	-	-	-	-	-	-	-	-	
Orange Street	Stuart Ave	280	0.09	45	1.5	4	100	0.17	45	1.7	8	190	
	Oriental Ave	150	0.16	45	1.7	7	182	0.22	45	1.9	10	247	
	Redlands Blvd	575	-	-	-	-	-	-	-	-	-	-	
6th Street	Stuart Ave	275	0.08	45	1.4	4	94	0.09	45	1.5	4	97	
7th Street	N/A	-	-	-	-	-	-	-	-	-	-	-	
9th Street	N/A	-	-	-	-	-	-	-	-	-	-	-	
Church Street	Stuart Ave	265	0.16	45	1.8	7	177	0.12	45	1.6	6	139	
N University Street	EB I-10 Ramp	1000	-	-	-	-	-	-	-	-	-	-	
	WB I-10 Ramp	555	0.10	45	1.5	4	111	0.15	45	1.6	7	166	

Red values indicate queue length that is greater than available storage

4.0 OPENING YEAR (2018) TRAFFIC CONDITIONS

This section analyzes traffic conditions during opening year (2018) under No Project and With Project conditions. The traffic volumes were developed as described in Section 2.3.

4.1 RTIP/SCAG PLANNED IMPROVEMENTS

The following RTIP/SCAG improvements were assumed in the Opening year (2018) traffic model.

Table 4-1 2018 RTIP/SCAG Planned Improvements

ID	Description
44810-44811 (City of San Bernardino CIP #SS11-008)	Add EB off-ramp auxiliary lane from I-10 ramp to Tippecanoe off-ramp and widen bridge.
200625	E Street Transit Corridor (SBx) – From San Bernardino to Loma Linda
4A07017	Widen Alabama from Lugonia Ave to Barton Rd from 4 to 6 lanes.
4A01239	Widen Church St from Colton Ave to Redlands Blvd from 1 to 2 lanes
SBD031294	Widen intersection of Redlands Blvd at California St and install traffic signals, drainage, curb and gutters
SBD31876	Widen California St from Barton Rd to Redlands Blvd from 2 to 4 lanes.
4GL04	I-10/Alabama, and Redlands Blvd and Alabama/Colton intersection – widen intersection approaches on all four legs. Add dual left turn lanes.

4.2 OPENING YEAR (2018) WITHOUT PROJECT CONDITIONS

4.2.1 Intersection Level of Service

Level of service analysis was conducted to evaluate existing intersection operations and is included in Appendix F. Table 4-2 on the following page provides a summary of the existing level of service at the study intersections. Results show that the following intersections do not operate at satisfactory levels of service per the Level of Service standards discussed in Section 2.5. There is one intersection in the AM peak hour and five intersections in the PM peak hour that do not operate at satisfactory levels of service.

AM Peak Hour

University Street and I-10 West Ramps	LOS D
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PM Peak Hour

California Street and I-10 West Ramps	1.09 V/C
California Street and I-10 East Ramps	1.05 V/C
Orange Street and Pearl Avenue	LOS D
6 th Street and Pearl Avenue	LOS D
University Street and I-10 East Ramp	LOS D

Table 4-2 Opening Year (2018) No Project - Peak Hour Levels of Service

No.	Intersection	Jurisdiction	LOS Standard	Control	AM Peak Hour			PM Peak Hour		
					Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C
1	Sierra Way and Mill Street	City of San Bernardino	D	Signalized	6.2	A	0.28	7.5	A	0.39
2	Waterman Avenue and 9th Street	City of San Bernardino*	E	Signalized	11.4	B	0.58	15.5	B	0.67
3	Waterman Avenue and Mill Street	City of San Bernardino*	E	Signalized	15.8	B	0.53	18.6	B	0.64
4	Waterman Avenue and Orange Show Road	City of San Bernardino	D	Signalized	21.8	C	0.69	48.9	D	0.93
5	Waterman Avenue and Dumas Street	City of San Bernardino	D	OWSC	0.1	A	-	0.2	A	-
6	Waterman Avenue and Washington Street	City of San Bernardino	D	Signalized	29.9	C	0.71	37.9	D	0.96
7	Tippecanoe Avenue and Victoria Avenue	City of San Bernardino	D	Signalized	6.2	A	0.48	6.7	A	0.57
8	Tippecanoe Avenue and Hospitality Lane	City of San Bernardino	D	Signalized	20.2	C	0.64	39.5	D	0.83
9	Tippecanoe Avenue and I-10 West Ramps	Caltrans*	E	Unsignalized	-	-	-	-	-	-
10	Anderson Avenue and I-10 East Ramps	Caltrans*	E	Signalized	19.0	B	0.69	36.4	D	0.86
11	Anderson Avenue and Academy Drive	City of Loma Linda	D	Signalized	21.8	C	0.82	11.2	B	0.60
12	California Street and I-10 West Ramps	Caltrans*	E	Signalized	31.7	C	0.88	65.1	E	1.09
13	California Street and I-10 East Ramps	Caltrans*	E	Signalized	33.9	C	0.60	51.6	D	1.05
14	California Street and Walmart Driveway	City of Redlands	C	OWSC	1.7	A	-	8.0	A	-
15	California Street and Redlands Boulevard	City of Redlands*	F	Signalized	22.8	C	0.80	49.7	D	0.91
16	Alabama Street and I-10 West Ramps	Caltrans*	E	Signalized	32.2	C	0.86	37.6	D	0.99
17	Alabama Street and I-10 East Ramps	Caltrans*	E	Signalized	16.8	B	0.66	34.2	C	0.91
18	Alabama Street and Industrial Avenue	City of Redlands	C	Signalized	5.5	A	0.44	32.9	C	0.84
19	Alabama Street and Redlands Boulevard	City of Redlands*	F	Signalized	26.7	C	0.56	37.4	D	0.93
20	Tennessee Street and Redlands Boulevard	City of Redlands*	E	Signalized	10.3	B	0.61	27.5	C	0.83
21	Texas Street and Stuart Avenue	City of Redlands	C	TWSC	3.3	A	-	2.3	A	-
22	Texas Street and Oriental Avenue	City of Redlands	C	TWSC	0.8	A	-	0.7	A	-
23	Eureka Street and Pearl Avenue	Caltrans	C	Signalized	19.3	B	0.47	25.5	C	0.70
24	Eureka Street and Stuart Avenue	City of Redlands	C	Signalized	6.6	A	0.38	5.6	A	0.30
25	Eureka Street and Oriental Avenue	City of Redlands	C	Signalized	5.5	A	0.27	6.1	A	0.31
26	Eureka Street and Redlands Boulevard	City of Redlands	C	Signalized	8.8	A	0.47	14.1	B	0.62
27	Orange Street and Colton Avenue	Caltrans	C	Signalized	15.0	B	0.55	14.0	B	0.68
28	Orange Street and Pearl Avenue	Caltrans	C	Signalized	16.2	B	0.79	51.0	D	1.05
29	Orange Street and Stuart Avenue	City of Redlands	C	Signalized	7.6	A	0.49	12.4	B	0.71
30	Orange Street and Oriental Avenue	City of Redlands	C	OWSC	0.1	A	-	1.1	A	-
31	Orange Street and Redlands Boulevard	City of Redlands*	E	Signalized	8.3	A	0.48	19.0	B	0.59
32	6th Street and I-10 West Ramps	City of Redlands	C	TWSC	9.8	A	-	13.3	B	-
33	6th Street and Pearl Avenue	City of Redlands	C	AWSC	13.5	B	-	29.6	D	-
34	6th Street and Stuart Avenue	City of Redlands	C	TWSC	3.3	A	-	4.9	A	-
35	Redlands Boulevard and Citrus Avenue	City of Redlands*	E	Signalized	23.9	C	0.72	26.0	C	0.76
36	Church Street and Stuart Avenue	City of Redlands	C	OWSC	1.5	A	-	1.8	A	-
37	University Street and I-10 West Ramps	City of Redlands	C	OWSC	25.6	D	-	8.4	A	-
38	University Street and I-10 East Ramps	City of Redlands	C	OWSC	8.0	A	-	25.2	D	-
39	Tippecanoe Avenue and Harriman Place	City of San Bernardino	D	Signalized	31.1	C	0.62	40.0	D	0.75

* CMP Intersection

Red values indicate the LOS or V/C threshold has been exceeded.

4.3 OPENING YEAR (2018) WITHOUT PROJECT CONDITIONS AND WITH CENTRAL AVENUE CLOSURE

4.3.1 Intersection Level of Service

Level of service analysis was conducted to evaluate existing intersection operations and is included in Appendix F. Table 4-3 provides a summary of the level of service at the study intersections. Results show that the following intersection does not operate at satisfactory levels of service in the PM peak hour per the Level of Service standards discussed in Section 2.5.

PM Peak Hour

Waterman Avenue and Orange Show Road LOS E

Table 4-3 Opening Year (2018) No Project and Central Avenue Closure - Peak Hour Levels of Service

No.	Intersection	Jurisdiction	LOS Standard	Control	AM Peak Hour			PM Peak Hour		
					Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C
1	Sierra Way and Mill Street	City of San Bernardino	D	Signalized	6.0	A	0.33	7.8	A	0.49
3	Waterman Avenue and Mill Street	City of San Bernardino*	E	Signalized	16.4	B	0.64	36.3	D	0.81
4	Waterman Avenue and Orange Show Road	City of San Bernardino	D	Signalized	26.8	C	0.80	78.0	E	1.04
5	Waterman Avenue and Dumas Street	City of San Bernardino	D	OWSC	0.1	A	-	0.2	A	-

* CMP Intersection

Red values indicate the LOS or V/C threshold has been exceeded.

4.4 OPENING YEAR (2018) WITH PROJECT CONDITIONS

4.4.1 Intersection Level of Service

Level of service analysis was conducted to evaluate existing intersection operations and is included in Appendix F. Table 4-4 on the following page provides a summary of the existing level of service at the study intersections. Results show that the following four intersections in the PM peak hour do not operate at satisfactory levels of service per the Level of Service standards discussed in Section 2.5.

PM Peak Hour

California Street and I-10 West Ramps 1.08 V/C
 California Street and I-10 East Ramps 1.10 V/C
 Orange Street and Pearl Avenue LOS D
 6th Street and Pearl Avenue LOS D

Table 4-4 Opening Year (2018) With Project - Peak Hour Levels of Service

No.	Intersection	Jurisdiction	LOS Standard	Control	AM Peak Hour			PM Peak Hour		
					Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C
1	Sierra Way and Mill Street	City of San Bernardino	D	Signalized	6.0	A	0.26	6.4	A	0.32
2	Waterman Avenue and 9th Street	City of San Bernardino*	E	Signalized	11.4	B	0.58	15.7	B	0.68
3	Waterman Avenue and Mill Street	City of San Bernardino*	E	Signalized	17.1	B	0.53	18.0	B	0.77
4	Waterman Avenue and Orange Show Road	City of San Bernardino	D	Signalized	21.9	C	0.67	48.2	D	0.95
5	Waterman Avenue and Dumas Street	City of San Bernardino	D	OWSC	0.1	A	-	0.1	A	-
6	Waterman Avenue and Washington Street	City of San Bernardino	D	Signalized	29.8	C	0.71	41.8	D	0.95
7	Tippecanoe Avenue and Victoria Avenue	City of San Bernardino	D	Signalized	5.9	A	0.47	5.7	A	0.48
8	Tippecanoe Avenue and Hospitality Lane	City of San Bernardino	D	Signalized	20.1	C	0.63	39.6	D	0.83
9	Tippecanoe Avenue and I-10 West Ramps	Caltrans*	E	Unsignalized	-	-	-	-	-	-
10	Anderson Avenue and I-10 East Ramps	Caltrans*	E	Signalized	19.5	B	0.72	35.5	D	0.87
11	Anderson Avenue and Academy Drive	City of Loma Linda	D	Signalized	21.7	C	0.82	12.5	B	0.63
12	California Street and I-10 West Ramps	Caltrans*	E	Signalized	26.7	C	0.84	75.9	E	1.08
13	California Street and I-10 East Ramps	Caltrans*	E	Signalized	22.7	C	0.64	47.5	D	1.10
14	California Street and Walmart Driveway	City of Redlands	C	OWSC	1.6	A	-	8.6	A	-
15	California Street and Redlands Boulevard	City of Redlands*	F	Signalized	20.2	C	0.65	49.9	D	0.89
16	Alabama Street and I-10 West Ramps	Caltrans*	E	Signalized	32.1	C	0.88	45.2	D	0.96
17	Alabama Street and I-10 East Ramps	Caltrans*	E	Signalized	18.2	B	0.57	32.6	C	0.87
18	Alabama Street and Industrial Avenue	City of Redlands	C	Signalized	5.2	A	0.36	30.4	C	0.78
19	Alabama Street and Redlands Boulevard	City of Redlands*	F	Signalized	24.6	C	0.54	36.3	D	0.89
20	Tennessee Street and Redlands Boulevard	City of Redlands*	E	Signalized	10.2	B	0.61	27.9	C	0.84
21	Texas Street and Stuart Avenue	City of Redlands	C	TWSC	3.3	A	-	2.0	A	-
22	Texas Street and Oriental Avenue	City of Redlands	C	TWSC	2.1	A	-	2.9	A	-
23	Eureka Street and Pearl Avenue	Caltrans	C	Signalized	19.5	B	0.48	24.2	C	0.71
24	Eureka Street and Stuart Avenue	City of Redlands	C	Signalized	6.7	A	0.39	7.0	A	0.26
25	Eureka Street and Oriental Avenue	City of Redlands	C	Signalized	5.2	A	0.26	6.2	A	0.32
26	Eureka Street and Redlands Boulevard	City of Redlands	C	Signalized	8.9	A	0.47	14.4	B	0.63
27	Orange Street and Colton Avenue	Caltrans	C	Signalized	14.8	B	0.54	14.0	B	0.68
28	Orange Street and Pearl Avenue	Caltrans	C	Signalized	16.2	B	0.79	53.3	D	1.07
29	Orange Street and Stuart Avenue	City of Redlands	C	Signalized	7.7	A	0.50	12.3	B	0.71
30	Orange Street and Oriental Avenue	City of Redlands	C	OWSC	0.1	A	-	1.0	A	-
31	Orange Street and Redlands Boulevard	City of Redlands*	E	Signalized	8.2	A	0.48	19.2	B	0.60
32	6th Street and I-10 West Ramps	City of Redlands	C	TWSC	9.9	A	-	13.3	B	-
33	6th Street and Pearl Avenue	City of Redlands	C	AWSC	13.8	B	-	29.9	D	-
34	6th Street and Stuart Avenue	City of Redlands	C	TWSC	3.1	A	-	3.8	A	-
35	Redlands Boulevard and Citrus Avenue	City of Redlands*	E	Signalized	23.7	C	0.71	25.6	C	0.75
36	Church Street and Stuart Avenue	City of Redlands	C	OWSC	1.5	A	-	2.0	A	-
37	University Street and I-10 West Ramps	City of Redlands	C	OWSC	17.4	C	-	7.0	A	-
38	University Street and I-10 East Ramps	City of Redlands	C	OWSC	7.9	A	-	24.9	C	-
39	Tippecanoe Avenue and Harriman Place	City of San Bernardino	D	Signalized	29.5	C	0.61	39.2	D	0.76

*CMP Intersection

**CMP intersection and defacto right turn lane

Red values indicate the LOS or V/C threshold has been exceeded.

4.4.2 Queuing Analysis

Table 4-5 provides a summary of the grade crossing influence zone queue analysis. The results show that the queues from the following intersections are expected to exceed the available storage distance between the signalized intersection and the grade crossing and could potentially block the grade crossing. Discussion of any required mitigation measures are included in Section 8.1.

AM Peak Hour

- EB I-10 Ramps and the California Street crossing
- Redlands Boulevard and the Alabama Street crossing
- Redlands Boulevard and the Tennessee Street crossing

PM Peak Hour

- EB I-10 Ramps and the California Street crossing
- Industrial Park Avenue and the Alabama Street crossing
- Redlands Boulevard and the Alabama Street crossing
- Redlands Boulevard and the Tennessee Street crossing

Table 4-6 provides a summary of the crossing spillback queue analysis. The results indicate that the queues from the following grade crossing locations exceed the available storage between the grade crossing and the signalized intersection and could potentially block the intersection.

AM Peak Hour

- Dumas Street and the Waterman Avenue crossing
- Victoria Avenue at Tippecanoe Avenue crossing
- EB I-10 Ramps and the California Street crossing
- Redlands Boulevard and the Tennessee Street crossing
- Redlands Boulevard and the Alabama Street crossing
- Oriental Avenue and the Orange Street crossing

PM Peak Hour

- Dumas Street and the Waterman Avenue crossing
- Victoria Avenue at Tippecanoe Avenue crossing
- EB I-10 Ramps and the California Street crossing
- Industrial Park Avenue and the Alabama Street crossing
- Redlands Boulevard and the Alabama Street crossing
- Redlands Boulevard and the Tennessee Street crossing
- Oriental Avenue and the Orange Street crossing

Table 4-5 Opening Year (2018) With Project Grade - Crossing Influence Zone Queue

Grade Crossing Location	Adjacent Intersection	Available Storage (ft)	AM Peak					PM Peak					
			q	R	d	Avg # Veh in Queue	Queue Length	q	R	d	Avg # Veh in Queue	Queue Length	
South E Street	W Rialto Avenue	390	-	-	-	-	-	-	-	-	-	-	-
D Street	W Rialto Avenue	410	-	-	-	-	-	-	-	-	-	-	-
South Arrowhead Avenue	W Rialto Avenue	395	-	-	-	-	-	-	-	-	-	-	-
South Sierra Way	W Rialto Avenue	700	-	-	-	-	-	-	-	-	-	-	-
East Mill St	S Sierra Way	610	0.09	27	4.6	2	60	0.13	27	4.9	4	89	
	S Waterman Ave	1330	0.08	33	19.5	3	69	0.09	31	14.4	3	73	
East Central Avenue	S Waterman Ave	1060	-	-	-	-	-	-	-	-	-	-	-
Orange Show Road	S Waterman Ave	650	0.17	50	22.1	9	213	0.18	83	54.1	17	427	
Waterman Avenue	Orange Show Road	660	0.16	52	18.3	8	208	0.24	67	34.1	16	407	
	Dumas St	35	-	-	-	-	-	-	-	-	-	-	-
Tippecanoe Avenue	E Victoria Ave	285	0.13	22	3.9	3	72	0.25	22.5	4.9	6	139	
	Hospitality Ln	1790	-	-	-	-	-	-	-	-	-	-	-
	WB I-10 Ramp	3290	-	-	-	-	-	-	-	-	-	-	-
	EB I-10 Ramp	3630	-	-	-	-	-	-	-	-	-	-	-
Richardson Street	N/A	-	-	-	-	-	-	-	-	-	-	-	
Mountain View Avenue	E Victoria Ave	1150	-	-	-	-	-	-	-	-	-	-	
California Street	WB I-10 Ramp	380	-	-	-	-	-	-	-	-	-	-	-
	EB I-10 Ramp	80	0.12	51	14.9	6	156	0.20	39	11.1	8	195	
	Shopping Center	320	-	-	-	-	-	-	-	-	-	-	-
	Redlands Blvd	1040	0.18	42	10.9	7	186	0.23	47.8	62	20	489	
Nevada Street	Redlands Blvd	1000	-	-	-	-	-	-	-	-	-	-	
Alabama Street	WB I-10 Ramp	1525	-	-	-	-	-	-	-	-	-	-	
	EB I-10 Ramp	870	-	-	-	-	-	-	-	-	-	-	
	Industrial Park Ave	280	0.22	30.2	4.1	7	166	0.27	67.2	34.0	18	449	
	Redlands Blvd	150	0.17	58.8	21.0	10	253	0.22	62.6	42.3	16	411	
Colton Avenue	Alabama St	825	-	-	-	-	-	-	-	-	-	-	
Tennessee Street	Redlands Blvd	36	0.18	26	10.1	5	115	0.17	48	31.9	9	236	
Caliber Auto Body	N/A	-	-	-	-	-	-	-	-	-	-	-	
Texas Street	Stuart Ave	190	-	-	-	-	-	-	-	-	-	-	
	Oriental Ave	220	-	-	-	-	-	-	-	-	-	-	
	Redlands Blvd	495	-	-	-	-	-	-	-	-	-	-	
North Eureka Street	Stuart Ave	260	0.02	26	5.3	1	15	0.10	31	3.0	3	80	
	Oriental Ave	155	0.13	20.8	5.2	3	69	0.14	16	6.0	2	55	
	Redlands Blvd	605	-	-	-	-	-	-	-	-	-	-	
Orange Street	Stuart Ave	280	0.18	27.2	7.9	5	123	0.23	27.2	12.2	6	157	
	Oriental Ave	150	-	-	-	-	-	-	-	-	-	-	
	Redlands Blvd	575	0.08	24	7.0	2	47	0.12	32.8	12.7	4	102	
6th Street	Stuart Ave	275	-	-	-	-	-	-	-	-	-	-	
7th Street	N/A	-	-	-	-	-	-	-	-	-	-	-	
9th Street	N/A	-	-	-	-	-	-	-	-	-	-	-	
Church Street	Stuart Ave	265	-	-	-	-	-	-	-	-	-	-	
N University Street	EB I-10 Ramp	1000	-	-	-	-	-	-	-	-	-	-	
	WB I-10 Ramp	555	-	-	-	-	-	-	-	-	-	-	

Red values indicate queue length that is greater than available storage

Table 4-6 Opening Year (2018) With Project - Crossing Spillback Queue

Grade Crossing Location	Adjacent Intersection	Available Storage (ft)	AM Peak					PM Peak				
			q	R	d	Avg # Veh in Queue	Queue Length	q	R	d	Avg # Veh in Queue	Queue Length
South E Street	W Rialto Avenue	390	-	-	-	-	-	-	-	-	-	-
D Street	W Rialto Avenue	410	-	-	-	-	-	-	-	-	-	-
South Arrowhead Avenue	W Rialto Avenue	395	-	-	-	-	-	-	-	-	-	-
South Sierra Way	W Rialto Avenue	700	-	-	-	-	-	-	-	-	-	-
East Mill St	S Sierra Way	610	0.12	45	1.6	6	138	0.14	45	1.6	6	157
	S Waterman Ave	1330	0.09	45	1.5	4	101	0.13	45	1.6	6	148
East Central Avenue	S Waterman Ave	1060	-	-	-	-	-	-	-	-	-	-
Orange Show Road	S Waterman Ave	650	0.10	45	1.5	5	118	0.21	45	1.9	10	239
Waterman Avenue	Orange Show Road	660	0.26	45	2.1	12	297	0.32	45	2.5	14	359
	Dumas St	35	0.18	45	1.8	8	202	0.29	45	2.3	13	325
Tippecanoe Avenue	E Victoria Ave	285	0.25	45	2.1	11	286	0.26	45	2.1	12	292
	Hospitality Ln	1790	0.09	45	1.6	4	99	0.16	45	2.1	7	185
	WB I-10 Ramp	3290	-	-	-	-	-	-	-	-	-	-
	EB I-10 Ramp	3630	-	-	-	-	-	-	-	-	-	-
Richardson Street	N/A	-	-	-	-	-	-	-	-	-	-	
Mountain View Avenue	E Victoria Ave	1150	-	-	-	-	-	-	-	-	-	
California Street	WB I-10 Ramp	380	-	-	-	-	-	-	-	-	-	-
	EB I-10 Ramp	80	0.15	45	2.3	7	164	0.16	45	2.5	7	182
	Shopping Center	320	-	-	-	-	-	-	-	-	-	-
	Redlands Blvd	1040	0.24	45	1.5	11	275	0.40	45	1.8	18	449
Nevada Street	Redlands Blvd	1000	-	-	-	-	-	-	-	-	-	
Alabama Street	WB I-10 Ramp	1525	-	-	-	-	-	-	-	-	-	-
	EB I-10 Ramp	870	-	-	-	-	-	-	-	-	-	-
	Industrial Park Ave	280	0.19	45	1.8	9	216	0.27	45	2.2	12	302
	Redlands Blvd	150	0.17	45	1.5	8	196	0.29	45	1.8	13	327
Colton Avenue	Alabama St	825	-	-	-	-	-	-	-	-	-	
Tennessee Street	Redlands Blvd	36	0.16	45	1.7	7	185	0.28	45	1.7	12	310
Caliber Auto Body	N/A	-	-	-	-	-	-	-	-	-	-	
Texas Street	Stuart Ave	190	0.12	45	1.6	6	139	0.09	45	1.5	4	100
	Oriental Ave	220	0.16	45	1.7	7	183	0.17	45	1.7	8	188
	Redlands Blvd	495	-	-	-	-	-	-	-	-	-	-
North Eureka Street	Stuart Ave	260	0.14	45	1.6	6	153	0.14	45	1.6	6	154
	Oriental Ave	155	0.03	45	1.3	1	28	0.11	45	1.5	5	122
	Redlands Blvd	605	-	-	-	-	-	-	-	-	-	-
Orange Street	Stuart Ave	280	0.10	45	1.5	4	109	0.18	45	1.7	8	198
	Oriental Ave	150	0.18	45	1.8	8	198	0.23	45	2.0	10	256
	Redlands Blvd	575	-	-	-	-	-	-	-	-	-	-
6th Street	Stuart Ave	275	0.09	45	1.5	4	103	0.09	45	1.5	4	107
7th Street	N/A	-	-	-	-	-	-	-	-	-	-	
9th Street	N/A	-	-	-	-	-	-	-	-	-	-	
Church Street	Stuart Ave	265	0.20	45	2	9	220	0.16	45	1.8	7	179
N University Street	EB I-10 Ramp	1000	-	-	-	-	-	-	-	-	-	-
	WB I-10 Ramp	555	0.11	45	1.5	5	122	0.16	45	1.7	7	180

Red values indicate queue length that is greater than available storage

4.5 OPENING YEAR (2018) WITH PROJECT CONDITIONS AND WITH CENTRAL AVENUE CLOSURE

4.5.1 Intersection Level of Service

Level of service analysis was conducted to evaluate existing intersection operations and is included in Appendix F. Table 4-7 provides a summary of the existing level of service at the study intersections adjacent to the Central Avenue closure. Results show that the following intersection in the PM peak hour does not operate at satisfactory levels of service per the Level of Service standards discussed in Section 2.5.

PM Peak Hour

Waterman Avenue and Orange Show Road

LOS F

Table 4-7 Opening Year (2018) With Project and Central Avenue Closure - Peak Hour Levels of Service

No.	Intersection	Jurisdiction	LOS Standard	Control	AM Peak Hour			PM Peak Hour		
					Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C
1	Sierra Way and Mill Street	City of San Bernardino	D	Signalized	5.7	A	0.30	6.2	A	0.41
3	Waterman Avenue and Mill Street	City of San Bernardino*	E	Signalized	17.3	B	0.55	45.7	D	0.83
4	Waterman Avenue and Orange Show Road	City of San Bernardino	D	Signalized	26.7	C	0.79	84.8	F	1.04
5	Waterman Avenue and Dumas Street	City of San Bernardino	D	OWSC	0.2	A	-	0.5	A	-

*CMP Intersection

Red values indicate the LOS or V/C threshold has been exceeded.

4.5.2 Queuing Analysis

Table 4-8 provides a summary of the grade crossing influence zone queue analysis. The results show that none of the queues from the intersections adjacent to the Central Avenue grade closure are expected to exceed the available storage distance between the signalized intersection and the grade crossings.

Table 4-8 Opening Year (2018) With Project and Central Avenue Closure - Grade Crossing Influence Zone Queue

Grade Crossing Location	Adjacent Intersection	Available Storage (ft)	AM Peak					PM Peak				
			q	R	d	Avg # Veh in Queue	Queue Length	q	R	d	Avg # Veh in Queue	Queue Length
East Mill St	S Sierra Way	610	0.11	27	4.4	3	76	0.19	27	4.8	5	125
	S Waterman Ave	1330	0.08	33	19.5	3	74	0.10	43	37.3	6	148
Orange Show Road	S Waterman Ave	650	0.19	45	24.2	9	223	0.20	90	69.8	23	566
Waterman Avenue	Orange Show Road	660	0.17	47	19.2	8	195	0.25	71	37.8	18	461
	Dumas St	35	-	-	-	-	-	-	-	-	-	-

Table 4-9 provides a summary of the crossing spillback queue analysis. The results indicate that the queues from the following grade crossing exceeds the available storage between the grade crossing and the signalized intersection and could potentially block the intersection. Refer to section 2.6 for definition of values.

AM and PM Peak Hours

Dumas Street and the Waterman Avenue crossing

Table 4-9 Opening Year (2018) With Project and Central Avenue Closure - Crossing Spillback Queue

Grade Crossing Location	Adjacent Intersection	Available Storage (ft)	AM Peak					PM Peak				
			q	R	d	Avg # Veh in Queue	Queue Length	q	R	d	Avg # Veh in Queue	Queue Length
East Mill St	S Sierra Way	610	0.15	45	1.6	7	167	0.18	45	1.8	8	202
	S Waterman Ave	1330	0.14	45	1.6	6	160	0.26	45	2.1	12	289
Orange Show Road	S Waterman Ave	650	0.13	45	1.6	6	144	0.27	45	2.2	12	300
Waterman Avenue	Orange Show Road	660	0.34	45	2.6	15	380	0.33	45	2.5	15	368
	Dumas St	35	0.19	45	1.8	9	214	0.32	45	2.5	14	355

5.0 FORECAST YEAR (2038) TRAFFIC CONDITIONS

This section analyzes traffic conditions during forecast year (2038) under No Project and With Project conditions. The traffic volumes were developed as described in Section 2.3.

5.1 RTIP/SCAG PLANNED IMPROVEMENTS

In addition to the RTIP/SCAG planned improvements included in the 2018 model and shown in Table 4-1, the following improvements were assumed in the Forecast year (2038) traffic model.

Table 5-1 2038 RTIP/SCAG Planned Improvements

ID	Description
4A07017	Widen California St from Redlands Blvd to I-10 from 5 to 6 lanes
4120178	Widen Redlands Blvd at intersections of Alabama St and Colton Ave
-	Widen Tippecanoe Ave from 4 to 6 lanes

5.2 FORECAST YEAR (2038) WITHOUT PROJECT CONDITIONS

5.2.1 Intersection Level of Service

Level of service analysis was conducted to evaluate existing intersection operations and is included in Appendix F. Table 5-2 on the following page provides a summary of the existing level of service at the study intersections. Results show that the following intersections do not operate at satisfactory levels of service per the Level of Service standards discussed in Section 2.5. There are six intersections in the AM peak hour and fifteen intersections in the PM peak hour that do not operate at satisfactory levels of service.

AM Peak Hour

California Street and I-10 West Ramps	LOS F
California Street and I-10 East Ramps	LOS F
Alabama Street and I-10 West Ramps	LOS E
Orange Street and Pearl Avenue	LOS D
6 th Street and Pearl Avenue	LOS D

PM Peak Hour

Waterman Avenue and Orange Show Road	LOS F
Tippecanoe Avenue and Hospitality Lane	LOS F
Anderson Avenue and I-10 East Ramps	LOS F
California Street and I-10 West Ramps	LOS F
California Street and I-10 East Ramps	LOS F
Alabama Street and I-10 West Ramps	LOS F
Alabama Street and I-10 East Ramps	LOS F
Alabama Street and Industrial Avenue	LOS E
Orange Street and Colton Avenue	LOS D
Orange Street and Pearl Avenue	LOS F
Orange Street and Stuart Avenue	LOS E
6 th Street and I-10 West Ramps	LOS D
6 th Street and Pearl Avenue	LOS F
University Street and I-10 East Ramps	LOS F

Table 5-2 Forecast Year (2038) No Project - Peak Hour Levels of Service

No.	Intersection	Jurisdiction	LOS Standard	Control	AM Peak Hour			PM Peak Hour		
					Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C
1	Sierra Way and Mill Street	City of San Bernardino	D	Signalized	8.1	A	0.38	8.1	A	0.50
2	Waterman Avenue and 9th Street	City of San Bernardino*	E	Signalized	14.6	B	0.76	42.9	D	0.88
3	Waterman Avenue and Mill Street	City of San Bernardino*	E	Signalized	20.0	C	0.71	28.4	C	0.71
4	Waterman Avenue and Orange Show Road	City of San Bernardino	D	Signalized	50.5	D	0.94	131.7	F	1.43
5	Waterman Avenue and Dumas Street	City of San Bernardino	D	OWSC	0.2	A	-	1.4	A	-
6	Waterman Avenue and Washington Street	City of San Bernardino	D	Signalized	34.6	C	0.86	46.9	D	0.85
7	Tippecanoe Avenue and Victoria Avenue	City of San Bernardino	D	Signalized	6.9	A	0.60	6.5	A	0.62
8	Tippecanoe Avenue and Hospitality Lane	City of San Bernardino	D	Signalized	24.8	C	0.87	124.6	F	1.31
9	Tippecanoe Avenue and I-10 West Ramps	Caltrans*	E	Signalized	-	-	-	-	-	-
10	Anderson Avenue and I-10 East Ramps	Caltrans*	E	Signalized	25.6	C	0.84	102.3	F	1.20
11	Anderson Avenue and Academy Drive	City of Loma Linda	D	Signalized	38.6	D	0.94	18.7	B	0.69
12	California Street and I-10 West Ramps	Caltrans*	E	Signalized	196.2	F	1.58	323.3	F	2.04
13	California Street and I-10 East Ramps	Caltrans*	E	Signalized	301.4	F	1.09	155.0	F	1.64
14	California Street and Walmart Driveway	City of Redlands	C	OWSC	6.3	A	-	ERR***	ERR***	-
15	California Street and Redlands Boulevard	City of Redlands*	F	Signalized	104.8	F	1.56	173.0	F	1.59
16	Alabama Street and I-10 West Ramps	Caltrans*	E	Signalized	76.4	E	1.07	120.7	F	1.29
17	Alabama Street and I-10 East Ramps	Caltrans*	E	Signalized	18.3	B	0.60	88.9	F	1.24
18	Alabama Street and Industrial Avenue	City of Redlands	C	Signalized	8.3	A	0.45	70.6	E	1.31
19	Alabama Street and Redlands Boulevard	City of Redlands*	F	Signalized	29.4	C	0.56	51.8	D	0.98
20	Tennessee Street and Redlands Boulevard	City of Redlands*	E	Signalized	14.4	B	0.61	51.2	D	0.97
21	Texas Street and Stuart Avenue	City of Redlands	C	TWSC	8.5	A	-	5.8	A	-
22	Texas Street and Oriental Avenue	City of Redlands	C	TWSC	0.9	A	-	0.7	A	-
23	Eureka Street and Pearl Avenue	Caltrans	C	Signalized	19.8	B	0.50	27.5	C	1.00
24	Eureka Street and Stuart Avenue	City of Redlands	C	Signalized	6.6	A	0.38	6.6	A	0.26
25	Eureka Street and Oriental Avenue	City of Redlands	C	Signalized	5.6	A	0.28	5.7	A	0.30
26	Eureka Street and Redlands Boulevard	City of Redlands	C	Signalized	9.7	A	0.53	19.2	B	0.65
27	Orange Street and Colton Avenue	Caltrans	C	Signalized	23.2	C	0.85	41.6	D	1.34
28	Orange Street and Pearl Avenue	Caltrans	C	Signalized	36.1	D	0.97	233.8	F	1.70
29	Orange Street and Stuart Avenue	City of Redlands	C	Signalized	7.7	A	0.50	45.4	D	1.04
30	Orange Street and Oriental Avenue	City of Redlands	C	OWSC	0.1	A	-	10.7	B	-
31	Orange Street and Redlands Boulevard	City of Redlands*	E	Signalized	18.1	B	0.65	26.2	C	0.81
32	6th Street and I-10 West Ramps	City of Redlands	C	TWSC	20.9	B	-	25.6	D	-
33	6th Street and Pearl Avenue	City of Redlands	C	AWSC	25.5	D	-	140.9	F	-
34	6th Street and Stuart Avenue	City of Redlands	C	TWSC	2.6	A	-	3.1	A	-
35	Redlands Boulevard and Citrus Avenue	City of Redlands*	E	Signalized	26.0	C	0.73	26.9	C	0.78
36	Church Street and Stuart Avenue	City of Redlands	C	OWSC	1.5	A	-	1.9	A	-
37	University Street and I-10 West Ramps	City of Redlands	C	OWSC	ERR***	ERR***	-	22.2	C	-
38	University Street and I-10 East Ramps	City of Redlands	C	OWSC	6.9	A	-	82.9	F	-
39	Tippecanoe Avenue and Harriman Place	City of San Bernardino	D	Signalized	43.4	D	0.82	53.5	D	0.96

*CMP Intersection

** CMP intersection and assumed defacto right-turn lane

***Volumes are out of bounds of the Highway Capacity Manual (HCM)

Red values indicate the LOS or V/C threshold has been exceeded.

5.3 FORECAST YEAR (2038) WITHOUT PROJECT CONDITIONS AND WITH CENTRAL AVENUE CLOSURE

5.3.1 Intersection Level of Service

Level of service analysis was conducted to evaluate existing intersection operations and is included in Appendix F. Table 5-3 provides a summary of the existing level of service at the study intersections. Results show that the following intersection does not operate at satisfactory levels of service per the Level of Service standards discussed in Section 2.5.

AM and PM Peak Hour

Waterman Avenue and Orange Show Road LOS F

Table 5-3 Forecast Year (2038) No Project and Central Avenue Closure - Peak Hour Levels of Service

No.	Intersection	Jurisdiction	LOS Standard	Control	AM Peak Hour			PM Peak Hour		
					Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C
1	Sierra Way and Mill Street	City of San Bernardino	D	Signalized	8.2	A	0.43	8.6	A	0.57
3	Waterman Avenue and Mill Street	City of San Bernardino*	E	Signalized	28.1	C	0.89	55.1	E	0.97
4	Waterman Avenue and Orange Show Road	City of San Bernardino	D	Signalized	74.8	E	1.03	200.9	F	1.75
5	Waterman Avenue and Dumas Street	City of San Bernardino	D	OWSC	0.4	A	-	1.9	A	-

*CMP Intersection

Red values indicate the LOS or V/C threshold has been exceeded.

5.4 FORECAST YEAR (2038) WITH PROJECT CONDITIONS

5.4.1 Intersection Level of Service

Level of service analysis was conducted to evaluate existing intersection operations and is included in Appendix F. Table 5-4 provides a summary of the existing level of service at the study intersections. Results show that the following intersections do not operate at satisfactory levels of service per the Level of Service standards discussed in Section 2.5. There are four intersections in the AM peak period and fourteen intersections in the PM peak period that do not operate at satisfactory levels of service.

AM Peak Hour

Waterman Avenue and Orange Show Road	LOS E
California Street and I-10 West Ramps	LOS F
California Street and I-10 East Ramps	LOS F
6 th Street and Pearl Avenue	LOS D

PM Peak Hour

Waterman Avenue and Orange Show Road	LOS F
Tippecanoe Avenue and Hospitality Lane	LOS F
Anderson Avenue and I-10 East Ramps	LOS F
California Street and I-10 West Ramps	LOS F
California Street and I-10 East Ramps	LOS F
Alabama Street and I-10 West Ramps	LOS F
Alabama Street and I-10 East Ramps	LOS F
Alabama Street and Industrial Avenue	LOS E
Orange Street and Colton Avenue	LOS D
Orange Street and Pearl Avenue	LOS F
Orange Street and Stuart Avenue	LOS E
6 th Street and I-10 West Ramps	LOS D
6 th Street and Pearl Avenue	LOS F
University Street and I-10 East Ramp	LOS F

Table 5-4 Forecast Year (2038) With Project - Peak Hour Levels of Service

No.	Intersection	Jurisdiction	LOS Standard	Control	AM Peak Hour			PM Peak Hour		
					Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C
1	Sierra Way and Mill Street	City of San Bernardino	D	Signalized	7.7	A	0.32	7.1	A	0.47
2	Waterman Avenue and 9th Street	City of San Bernardino*	E	Signalized	14.5	B	0.75	42.8	D	0.87
3	Waterman Avenue and Mill Street	City of San Bernardino*	E	Signalized	22.6	C	0.71	31.9	C	0.73
4	Waterman Avenue and Orange Show Road	City of San Bernardino	D	Signalized	72.6	E	0.96	129.2	F	1.35
5	Waterman Avenue and Dumas Street	City of San Bernardino	D	OWSC	0.0	A	-	0.1	A	-
6	Waterman Avenue and Washington Street	City of San Bernardino	D	Signalized	32.4	C	0.79	51.4	D	0.87
7	Tippecanoe Avenue and Victoria Avenue	City of San Bernardino	D	Signalized	5.8	A	0.57	5.0	A	0.59
8	Tippecanoe Avenue and Hospitality Lane	City of San Bernardino	D	Signalized	22.5	C	0.83	113.0	F	1.27
9	Tippecanoe Avenue and I-10 West Ramps	Caltrans*	E	Signalized	-	-	-	-	-	-
10	Anderson Avenue and I-10 East Ramps	Caltrans*	E	Signalized	24.1	C	0.85	102.7	F	1.20
11	Anderson Avenue and Academy Drive	City of Loma Linda	D	Signalized	38.6	D	0.94	20.8	C	0.72
12	California Street and I-10 West Ramps	Caltrans*	E	Signalized	200.0	F	1.60	326.4	F	2.05
13	California Street and I-10 East Ramps	Caltrans*	E	Signalized	290.2	F	1.06	154.6	F	1.63
14	California Street and Walmart Driveway	City of Redlands	C	OWSC	5.2	A	-	ERR***	ERR***	-
15	California Street and Redlands Boulevard	City of Redlands*	F	Signalized	97.1	F	1.48	171.5	F	1.59
16	Alabama Street and I-10 West Ramps	Caltrans*	E	Signalized	76.6	E	1.07	121.5	F	1.29
17	Alabama Street and I-10 East Ramps	Caltrans*	E	Signalized	17.9	B	0.62	89.4	F	1.24
18	Alabama Street and Industrial Avenue	City of Redlands	C	Signalized	7.9	A	0.44	76.6	E	1.39
19	Alabama Street and Redlands Boulevard	City of Redlands*	F	Signalized	31.0	C	0.58	57.3	E	0.97
20	Tennessee Street and Redlands Boulevard	City of Redlands*	E	Signalized	15.0	B	0.61	52.5	D	0.98
21	Texas Street and Stuart Avenue	City of Redlands	C	TWSC	8.7	A	-	5.4	A	-
22	Texas Street and Oriental Avenue	City of Redlands	C	TWSC	3.9	A	-	4.0	A	-
23	Eureka Street and Pearl Avenue	Caltrans	C	Signalized	19.6	B	0.50	29.2	C	1.03
24	Eureka Street and Stuart Avenue	City of Redlands	C	Signalized	6.7	A	0.39	7.7	A	0.26
25	Eureka Street and Oriental Avenue	City of Redlands	C	Signalized	5.2	A	0.27	5.7	A	0.30
26	Eureka Street and Redlands Boulevard	City of Redlands	C	Signalized	9.8	B	0.54	18.9	B	0.65
27	Orange Street and Colton Avenue	Caltrans	C	Signalized	23.2	C	0.85	42.1	D	1.35
28	Orange Street and Pearl Avenue	Caltrans	C	Signalized	38.4	D	0.98	259.5	F	1.69
29	Orange Street and Stuart Avenue	City of Redlands	C	Signalized	7.7	A	0.49	52.3	D	1.05
30	Orange Street and Oriental Avenue	City of Redlands	C	OWSC	0.0	A	-	8.9	A	-
31	Orange Street and Redlands Boulevard	City of Redlands*	E	Signalized	17.9	B	0.64	26.2	C	0.81
32	6th Street and I-10 West Ramps	City of Redlands	C	TWSC	22.4	C	-	25.2	D	-
33	6th Street and Pearl Avenue	City of Redlands	C	AWSC	28.7	D	-	134.4	F	-
34	6th Street and Stuart Avenue	City of Redlands	C	TWSC	2.5	A	-	2.5	A	-
35	Redlands Boulevard and Citrus Avenue	City of Redlands*	E	Signalized	25.2	C	0.72	26.9	C	0.78
36	Church Street and Stuart Avenue	City of Redlands	C	OWSC	1.4	A	-	1.4	A	-
37	University Street and I-10 West Ramps	City of Redlands	C	OWSC	145.5	F	-	16.3	C	-
38	University Street and I-10 East Ramps	City of Redlands	C	OWSC	6.8	A	-	74.7	F	-
39	Tippecanoe Avenue and Harriman Place	City of San Bernardino	D	Signalized	32.9	C	0.65	40.1	D	0.94

* CMP Intersection

**CMP intersection and defacto right turn lane

***Volumes are out of bounds of the Highway Capacity Manual (HCM)

Red values indicate the LOS or V/C threshold has been exceeded.

5.4.2 Queuing Analysis

Table 5-5 provides a summary of the grade crossing influence zone queue analysis. The results show that the queues from the following intersections exceed the available storage distance between the signalized intersection and the grade crossing and could potentially block the grade crossing. Discussion of any required mitigation measures are included in Section 8.2.

AM Peak Hour

- Waterman Avenue and the Orange Show Road crossing
- Orange Show Road and the Waterman Avenue crossing
- EB I-10 Ramps and the California Street crossing
- Redlands Boulevard and the California Street crossing
- Redlands Boulevard and the Alabama Street crossing
- Redlands Boulevard and the Tennessee Street crossing

PM Peak Hour

- Waterman Avenue and the Orange Show Road crossing
- Orange Show Road and the Waterman Avenue crossing
- EB I-10 Ramps and the California Street crossing
- Redlands Boulevard and the California Street crossing
- Industrial Park Avenue and the Alabama Street crossing
- Redlands Boulevard and the Alabama Street crossing
- Redlands Boulevard and the Tennessee Street crossing

Table 5-6 provides a summary of the crossing spillback queue analysis. The results indicate that the queues from the following grade crossing locations exceed the available storage between the grade crossing and the signalized intersection and could potentially block the intersection.

AM Peak Hour

- Dumas Street and the Waterman Avenue crossing
- Victoria Avenue and the Tippecanoe Avenue crossing
- EB I-10 Ramps and the California Street crossing
- Redlands Boulevard and the Alabama Street crossing
- Redlands Boulevard and the Tennessee Street crossing
- Oriental Avenue and the Orange Street crossing

PM Peak Hour

- Dumas Street and the Waterman Avenue crossing
- Victoria Avenue and the Tippecanoe Avenue crossing
- EB I-10 Ramps and the California Street crossing
- Industrial Park Avenue and the Alabama Street crossing
- Redlands Boulevard and the Alabama Street crossing
- Redlands Boulevard and the Tennessee Street crossing
- Stuart Avenue and the Orange Street crossing
- Oriental Avenue and the Orange Street crossing

Table 5-5 Forecast Year (2038) With Project - Grade Crossing Influence Zone Queue

Grade Crossing Location	Adjacent Intersection	Available Storage (ft)	AM Peak					PM Peak				
			q	R	d	Avg # Veh in Queue	Queue Length	q	R	d	Avg # Veh in Queue	Queue Length
South E Street	W Rialto Avenue	390	-	-	-	-	-	-	-	-	-	-
D Street	W Rialto Avenue	410	-	-	-	-	-	-	-	-	-	-
South Arrowhead Avenue	W Rialto Avenue	395	-	-	-	-	-	-	-	-	-	-
South Sierra Way	W Rialto Avenue	700	-	-	-	-	-	-	-	-	-	-
East Mill St	S Sierra Way	610	0.09	27	6.1	2	60	0.22	27	5.3	6	146
	S Waterman Ave	1330	0.10	33	14.0	3	79	0.11	51	28.8	6	151
East Central Avenue	S Waterman Ave	1060	-	-	-	-	-	-	-	-	-	-
Orange Show Road	S Waterman Ave	650	0.22	88	79.0	27	667	0.25	86	75.5	29	734
Waterman Avenue	Orange Show Road	660	0.29	76	79.0	34	847	0.35	76	102.0	49	1215
	Dumas St	35	-	-	-	-	-	-	-	-	-	-
Tippecanoe Avenue	E Victoria Ave	285	0.34	22	5.2	7	186	0.38	22	4.2	8	209
	Hospitality Ln	1790	-	-	-	-	-	-	-	-	-	-
	WB I-10 Ramp	3290	-	-	-	-	-	-	-	-	-	-
	EB I-10 Ramp	3630	-	-	-	-	-	-	-	-	-	-
Richardson Street	N/A	-	-	-	-	-	-	-	-	-	-	-
Mountain View Avenue	E Victoria Ave	1150	-	-	-	-	-	-	-	-	-	-
California Street	WB I-10 Ramp	380	-	-	-	-	-	-	-	-	-	-
	EB I-10 Ramp	80	0.20	45	12.5	9	222	0.33	63	60.5	30	759
	Shopping Center	320	-	-	-	-	-	-	-	-	-	-
	Redlands Blvd	1040	0.37	36	161.2	67	1675	0.31	39	173.4	59	1477
Nevada Street	Redlands Blvd	1000	-	-	-	-	-	-	-	-	-	-
Alabama Street	WB I-10 Ramp	1525	-	-	-	-	-	-	-	-	-	-
	EB I-10 Ramp	870	-	-	-	-	-	-	-	-	-	-
	Industrial Park Ave	280	0.20	39.2	8.6	8	192	0.29	81	45.4	25	620
	Redlands Blvd	150	0.18	58	22.2	11	264	0.34	75	72.9	37	932
Colton Avenue	Alabama St	825	-	-	-	-	-	-	-	-	-	-
Tennessee Street	Redlands Blvd	36	0.19	34	13.1	7	164	0.18	63	54.7	16	388
Caliber Auto Body	N/A	-	-	-	-	-	-	-	-	-	-	-
Texas Street	Stuart Ave	190	-	-	-	-	-	-	-	-	-	-
	Oriental Ave	220	-	-	-	-	-	-	-	-	-	-
	Redlands Blvd	495	-	-	-	-	-	-	-	-	-	-
North Eureka Street	Stuart Ave	260	0.02	20	5.4	0	12	0.11	30	3.1	3	83
	Oriental Ave	155	0.14	14	5.2	2	49	0.15	14	5.3	2	52
	Redlands Blvd	605	-	-	-	-	-	-	-	-	-	-
Orange Street	Stuart Ave	280	0.19	27.2	7.8	5	130	0.25	40	12.5	10	251
	Oriental Ave	150	-	-	-	-	-	-	-	-	-	-
	Redlands Blvd	575	0.16	28.8	10.5	5	119	0.28	34.6	17.0	10	238
6th Street	Stuart Ave	275	-	-	-	-	-	-	-	-	-	-
7th Street	N/A	-	-	-	-	-	-	-	-	-	-	-
9th Street	N/A	-	-	-	-	-	-	-	-	-	-	-
Church Street	Stuart Ave	265	-	-	-	-	-	-	-	-	-	-
N University Street	EB I-10 Ramp	1000	-	-	-	-	-	-	-	-	-	-
	WB I-10 Ramp	555	-	-	-	-	-	-	-	-	-	-

Red values indicate queue length that is greater than available storage

Table 5-6 Forecast Year (2038) With Project - Crossing Spillback Queue

Grade Crossing Location	Adjacent Intersection	Available Storage (ft)	AM Peak					PM Peak					
			q	R	d	Avg # Veh in Queue	Queue Length	q	R	d	Avg # Veh in Queue	Queue Length	
South E Street	W Rialto Avenue	390	-	-	-	-	-	-	-	-	-	-	-
D Street	W Rialto Avenue	410	-	-	-	-	-	-	-	-	-	-	-
South Arrowhead Avenue	W Rialto Avenue	395	-	-	-	-	-	-	-	-	-	-	-
South Sierra Way	W Rialto Avenue	700	-	-	-	-	-	-	-	-	-	-	-
East Mill St	S Sierra Way	610	0.15	45	1.7	7	173	0.19	45	1.8	9	215	
	S Waterman Ave	1330	0.09	45	1.5	4	99	0.22	45	1.9	10	243	
East Central Avenue	S Waterman Ave	1060	-	-	-	-	-	-	-	-	-	-	-
Orange Show Road	S Waterman Ave	650	0.22	45	1.9	10	251	0.37	45	2.8	17	413	
Waterman Avenue	Orange Show Road	660	0.31	45	2.4	14	354	0.41	45	3.2	18	462	
	Dumas St	35	0.32	45	2.5	14	360	0.40	45	3.2	18	454	
Tippecanoe Avenue	E Victoria Ave	285	0.31	45	2.4	14	349	0.40	45	3.1	18	446	
	Hospitality Ln	1790	0.23	45	2.6	10	254	0.25	45	2.9	11	286	
	WB I-10 Ramp	3290	-	-	-	-	-	-	-	-	-	-	-
	EB I-10 Ramp	3630	-	-	-	-	-	-	-	-	-	-	-
Richardson Street	N/A	-	-	-	-	-	-	-	-	-	-	-	-
Mountain View Avenue	E Victoria Ave	1150	-	-	-	-	-	-	-	-	-	-	-
California Street	WB I-10 Ramp	380	-	-	-	-	-	-	-	-	-	-	-
	EB I-10 Ramp	80	0.27	45	5.5	12	308	0.27	45	5.2	12	301	
	Shopping Center	320	-	-	-	-	-	-	-	-	-	-	-
	Redlands Blvd	1040	0.39	45	1.8	18	444	0.66	45	2.6	30	743	
Nevada Street	Redlands Blvd	1000	-	-	-	-	-	-	-	-	-	-	-
Alabama Street	WB I-10 Ramp	1525	-	-	-	-	-	-	-	-	-	-	-
	EB I-10 Ramp	870	-	-	-	-	-	-	-	-	-	-	-
	Industrial Park Ave	280	0.20	45	1.9	9	229	0.37	45	2.8	16	412	
	Redlands Blvd	150	0.19	45	1.6	8	211	0.33	45	1.9	15	369	
Colton Avenue	Alabama St	825	-	-	-	-	-	-	-	-	-	-	-
Tennessee Street	Redlands Blvd	36	0.19	45	1.8	9	218	0.33	45	2.6	15	373	
Caliber Auto Body	N/A	-	-	-	-	-	-	-	-	-	-	-	-
Texas Street	Stuart Ave	190	0.11	45	1.5	5	127	0.11	45	1.5	5	122	
	Oriental Ave	220	0.17	45	1.7	8	193	0.18	45	1.8	8	208	
	Redlands Blvd	495	-	-	-	-	-	-	-	-	-	-	-
North Eureka Street	Stuart Ave	260	0.15	45	1.6	7	164	0.15	45	1.7	7	168	
	Oriental Ave	155	0.03	45	1.3	1	29	0.11	45	1.5	5	129	
	Redlands Blvd	605	-	-	-	-	-	-	-	-	-	-	-
Orange Street	Stuart Ave	280	0.18	45	1.8	8	202	0.38	45	2.9	17	427	
	Oriental Ave	150	0.18	45	1.8	8	207	0.25	45	2.1	11	279	
	Redlands Blvd	575	-	-	-	-	-	-	-	-	-	-	-
6th Street	Stuart Ave	275	0.15	45	1.6	7	167	0.10	45	1.5	4	109	
7th Street	N/A	-	-	-	-	-	-	-	-	-	-	-	-
9th Street	N/A	-	-	-	-	-	-	-	-	-	-	-	-
Church Street	Stuart Ave	265	0.17	45	1.8	8	193	0.18	45	1.9	8	208	
N University Street	EB I-10 Ramp	1000	-	-	-	-	-	-	-	-	-	-	-
	WB I-10 Ramp	555	0.13	45	1.6	6	141	0.20	45	1.9	9	227	

Red values indicate queue length that is greater than available storage

5.5 FORECAST YEAR (2038) WITH PROJECT CONDITIONS AND WITH CENTRAL AVENUE CLOSURE

5.5.1 Intersection Level of Service

Level of service analysis was conducted to evaluate existing intersection operations and is included in Appendix F. Table 5-7 provides a summary of the existing level of service at the study intersections adjacent to the Central Avenue closure. Results show that the following intersection does not operate at satisfactory levels of service per the Level of Service standards discussed in Section 2.5.

AM and PM Peak Hours

Waterman Avenue and Orange Show Road LOS F

Table 5-7 Forecast Year (2038) With Project and Central Avenue Closure - Peak Hour Levels of Service

No.	Intersection	Jurisdiction	LOS Standard	Control	AM Peak Hour			PM Peak Hour		
					Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C
1	Sierra Way and Mill Street	City of San Bernardino	D	Signalized	7.6	A	0.37	7.7	A	0.55
3	Waterman Avenue and Mill Street	City of San Bernardino*	E	Signalized	32.1	C	1.05	59.7	E	0.97
4	Waterman Avenue and Orange Show Road	City of San Bernardino	D	Signalized	76.4	F	0.99	198.5	F	1.74
5	Waterman Avenue and Dumas Street	City of San Bernardino	D	OWSC	0.0	A	-	2.8	A	-

* CMP Intersection

Red values indicate the LOS or V/C threshold has been exceeded.

5.5.2 Queuing Analysis

Table 5-8 provides a summary of the grade crossing influence zone queue analysis. The results show that the queues from the following intersection exceeds the available storage distance between the signalized intersection and the grade crossing and could potentially block the grade crossing.

AM and PM Peak Hours

Waterman Avenue and the Orange Show Road crossing

Orange Show Road and the Waterman Avenue crossing

Table 5-8 Forecast Year (2038) With Project and Central Avenue Closure - Grade Crossing Influence Zone Queue

Grade Crossing Location	Adjacent Intersection	Available Storage (ft)	AM Peak					PM Peak				
			q	R	d	Avg # Veh in Queue	Queue Length	q	R	d	Avg # Veh in Queue	Queue Length
East Mill St	S Sierra Way	610	0.15	27	6.0	4	99	0.29	27	6.1	8	199
	S Waterman Ave	1330	0.11	37	14.8	4	97	0.12	76	50.7	11	266
Orange Show Road	S Waterman Ave	650	0.24	83	87.3	31	776	0.28	85	105.8	41	1037
Waterman Avenue	Orange Show Road	660	0.31	65	41.7	23	583	0.38	72	97.7	50	1255
	Dumas St	35	-	-	-	-	-	-	-	-	-	-

Table 5-9 provides a summary of the crossing spillback queue analysis. The results indicate that the queues from the following grade crossing location exceeds the available storage between the grade

crossing and the signalized intersection and could potentially block the intersection. Refer to Section 2.6 for definition of values.

AM and PM Peak Hours

Dumas Street and the Waterman Avenue crossing

Table 5-9 Forecast Year (2038) With Project and Central Avenue Closure - Crossing Spillback Queue

Grade Crossing Location	Adjacent Intersection	Available Storage (ft)	AM Peak					PM Peak				
			q	R	d	Avg # Veh in Queue	Queue Length	q	R	d	Avg # Veh in Queue	Queue Length
East Mill St	S Sierra Way	610	0.19	45	1.8	8	209	0.25	45	2.1	11	279
	S Waterman Ave	1330	0.26	45	2.1	12	298	0.33	45	2.5	15	372
Orange Show Road	S Waterman Ave	650	0.28	45	2.2	13	317	0.45	45	3.6	20	502
Waterman Avenue	Orange Show Road	660	0.41	45	3.2	18	459	0.46	45	3.8	21	514
	Dumas St	35	0.37	45	2.9	17	419	0.48	45	4.1	22	541

6.0 EXISTING AND WITH PROJECT ROADWAY OPERATING CONDITIONS

6.1 ROADWAY INTERSECTION LEVEL OF SERVICE

The Project Study Area is anticipated to experience decreases in LOS and V/C if no roadway improvements are completed by the City of San Bernardino, City of Redlands, and Caltrans in the future. For Year 2018 and 2038 With Project conditions, the following intersections are projected to operate outside the LOS or V/C threshold (as defined in Section 2.5) as shown in Table 6-1 through Table 6-7.

6.1.1 Opening Year (2018)

#12. California Street and I-10 West Ramps: Per the CMP standards, the LOS does not drop below E or the current level in both With or Without the Project, and the Project does not result in an increase in V/C over Without Project conditions. No Project mitigation is required.

#28. Orange Street and Pearl Avenue: The LOS drops below the Caltrans standard in both With and Without Project conditions. The Project does not result in a further decrease in LOS or increase in V/C. No Project mitigation is required.

#33. 6th Street and Pearl Avenue: The LOS drops below the City of Redlands standard in both With and Without Project conditions. The Project does not result in a further decrease in LOS or increase in V/C. No Project mitigation is required.

Table 6-1 Opening Year (2018) With and Without Project Intersections with Unsatisfactory LOS & V/C

No.	Intersection	Jurisdiction	LOS				V/C			Mitigation
			Standard	Existing	2018 Without Project	2018 With Project	2018 Without Project	2018 With Project	Increase	
12	California Street and I-10 West Ramps	Caltrans*	E	E	E	E	1.09	1.08	-0.01	None
28	Orange Street and Pearl Avenue	Caltrans	C	E	D	D	1.05	1.07	0.02	Caltrans
33	6 th Street and Pearl Avenue	City of Redlands	C	C	D	D	-	-	-	City of Redlands

*CMP Intersection

6.1.2 Opening Year (2018) With Central Avenue Closure

#3 Waterman Avenue and Orange Show Road: The LOS drops below the City of San Bernardino standard in both With and Without Project conditions. No project mitigation is required.

Table 6-2 Forecast Year (2018) With Central Avenue Closure- With and Without Project Intersections with Unsatisfactory LOS & V/C

No.	Intersection	Jurisdiction	LOS				V/C			Mitigation
			Standard	Existing	2018 Without Project	2018 With Project	2018 Without Project	2018 With Project	Increase	
4	Waterman Avenue and Orange Show Road	City of San Bernardino	D	E	E	F	1.04	1.04	0.00	City of San Bernardino

6.1.3 Forecast Year (2038)

#4. Waterman Avenue and Orange Show Road: The LOS drops below the City of San Bernardino standard in both With and Without Project conditions. The Project does not result in a further decrease in LOS or increase in V/C. No Project mitigation is required.

#9. Anderson Avenue and I-10 West Ramps: The LOS drops below the CMP standard in both With and Without Project conditions. The Project does not result in a further decrease in LOS or increase in V/C. No Project mitigation is required.

#10. Anderson Avenue and I-10 East Ramps: The LOS drops below the CMP standard in both With and Without Project conditions. The Project does not result in a further decrease in LOS or increase in V/C. No Project mitigation is required.

#13. California Street and I-10 East Ramps: Per the CMP standards, the LOS drops below E in both With or Without the Project, and the Project does result in an increased V/C over Without Project conditions. No Project mitigation is required.

#16. Alabama Street and I-10 West Ramps: Per the CMP standards, the LOS drops below E in both With or Without the Project, and the Project does result in an increased V/C over Without Project conditions. No Project mitigation is required.

#17. Alabama Street and I-10 East Ramps: Per the CMP standards, the LOS drops below E in both With or Without the Project, and the Project does result in an increased V/C over Without Project conditions. No Project mitigation is required.

#27. Orange Street and Colton Avenue: The LOS drops below the Caltrans standard in both With and Without Project conditions. No Project mitigation is required.

#28. Orange Street and Pearl Avenue: The LOS drops below the Caltrans standard in both With and Without Project conditions. No Project mitigation is required.

#29. Orange Street and Stuart Avenue: The LOS drops below the City of Redlands standard in both With or Without Project conditions. No Project mitigation is required.

#32. 6th Street and I-10 West Ramps: The LOS drops below the City of Redlands standard in both With and Without Project conditions. No Project mitigation is required.

#33. 6th Street and Pearl Avenue: The LOS drops below the City of Redlands standard in both With and Without Project conditions. No Project mitigation is required.

#38. University Street and I-10 East Ramps: The LOS drops below the City of Redlands standard in Without Project conditions. No Project mitigation is required.

Table 6-3 Forecast Year (2038) With and Without Project Intersections with Unsatisfactory LOS & V/C

No.	Intersection	Jurisdiction	LOS				V/C			Mitigation
			Standard	Existing	2038 Without Project	2038 With Project	2038 Without Project	2038 With Project	Increase	
4	Waterman Avenue and Orange Show Road	City of San Bernardino	D	E	F	F	0.94	0.96	0.02	City of San Bernardino
8	Tippecanoe Avenue and Hospitality Lane	City of San Bernardino	D	C	F	F	1.31	1.27	-0.04	City of San Bernardino
10	Anderson Avenue and I-10 East Ramps	Caltrans*	E	E	F	F	1.2	1.2	0.00	Caltrans
13	California Street and I-10 East Ramps	Caltrans*	E	F	F	F	1.64	1.63	-0.01	Caltrans
16	Alabama Street and I-10 West Ramps	Caltrans*	E	E	F	F	1.29	1.29	0.00	Caltrans
17	Alabama Street and I-10 East Ramps	Caltrans*	E	E	F	F	1.24	1.24	0.00	Caltrans
27	Orange Street and Colton Avenue	Caltrans	C	B	D	D	1.34	1.35	0.01	Caltrans
28	Orange Street and Pearl Avenue	Caltrans	C	E	F	F	1.7	1.69	-0.01	Caltrans
29	Orange Street and Stuart Avenue	City of Redlands	C	B	D	D	1.04	1.05	0.01	City of Redlands
32	6th Street and I-10 West Ramps	City of Redlands	C	A	D	D	-	-	-	City of Redlands
33	6th Street and Pearl Avenue	City of Redlands	C	C	F	F	-	-	-	City of Redlands
38	University Street and I-10 East Ramps	City of Redlands	C	C	F	F	-	-	-	City of Redlands

*CMP Intersection

6.1.4 Forecast Year (2038) With Central Avenue Closure

#3 Waterman Avenue and Orange Show Road: The LOS drops below the City of San Bernardino standard in both With and Without Project conditions. No project mitigation is required.

Table 6-4 Forecast Year (2038) With Central Avenue Closure- With and Without Project Intersections with Unsatisfactory LOS & V/C

No.	Intersection	Jurisdiction	LOS				V/C			Mitigation
			Standard	Existing	2038 Without Project	2038 With Project	2038 Without Project	2038 With Project	Increase	
4	Waterman Avenue and Orange Show Road	City of San Bernardino	D	C	F	F	1.75	1.74	-0.01	City of San Bernardino

6.2 ROADWAY IMPROVEMENTS BY OTHERS

6.2.1 Opening Year (2018)

As shown in Section 6.1, the Project would not increase the LOS or V/C to the area in the Year 2018 and 2038, although existing condition impacts will exist. A level of service analysis was conducted to evaluate 2018 and 2038 With Project conditions with improvements at the study intersections. The results are summarized in Table 6-5 through Table 6-8 and show that the intersection would operate at acceptable levels of service during the AM and PM peak periods.

These suggested roadway improvements have not been included in the traffic modeling, and therefore, future with project conditions are not contingent on the completion of these suggested roadway improvements. Suggested improvements are not considered Project mitigation and are presented for informational purposes intended for the appropriate agencies. The following circulation improvements are recommended to improve operations at these locations:

#12. California Street and I-10 West Ramps: Intersection improvements will be needed in order to reduce the V/C to less than 1.

- Ramp improvement to include a right-turn pocket. The existing right-turn lane will become a shared left-turn lane to accommodate the high number of left turns.

#28. Orange Street and Pearl Avenue: Intersection improvements will be needed in order to improve the LOS.

- Stripe a westbound right-turn lane to accommodate the high number of right turns.

#33. 6th Street and Pearl Avenue: Intersection improvements will be needed in order to improve the LOS.

- Signalize the intersection.

Table 6-5 Opening Year (2018) With Project and Suggested Improvements LOS & V/C

No.	Intersection	AM Peak Hour			PM Peak Hour		
		Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C
12	California Street and I-10 West Ramps	23.3	C	0.76	49.2	D	0.99
28	Orange Street and Pearl Avenue	14.1	B	0.74	33.1	C	0.95
33	6th Street and Pearl Avenue	6.3	A	0.43	10.2	B	0.66

6.2.2 Opening Year (2018) With Central Avenue Closure

#4. Waterman Avenue and Orange Show Road: Intersection improvements will be needed in order to improve the LOS.

- Stripe an eastbound and southbound right-turn pocket to accommodate the high number of right turns.

Table 6-6 Opening Year (2018) With Central Avenue Closure - With Project and Suggested Improvements LOS & V/C

No.	Intersection	AM Peak Hour			PM Peak Hour		
		Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C
4	Waterman Avenue and Orange Show Road	20.3	C	0.67	54.3	D	0.93

6.2.3 Forecast Year (2038)

#4. Waterman Avenue and Orange Show Road: Intersection improvements will be needed in order to improve the LOS.

- Widen Waterman Avenue to accommodate three through lanes, one right-turn only lane, and dual northbound left-turn lane. Widen Orange Show Road to accommodate three through lanes with a shared right-turn lane and a dual eastbound left-turn lane.

#9. Anderson Avenue and I-10 West Ramps: Intersection improvements will be needed in order to reduce the V/C to less than 1.

- Stripe a dual northbound left, dual southbound right and a dual westbound right.

#10. Anderson Avenue and I-10 East Ramps: Intersection improvements will be needed in order to reduce the V/C to less than 1.

- Stripe a northbound left-turn pocket, dual southbound left, and a dual eastbound left.

#13. California Street and I-10 East Ramps: Intersection improvements will be needed in order to reduce the V/C to less than 1.

- In addition to the ramp improvements in Section 6.1, stripe a dual northbound right and a dual northbound left.

#16. Alabama Street and I-10 West Ramps: Intersection improvements will be needed in order to reduce the V/C to less than 1.

- Stripe a westbound right-turn pocket and southbound right-turn pocket.

#17. Alabama Street and I-10 East Ramps: Intersection improvements will be needed in order to reduce the V/C to less than 1.

- Stripe an eastbound right-turn pocket and a northbound right-turn pocket.

#27. Orange Street and Colton Avenue: Intersection improvements will be needed in order to improve the LOS.

- Stripe an eastbound right-turn pocket.

#28. Orange Street and Pearl Avenue: Intersection improvements will be needed in order to improve the LOS.

- In addition to the westbound improvements to Pearl Avenue in Section 6.1, stripe eastbound left-turn and right-turn pockets, and southbound left-turn pocket.

#29. Orange Street and Stuart Avenue: The Project results in a V/C increase of 0.01, which falls within the threshold.

- Stripe a southbound left-turn pocket.

#32. 6th Street and I-10 West Ramps: Intersection improvements will be needed in order to improve the LOS.

- Stripe a westbound left-turn pocket.

#33. 6th Street and Pearl Avenue: Intersection improvements will be needed in order to improve the LOS.

- As in year 2018, signalize the intersection.

#38. University Street and I-10 East Ramps: Intersection improvements will be needed in order to improve the LOS.

- Signalize the intersection.

Table 6-7 Forecast Year (2038) With Project with Improvement LOS & V/C

No.	Intersection	AM Peak Hour			PM Peak Hour		
		Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C
4	Waterman Avenue and Orange Show Road	30.1	C	0.70	52.9	D	1.16
8	Tippecanoe Avenue and Hospitality Lane	23.3	C	0.81	43.7	D	0.94
10	Anderson Avenue and I-10 East Ramps	19.4	B	0.60	48.3	D	0.98
13	California Street and I-10 East Ramps	31.5	C	0.85	32.3	C	0.93
16	Alabama Street and I-10 West Ramps	36.1	D	0.93	47.3	D	0.93
17	Alabama Street and I-10 East Ramps	18.2	B	0.44	43.8	D	0.92
27	Orange Street and Colton Avenue	19.5	B	0.68	28.6	C	0.94
28	Orange Street and Pearl Avenue	12.6	B	0.68	29.2	C	0.93
29	Orange Street and Stuart Avenue	7.8	A	0.49	17.6	B	0.77
32	6th Street and I-10 West Ramps	20.5	C	-	24.9	C	-
33	6th Street and Pearl Avenue	8.7	A	0.56	23.8	C	0.88
38	University Street and I-10 East Ramps	8.4	A	0.57	17.0	B	0.72

6.2.4 Forecast Year (2038) With Central Avenue Closure

#4. Waterman Avenue and Orange Show Road: Intersection improvements will be needed in order to improve the LOS.

- Widen Waterman Avenue to accommodate three through lanes, one right-turn only lane, and dual northbound left-turn lane. Widen Orange Show Road to accommodate three through lanes with a shared right-turn lane and a dual eastbound left-turn lane.

Table 6-8 Forecast Year (2038) With Central Avenue Closure - With Project with Improvement LOS & V/C

No.	Intersection	AM Peak Hour			PM Peak Hour		
		Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C
4	Waterman Avenue and Orange Show Road	28.4	C	0.76	46.0	D	0.92

7.0 PROJECT IMPACTS AND PROPOSED MITIGATION MEASURES

7.1 ROADWAY IMPACTS

For opening year 2018 With Project conditions with either the Preferred Alternative or Waterman Option, the following intersections are projected to operate outside the level of service or V/C threshold as shown in Table 7-1 and Table 7-2. The LOS standards are defined in Section 2.5.

7.1.1 Opening Year (2018)

#13. California Street and I-10 East Ramps: Per the CMP standards, the LOS does not drop below E or the current level, but the Project causes an increase in V/C of 0.05 over base conditions.

Table 7-1 Opening Year (2018) With Project - Intersections with Unsatisfactory LOS & V/C

No.	Intersection	Jurisdiction	LOS				V/C			Mitigation
			Standard	Existing	2018 Without Project	2018 With Project	2018 Without Project	2018 With Project	Increase	
13	California Street and I-10 East Ramps	Caltrans*	E	F	D	D	1.05	1.10	0.05	Shared

*CMP Intersection

7.1.2 Forecast Year (2038)

#12. California Street and I-10 West Ramps: Per the CMP standards, the LOS drops below E in both With and Without Project conditions, but the Project causes an increase in V/C of 0.01 over Without Project conditions.

#18. Alabama Street and Industrial Avenue: The LOS drops below the City of Redlands standard in both With and Without Project conditions.

Table 7-2 Forecast Year (2038) With Project - Intersections with Unsatisfactory LOS & V/C

No.	Intersection	Jurisdiction	LOS				V/C			Mitigation
			Standard	Existing	2038 Without Project	2038 With Project	2038 Without Project	2038 With Project	Increase	
12	California Street and I-10 West Ramps	Caltrans*	E	E	F	F	2.04	2.05	0.01	Shared
18	Alabama Street and Industrial Avenue	City of Redlands	C	D	E	E	1.31	1.39	0.08	Shared

*CMP Intersection

7.2 PROPOSED MITIGATION MEASURES

A level of service analysis was conducted to evaluate 2018 and 2038 With Project conditions with proposed improvements at the study intersections. The results are summarized in Table 7-3 and Table 7-4, and show that the intersection would operate at acceptable levels of service during the AM and PM peak periods. The following circulation improvements are recommended to improve operations at these locations:

7.2.1 Opening Year (2018)

#13. California Street and I-10 East Ramps: Project mitigation will be required to reduce the V/C to pre-project conditions and the Agency will need to provide further improvements to the intersection, resulting in a shared cost.

- Ramp improvement to include a right-turn pocket. The existing right-turn lane will become a shared right-turn lane to accommodate the high number of right turns.

Table 7-3 Opening Year (2018) With Project, With Improvement LOS & V/C

No.	Intersection	AM Peak Hour			PM Peak Hour		
		Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C
13	California Street and I-10 East Ramps	21.3	C	0.60	21.7	C	0.89

7.2.2 Forecast Year (2038)

#12. California Street and I-10 West Ramps: Project mitigation will be required to reduce the V/C to pre-project conditions and the Agency will need to provide further improvements to the intersection, resulting in a shared cost.

- Stripe a dual southbound right and a dual northbound left.

#18 Alabama Street and Industrial Avenue: Project mitigation will be required to reduce the V/C to pre-project conditions and the Agency will need to provide further improvements to the intersection, resulting in a shared cost.

- Stripe an exclusive westbound right turn lane, with the minimum amount of storage per agency standards, to accommodate the high number of right turns.

Table 7-4 Forecast Year (2038) With Project, with Improvement LOS & V/C

No.	Intersection	AM Peak Hour			PM Peak Hour		
		Delay (sec)	LOS	V/C	Delay (sec)	LOS	V/C
12	California Street and I-10 West Ramps	59.7	E	0.97	57.0	E	1.03
18	Alabama Street and Industrial Avenue	7.7	A	0.44	31.5	C	0.91

8.0 SAFETY IMPACTS AND PROPOSED MITIGATION MEASURES

There are three types of alternative solutions when the 95th percentile queue at a signalized intersection exceeds the clear storage distance between the intersection and the grade crossing.

1. Advanced Pre-emption – Feasible if at least a minimum of 30-35 seconds of total warning time can be provided at the crossing. Improvements required would be installation/relocation of the train motion detection to provide additional warning time. Minimal equipment and programming would be required at the existing traffic signal cabinet.
2. Advanced Pre-emption with a Pre-Signal – Feasible if at least a minimum of 25-30 seconds of total warning time can be provided at the crossing and a clear storage distance under 120 feet. Improvements required would be the installation/relocation of the train motion detection to provide additional warning time and a signal pole and mast arm connected to the intersection traffic signal controller. Minimal equipment and programming would be required at the existing traffic signal cabinet.
3. Simultaneous Pre-emption with a Queue-Cutter Signal – Feasible with 20 seconds of total warning time and a clear storage distance over 120 feet. Improvements required would be a signal pole and mast arm, traffic signal controller and cabinet, and vehicle detection connected to the intersection traffic signal controller. Minimal equipment and programming would be required at the existing traffic signal cabinet.

Metrolink equipment runs a minimum time of 25 to 30 seconds of railroad equipment warning time based on the *Southern California Regional Rail Authority (SCRRA) Highway – Rail Grade Crossings Recommended Design Practices and Standards Manual*. If the existing Metrolink track circuitry is not capable of providing additional warning time, then the traffic signal will need to run simultaneous.

The recommendations below are assuming additional warning time is available and that the existing traffic signal equipment and software are capable of preemption. These recommendations are based on the information provided in the study only and should be considered preliminary. No field diagnostics of the crossing or inspection of the existing railroad and traffic signal equipment has been done.

8.1 OPENING YEAR (2018) WITH PROJECT

There are three locations, as shown in Table 8-1, where the influence zone queue exceeds the available storage distance between the signalized intersection and the grade crossing. Queue calculations are based on forecasted counts and trends are based on existing counts.

Table 8-1 Locations of 2018 Safety Improvements

Grade Crossing Location	Adjacent Intersection	Available Storage (ft)	Queue Length
California Street	EB I-10 Ramp	80	195
Alabama Street	Industrial Park Ave	280	449
Tennessee Street	Redlands Blvd	36	236

Eastbound I-10 Ramps and California Street Crossing:

- Major leg of intersection
- Seven hour PM peak with gradual decrease
- Queue reaches tracks in AM and PM peak
- Pre-signal recommended for further consideration

Industrial Park Avenue and Alabama Street Crossing:

- Major leg of intersection
- Seven hour PM peak with sharp decrease
- Queue reaches tracks only during PM peak
- Pre-signal recommended for further consideration

Redlands Boulevard and Tennessee Street Crossing:

- Major leg of intersection
- Two hour AM peak and six hour PM peak with sharp decrease
- Queue reaches tracks in AM and PM peak
- Pre-signal recommended for further consideration

8.2 FORECAST YEAR (2038) WITH PROJECT

There are seven locations, as shown in Table 8-2, where the influence zone queue exceeds the available storage distance between the signalized intersection and the grade crossing.

Table 8-2 Locations of 2038 Safety Improvements

Grade Crossing Location	Adjacent Intersection	Available Storage (ft)	Queue Length
Orange Show Road	S Waterman Ave	650	734
Waterman Avenue	Orange Show Road	660	1215
California Street	EB I-10 Ramp	80	759
	Redlands Blvd	1040	1477
Alabama Street	Industrial Park Ave	280	620
	Redlands Blvd	290	932
Tennessee Street	Redlands Blvd	36	388

In addition to the three locations in 2018, the recommendations for the remaining four intersections are as follows:

Waterman Avenue and Orange Show Road Crossing:

- Major leg of intersection
- One hour AM peak and two hour PM peak with sharp decrease
- Queue reaches tracks in PM peak
- Queue cutter signal recommended for further consideration

Orange Show Road and Waterman Avenue Crossing:

- Major leg of intersection
- Three hour AM peak and five hour PM peak with sharp decrease
- Queue reaches tracks in PM peak
- Queue cutter signal recommended for further consideration

Redlands Boulevard and California Street Crossing:

- Major leg of intersection
- Six hour AM Peak and six hour PM peak with gradual decrease
- Queue reaches tracks in AM and PM peak
- Queue cutter signal recommended for further consideration

Redlands Boulevard and Alabama Street Crossing:

- Major leg of intersection
- Five hour AM Peak and seven hour PM peak with gradual decrease
- Queue reaches tracks in PM peak
- Queue cutter signal recommended for further consideration

8.3 RECOMMENDED SAFETY MITIGATION MEASURES

Under Forecast Year 2018 SANBAG will be required to install pre-signals as proposed mitigation, prior to the implementation of Project operations at the following grade crossing locations:

- Eastbound I-10 Ramps and California Street
- Industrial Park Avenue and Alabama Street
- Redlands Boulevard and Tennessee Street

Under Forecast Year 2038 SANBAG will be required to install as proposed mitigation prior to the implementation of Project operations, queue-cutter signals at the following grade crossing locations in 2038:

- Waterman Avenue and Orange Show Road
- Orange Show Road and Waterman Avenue
- Redlands Boulevard and California Street
- Redlands Boulevard and Alabama Street

9.0 SUMMARY AND CONCLUSIONS

The proposed Project will provide local transit service from the proposed new rail station at Rialto Avenue and E Street in downtown San Bernardino to the University of Redlands. No Project and With Project conditions were evaluated under year 2011, 2018 and 2038 conditions. The following present a summary of the analysis.

9.1 EXISTING (2011) TRAFFIC CONDITIONS

Table 9-1 provides a comparison of the intersection LOS and V/C values for the Existing With and Without Project conditions. Under Existing No Project conditions, all intersections currently operate at acceptable levels of service except for the following intersections.

- Waterman Avenue and Orange Show Road LOS E
- Anderson Avenue and I-10 East Ramps 1.09 V/C
- California Street and I-10 West Ramps 1.04 V/C
- California Street and I-10 East Ramps LOS F
- Alabama Street and I-10 West Ramps 1.04 V/C
- Alabama Street and I-10 East Ramps 1.05 V/C
- Alabama Street and Industrial Boulevard LOS D
- Alabama Street and Redlands Boulevard 1.07 V/C
- Eureka Street and Pearl Avenue LOS E
- Orange Street and Pearl Avenue LOS E

Under Existing With Project conditions, all intersections operate at the same or within acceptable levels of service as No Project conditions.

Table 9-1 Existing (2011) With or Without Traffic Conditions Comparison

No.	Intersection	Without Project				With Project			
		AM Peak		PM Peak		AM Peak		PM Peak	
		LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C
1	Sierra Way and Mill Street	A	0.3	A	0.38	A	0.27	A	0.33
2	Waterman Avenue and 9th Street	C	0.52	C	0.67	B	0.52	B	0.61
3	Waterman Avenue and Mill Street	C	0.38	C	0.56	B	0.47	C	0.68
4	Waterman Avenue and Orange Show Road	C	0.58	E	0.96	C	0.55	D	0.85
5	Waterman Avenue and Dumas Street	A	-	A	-	A	-	A	-
6	Waterman Avenue and Washington Street	C	0.8	D	0.71	C	0.84	D	0.66
7	Tippecanoe Avenue and Victoria Avenue	A	0.41	A	0.49	A	0.44	A	0.53
8	Tippecanoe Avenue and Hospitality Lane	D	0.64	C	0.82	B	0.45	C	0.73
9	Tippecanoe Avenue and I-10 West Ramps	C	0.57	D	0.88	C	0.71	D	0.85
10	Anderson Avenue and I-10 East Ramps	C	0.7	E	1.09	B	0.76	D	1.03
11	Anderson Avenue and Academy Drive	D	0.85	B	0.51	C	0.88	B	0.48
12	California Street and I-10 West Ramps	D	1.0	E	1.04	D	0.96	D	0.98
13	California Street and I-10 East Ramps	F	0.9	F	0.96	F	0.79	F	0.93
14	California Street and Walmart Driveway	A	-	A	-	A	-	A	-
15	California Street and Redlands Boulevard	E	0.98	F	0.98	C	0.6	E	0.95
16	Alabama Street and I-10 West Ramps	E	0.82	E	1.04	C	0.8	D	0.91
17	Alabama Street and I-10 East Ramps	C	0.6	E	1.05	B	0.68	D	0.9
18	Alabama Street and Industrial Avenue	B	0.46	D	0.97	B	0.48	C	0.82
19	Alabama Street and Redlands Boulevard	D	0.75	F	1.07	B	0.55	C	0.87
20	Tennessee Street and Redlands Boulevard	D	0.73	E	0.90	B	0.67	C	0.76
21	Texas Street and Stuart Avenue	A	-	A	-	A	-	A	-
22	Texas Street and Oriental Avenue	A	-	A	-	A	-	A	-
23	Eureka Street and Pearl Avenue	C	0.52	E	0.77	B	0.44	C	0.68
24	Eureka Street and Stuart Avenue	A	0.39	A	0.24	A	0.38	A	0.23
25	Eureka Street and Oriental Avenue	A	0.27	A	0.30	A	0.26	A	0.32
26	Eureka Street and Redlands Boulevard	B	0.38	C	0.63	A	0.46	C	0.64
27	Orange Street and Colton Avenue	B	0.51	B	0.63	B	0.5	B	0.66
28	Orange Street and Pearl Avenue	B	0.73	E	1.04	B	0.73	C	0.97
29	Orange Street and Stuart Avenue	A	0.48	B	0.70	A	0.47	B	0.7
30	Orange Street and Oriental Avenue	A	-	A	-	A	-	A	-
31	Orange Street and Redlands Boulevard	C	0.53	C	0.86	A	0.46	C	0.75
32	6th Street and I-10 West Ramps	A	-	A	-	A	-	A	-
33	6th Street and Pearl Avenue	B	-	C	-	B	-	C	-
34	6th Street and Stuart Avenue	A	-	A	-	A	-	A	-
35	Redlands Boulevard and Citrus Avenue	D	0.92	C	0.69	D	0.88	C	0.7
36	Church Street and Stuart Avenue	A	-	A	-	A	-	A	-
37	University Street and I-10 West Ramps	B	-	A	-	B	-	A	-
38	University Street and I-10 East Ramps	A	-	C	-	A	-	C	-
39	Tippecanoe Avenue and Harriman Place	A	0.31	B	0.87	A	0.3	B	0.81

9.2 OPENING YEAR (2018) TRAFFIC CONDITIONS

Table 9-2 provides a comparison of the intersection LOS and V/C values for the Opening Year With and Without Project conditions. Under Opening Year 2018 Without Project conditions, all intersections operate at acceptable levels of service except for the following intersections:

- California Street and I-10 West Ramps 1.09 V/C
- California Street and I-10 East Ramps 1.05 V/C
- Orange Street and Pearl Avenue LOS D
- 6th Street and Pearl Avenue LOS D
- University Street and I-10 West Ramps LOS D
- University Street and I-10 East Ramp LOS D

Under Opening Year 2018 all intersections operate at the same or within acceptable LOS With Project conditions.

Table 9-2 Opening Year (2018) With and Without Project Traffic Conditions Comparison

No.	Intersection	Standard	Without Project				With Project			
			AM Peak		PM Peak		AM Peak		PM Peak	
			LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C
1	Sierra Way and Mill Street	D	A	0.28	A	0.39	A	0.26	A	0.32
2	Waterman Avenue and 9th Street	E	B	0.58	B	0.67	B	0.58	B	0.68
3	Waterman Avenue and Mill Street	E	B	0.53	B	0.64	B	0.53	B	0.77
4	Waterman Avenue and Orange Show Road	D	C	0.69	D	0.93	C	0.67	D	0.95
5	Waterman Avenue and Dumas Street	D	A	-	A	-	A	-	A	-
6	Waterman Avenue and Washington Street	D	C	0.71	D	0.96	C	0.71	D	0.95
7	Tippecanoe Avenue and Victoria Avenue	D	A	0.48	A	0.57	A	0.47	A	0.48
8	Tippecanoe Avenue and Hospitality Lane	D	C	0.64	D	0.83	C	0.63	D	0.83
9	Tippecanoe Avenue and I-10 West Ramps	E	-	-	-	-	-	-	-	-
10	Anderson Avenue and I-10 East Ramps	E	B	0.69	D	0.86	B	0.72	D	0.87
11	Anderson Avenue and Academy Drive	D	C	0.82	B	0.60	C	0.82	B	0.63
12	California Street and I-10 West Ramps	E	C	0.88	E	1.09	C	0.84	E	1.08
13	California Street and I-10 East Ramps	E	C	0.60	D	1.05	C	0.64	D	1.10
14	California Street and Walmart Driveway	C	A	-	A	-	A	-	A	-
15	California Street and Redlands Boulevard	F	C	0.80	D	0.91	C	0.65	D	0.89
16	Alabama Street and I-10 West Ramps	E	C	0.86	D	0.99	C	0.88	D	0.96
17	Alabama Street and I-10 East Ramps	E	B	0.66	C	0.91	B	0.57	C	0.87
18	Alabama Street and Industrial Avenue	C	A	0.44	C	0.84	A	0.36	C	0.78
19	Alabama Street and Redlands Boulevard	F	C	0.56	D	0.93	C	0.54	D	0.89
20	Tennessee Street and Redlands Boulevard	E	B	0.61	C	0.83	B	0.61	C	0.84
21	Texas Street and Stuart Avenue	C	A	-	A	-	A	-	A	-
22	Texas Street and Oriental Avenue	C	A	-	A	-	A	-	A	-
23	Eureka Street and Pearl Avenue	C	B	0.47	C	0.70	B	0.48	C	0.71
24	Eureka Street and Stuart Avenue	C	A	0.38	A	0.30	A	0.39	A	0.26
25	Eureka Street and Oriental Avenue	C	A	0.27	A	0.31	A	0.26	A	0.32
26	Eureka Street and Redlands Boulevard	C	A	0.47	B	0.62	A	0.47	B	0.63
27	Orange Street and Colton Avenue	C	B	0.55	B	0.68	B	0.54	B	0.68
28	Orange Street and Pearl Avenue	C	B	0.79	D	1.05	B	0.79	D	1.07
29	Orange Street and Stuart Avenue	C	A	0.49	B	0.71	A	0.50	B	0.71
30	Orange Street and Oriental Avenue	C	A	-	A	-	A	-	A	-
31	Orange Street and Redlands Boulevard	E	A	0.48	B	0.59	A	0.48	B	0.60
32	6th Street and I-10 West Ramps	C	A	-	B	-	A	-	B	-
33	6th Street and Pearl Avenue	C	B	-	D	-	B	-	D	-
34	6th Street and Stuart Avenue	C	A	-	A	-	A	-	A	-
35	Redlands Boulevard and Citrus Avenue	E	C	0.72	C	0.76	C	0.71	C	0.75
36	Church Street and Stuart Avenue	C	A	-	A	-	A	-	A	-
37	University Street and I-10 West Ramps	C	D	-	A	-	C	-	A	-
38	University Street and I-10 East Ramps	C	A	-	D	-	A	-	C	-
39	Tippecanoe Avenue and Harriman Place		C	0.62	D	0.75	C	0.61	D	0.76

9.3 OPENING YEAR (2018) TRAFFIC CONDITIONS WITH CENTRAL AVENUE CLOSURE

Table 9-3 provides a comparison of the intersection LOS and V/C values for the Opening Year 2018 With and Without Project conditions. Under Opening Year 2018 Without Project conditions, all intersections operate at acceptable levels of service except for the following intersection:

- Waterman Avenue and Orange Show Road LOS E

Under Opening Year 2018 all intersections operate at the same or within acceptable LOS With Project conditions.

Table 9-3 Opening Year (2018) With and Without Project and With Central Avenue Closure - Traffic Conditions Comparison

Intersection	Without Project				With Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C
Sierra Way and Mill Street	A	0.33	A	0.49	A	0.3	A	0.41
Waterman Avenue and Mill Street	B	0.64	D	0.81	B	0.55	D	0.83
Waterman Avenue and Orange Show Road	C	0.80	E	1.04	C	0.79	F	1.04
Waterman Avenue and Dumas Street	A	-	A	-	A	-	A	-

9.4 FORECAST YEAR (2038) TRAFFIC CONDITIONS

Table 9-4 provides a comparison of the intersection LOS and V/C values for the Forecast Year With and Without Project conditions. Under Forecast Year 2038 No Project conditions, all intersections operate at acceptable levels of service except for the following intersections:

- Waterman Avenue and Orange Show Road LOS F
- Tippecanoe Avenue and Hospitality Lane LOS F
- Anderson Avenue and I-10 East Ramps LOS F
- California Street and I-10 West Ramps LOS F
- California Street and I-10 East Ramps LOS F
- Alabama Street and I-10 West Ramps LOS F
- Alabama Street and I-10 East Ramps LOS F
- Alabama Street and Industrial Avenue LOS E
- Orange Street and Colton Avenue LOS D
- Orange Street and Pearl Avenue LOS F
- Orange Street and Stuart Avenue LOS D
- 6th Street and I-10 West Ramps LOS D
- 6th Street and Pearl Avenue LOS F
- University Street and I-10 East Ramps LOS F

Under Forecast Year 2038, all intersections operate at the same or within acceptable LOS With Project conditions.

Table 9-4 Forecast Year (2038) With and Without Project Traffic Conditions Comparison

No.	Intersection	Without Project				With Project			
		AM Peak		PM Peak		AM Peak		PM Peak	
		LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C
1	Sierra Way and Mill Street	A	0.38	A	0.50	A	0.32	A	0.47
2	Waterman Avenue and 9th Street	B	0.76	D	0.88	B	0.75	D	0.87
3	Waterman Avenue and Mill Street	C	0.71	C	0.71	C	0.71	C	0.73
4	Waterman Avenue and Orange Show Road	D	0.94	F	1.43	E	0.96	F	1.35
5	Waterman Avenue and Dumas Street	A	-	A	-	A	-	A	-
6	Waterman Avenue and Washington Street	C	0.86	D	0.85	C	0.79	D	0.87
7	Tippecanoe Avenue and Victoria Avenue	A	0.60	A	0.62	A	0.57	A	0.59
8	Tippecanoe Avenue and Hospitality Lane	C	0.87	F	1.31	C	0.83	F	1.27
9	Tippecanoe Avenue and I-10 West Ramps	-	-	-	-	-	-	-	-
10	Anderson Avenue and I-10 East Ramps	C	0.84	F	1.20	C	0.85	F	1.20
11	Anderson Avenue and Academy Drive	D	0.94	B	0.69	D	0.94	C	0.72
12	California Street and I-10 West Ramps	F	1.58	F	2.04	F	1.60	F	2.05
13	California Street and I-10 East Ramps	F	1.09	F	1.64	F	1.06	F	1.63
14	California Street and Walmart Driveway	A	-	ERR*	-	A	-	ERR*	-
15	California Street and Redlands Boulevard	F	1.56	F	1.59	F	1.48	F	1.59
16	Alabama Street and I-10 West Ramps	E	1.07	F	1.29	E	1.07	F	1.29
17	Alabama Street and I-10 East Ramps	B	0.60	F	1.24	B	0.62	F	1.24
18	Alabama Street and Industrial Avenue	A	0.45	E	1.31	A	0.44	E	1.39
19	Alabama Street and Redlands Boulevard	C	0.56	D	0.98	C	0.58	E	0.97
20	Tennessee Street and Redlands Boulevard	B	0.61	D	0.97	B	0.61	D	0.98
21	Texas Street and Stuart Avenue	A	-	A	-	A	-	A	-
22	Texas Street and Oriental Avenue	A	-	A	-	A	-	A	-
23	Eureka Street and Pearl Avenue	B	0.50	C	1.00	B	0.50	C	1.03
24	Eureka Street and Stuart Avenue	A	0.38	A	0.26	A	0.39	A	0.26
25	Eureka Street and Oriental Avenue	A	0.28	A	0.30	A	0.27	A	0.30
26	Eureka Street and Redlands Boulevard	A	0.53	B	0.65	B	0.54	B	0.65
27	Orange Street and Colton Avenue	C	0.85	D	1.34	C	0.85	D	1.35
28	Orange Street and Pearl Avenue	D	0.97	F	1.70	D	0.98	F	1.69
29	Orange Street and Stuart Avenue	A	0.50	D	1.04	A	0.49	D	1.05
30	Orange Street and Oriental Avenue	A	-	B	-	A	-	A	-
31	Orange Street and Redlands Boulevard	B	0.65	C	0.81	B	0.64	C	0.81
32	6th Street and I-10 West Ramps	B	-	D	-	C	-	D	-
33	6th Street and Pearl Avenue	D	-	F	-	D	-	F	-
34	6th Street and Stuart Avenue	A	-	A	-	A	-	A	-
35	Redlands Boulevard and Citrus Avenue	C	0.73	C	0.78	C	0.72	C	0.78
36	Church Street and Stuart Avenue	A	-	A	-	A	-	A	-
37	University Street and I-10 West Ramps	ERR*	-	C	-	ERR*	-	C	-
38	University Street and I-10 East Ramps	A	-	F	-	A	-	F	-
39	Tippecanoe Avenue and Harriman Place	D	0.82	D	0.96	C	0.65	D	0.94

*Volumes are out of bounds of the Highway Capacity Manual (HCM)

9.5 FORECAST YEAR (2038) TRAFFIC CONDITIONS WITH CENTRAL AVENUE CLOSURE

Table 9-5 provides a comparison of the intersection LOS and V/C values for the Forecast Year With and Without Project conditions. Under Forecast Year 2038 Without Project conditions, all intersections operate at acceptable levels of service except for the following intersection:

- Waterman Avenue and Orange Show Road LOS F

Table 9-5 Forecast Year (2038) With and Without Project and With Central Avenue Closure - Traffic Conditions Comparison

No.	Intersection	Without Project				With Project			
		AM Peak		PM Peak		AM Peak		PM Peak	
		LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C
1	Sierra Way and Mill Street	A	0.45	A	0.61	A	0.37	A	0.55
3	Waterman Avenue and Mill Street	C	0.89	E	0.97	C	0.91	E	0.97
4	Waterman Avenue and Orange Show Road	F	1.03	F	1.75	F	0.99	F	1.74
5	Waterman Avenue and Dumas Street	A	-	A	-	A	-	A	-

9.6 PROJECT IMPACTS AND SAFETY IMPROVEMENT RECOMMENDATIONS

The Project Study Area is anticipated to experience decreases in the LOS and V/C in the event no future roadway improvements are completed in the Study Area. Although planned roadway improvements have been identified in the RTIP/SCAG for the area, more roadway improvements will be required for compliance with the local standards, which would be the responsibility of the City of San Bernardino, the City of Redlands, and Caltrans.

The proposed Project will provide local transit service from the proposed new rail station at Rialto Avenue and E Street in downtown San Bernardino to the University of Redlands, which is anticipated to reduce the number of vehicles on the area roadways, resulting in an increase in LOS and V/C. The Project is anticipated to have a beneficial effect to the area and could reduce the roadway improvements required to be completed by the agencies.

Project impacts under Year 2018 conditions consist of an increased V/C at the intersection of California Street and I-10 East ramps. SANBAG will pay their “fair share” of the roadway improvement with Caltrans to include proposed ramp improvements with a right-turn pocket; the right-turn lane will become a share right-turn lane to accommodate the high number of right turns. Roadway improvements would reduce project effects to the pre-project conditions.

Project impacts under Year 2038 conditions consist of an increased V/C and reduced LOS at the intersections of California Street and I-10 West Ramps, and Alabama Street and Industrial Avenue. SANBAG will pay their “fair share” of the roadway improvements with Caltrans and City of Redlands, respectively, to include proposed ramp improvements with a dual southbound right and a dual northbound left. It is proposed to stripe a westbound right turn lane with 50-feet of storage to accommodate the high number of right turns at Alabama Street and Industrial Avenue. Roadway improvements would reduce project effects to pre-project conditions.

As stated in Section 8.1, there are three locations that exceed the available storage distance between the signalized intersection and the grade crossing for year 2018 and five locations for year 2038.

Under Forecast Year 2018, SANBAG will be required to install pre-signals as proposed mitigation, prior to the implementation of Project operations at the following grade crossing locations:

- Eastbound I-10 Ramps and California Street crossing
- Industrial Park Avenue and Alabama Street crossing
- Redlands Boulevard and Tennessee Street crossing

Under Forecast Year 2038, SANBAG will be required to install queue-cutter signals as proposed mitigation, prior to the implementation of Project operations. at the following grade crossing locations:

- Waterman Avenue and Orange Show Road Crossing
- Orange Show Road and Waterman Avenue Crossing
- Redlands Boulevard and California Street Crossing
- Redlands Boulevard and Alabama Street Crossing

Implementation of these safety improvements will reduce project effects to pre-project conditions. Therefore, implementation of the proposed roadway and safety improvement mitigation measures would reduce all project adverse effects, and no immitigable effects would occur.

Appendix A

Intersection Turning Movement Data

Location: City of San Bernardino
 N/S: Sierra Way
 E/W: Mill Street
 Contol: Signalized



File Name: SBCSIMI
 Date: 12/14/2011
 Day: Wednesday

	Northbound			Sierra Way Southbound			Mill Street Eastbound			Mill Street Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	0	0	1.5	0	1.5	1	2	0	0	2	0	8
7:00 AM				8		20	15	66			39	7	155
7:15 AM				21		19	17	82			69	8	216
7:30 AM				17		18	10	80			59	7	191
7:45 AM				29		15	15	120			68	10	257
8:00 AM				24		24	18	99			102	6	273
8:15 AM				17		12	7	87			70	5	198
8:30 AM				10		17	14	85			76	7	209
8:45 AM				17		29	12	74			70	8	210
TOTAL VOLUMES:	0	0	0	143	0	154	108	693	0	0	553	58	1709

AM Peak Hr Begins at: 745 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	0	0	80	0	68	54	391	0	0	316	28	937

PEAK HR FACTOR:	0.000	0.771	0.824	0.796	0.858
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	Northbound			Sierra Way Southbound			Mill Street Eastbound			Mill Street Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	0	0	1.5	0	1.5	1	2	0	0	2	0	8
4:00 PM				26		30	23	125			140	13	357
4:15 PM				17		35	16	152			117	10	347
4:30 PM				22		42	20	127			144	8	363
4:45 PM				20		32	17	155			114	9	347
5:00 PM				39		33	14	109			191	7	393
5:15 PM				21		27	19	111			131	8	317
5:30 PM				13		6	16	84			138	11	268
5:45 PM				13		17	13	87			92	8	230
TOTAL VOLUMES:	0	0	0	171	0	222	138	950	0	0	1067	74	2622

PM Peak Hr Begins at: 415 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	0	0	98	0	142	67	543	0	0	566	34	1450

PEAK HR FACTOR:	0.000	0.833	0.887	0.758	0.922
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Location: City of San Bernardino
 N/S: Waterman Avenue
 E/W: 9th Street
 Contol: Signalized



File Name: SBCWA9
 Date: 12/14/2011
 Day: Wednesday

	Waterman Avenue Northbound			Waterman Avenue Southbound			9th Street Eastbound			9th Street Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
7:00 AM	3	48	8	8	107	10	5	21	7	16	31	4	268
7:15 AM	3	73	8	5	167	10	9	29	8	24	32	13	381
7:30 AM	6	72	10	7	173	12	11	31	14	20	37	6	399
7:45 AM	12	74	14	7	174	7	10	49	15	18	55	8	443
8:00 AM	8	108	16	11	159	12	13	29	14	11	35	8	424
8:15 AM	14	92	9	20	139	9	9	47	11	12	40	11	413
8:30 AM	13	96	11	16	148	6	5	54	7	23	70	14	463
8:45 AM	7	114	13	14	162	12	15	37	12	32	56	18	492
TOTAL VOLUMES:	66	677	89	88	1229	78	77	297	88	156	356	82	3283

AM Peak Hr Begins at: 800 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	42	410	49	61	608	39	42	167	44	78	201	51	1792

PEAK HR FACTOR:	0.935			0.941			0.944			0.771			0.911
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	Waterman Avenue Northbound			Waterman Avenue Southbound			9th Street Eastbound			9th Street Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
4:00 PM	21	204	26	14	159	21	25	79	15	35	73	16	688
4:15 PM	17	177	37	12	199	7	28	65	10	27	69	10	658
4:30 PM	16	218	33	19	179	17	28	74	18	35	48	20	705
4:45 PM	29	181	39	20	178	12	31	80	18	25	63	15	691
5:00 PM	25	233	37	14	210	22	29	66	12	27	64	24	763
5:15 PM	20	222	31	14	168	26	33	59	15	35	65	16	704
5:30 PM	23	220	27	21	160	23	22	52	12	25	47	18	650
5:45 PM	22	185	28	17	137	21	26	50	11	34	46	12	589
TOTAL VOLUMES:	173	1640	258	131	1390	149	222	525	111	243	475	131	5448

PM Peak Hr Begins at: 430 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	90	854	140	67	735	77	121	279	63	122	240	75	2863

PEAK HR FACTOR:	0.919			0.893			0.897			0.942			0.938
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Location: City of San Bernardino
 N/S: Waterman Avenue
 E/W: Mill Street
 Contol: Signalized



File Name: SBCWAMI
 Date: 12/15/2011
 Day: Thursday

	Waterman Avenue Northbound			Waterman Avenue Southbound			Mill Street Eastbound			Mill Street Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	3	0	1	3	0	1	2	1	1	2	1	16
7:00 AM	12	77	24	20	95	9	16	47	13	18	29	1	361
7:15 AM	15	77	22	20	136	11	5	45	26	26	36	9	428
7:30 AM	8	97	21	16	149	17	32	62	31	24	42	12	511
7:45 AM	21	106	29	13	153	18	16	74	33	24	57	7	551
8:00 AM	20	127	15	23	124	11	6	71	29	27	44	28	525
8:15 AM	22	122	11	21	125	13	25	60	17	27	53	10	506
8:30 AM	25	124	32	26	105	18	21	35	34	22	40	12	494
8:45 AM	22	127	23	33	122	18	27	52	22	29	41	19	535
TOTAL VOLUMES:	145	857	177	172	1009	115	148	446	205	197	342	98	3911

AM Peak Hr Begins at: 730 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	71	452	76	73	551	59	79	267	110	102	196	57	2093

PEAK HR FACTOR:	0.924			0.928			0.912			0.896			0.950
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	Waterman Avenue Northbound			Waterman Avenue Southbound			Mill Street Eastbound			Mill Street Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	3	0	1	3	0	1	2	1	1	2	1	16
4:00 PM	31	156	26	25	170	37	29	87	39	44	104	28	776
4:15 PM	34	178	21	24	173	26	33	63	38	27	60	19	696
4:30 PM	29	196	32	23	208	43	38	79	53	38	65	22	826
4:45 PM	22	192	18	37	177	29	30	67	35	29	56	20	712
5:00 PM	35	230	25	22	180	27	37	81	48	41	113	33	872
5:15 PM	42	183	19	20	185	26	28	72	32	26	61	22	716
5:30 PM	24	153	23	34	159	29	24	71	32	30	64	27	670
5:45 PM	15	102	16	17	126	26	30	43	13	32	55	12	487
TOTAL VOLUMES:	232	1390	180	202	1378	243	249	563	290	267	578	183	5755

PM Peak Hr Begins at: 430 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	128	801	94	102	750	125	133	299	168	134	295	97	3126

PEAK HR FACTOR:	0.882			0.891			0.882			0.703			0.896
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Location: City of San Bernardino
 N/S: Waterman Avenue
 E/W: Orange Show Road
 Contol: Signalized



File Name: SBCWAOS
 Date: 12/14/2011
 Day: Wednesday

	Waterman Avenue Northbound			Waterman Avenue Southbound			Orange Show Road Eastbound			Orange Show Road Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
7:00 AM	14	99	8	11	71	9	26	38	22	11	27	11	347
7:15 AM	16	115	10	9	130	18	21	50	41	10	32	5	457
7:30 AM	21	103	8	9	147	18	35	55	54	19	44	9	522
7:45 AM	11	119	11	14	184	21	28	89	65	19	67	10	638
8:00 AM	12	168	6	12	107	13	36	71	40	28	62	17	572
8:15 AM	21	139	15	11	125	16	10	38	22	14	42	7	460
8:30 AM	18	115	6	8	126	22	29	34	20	12	54	12	456
8:45 AM	16	131	4	12	123	21	28	37	20	9	37	6	444
TOTAL VOLUMES:	129	989	68	86	1013	138	213	412	284	122	365	77	3896

AM Peak Hr Begins at: 730 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	65	529	40	46	563	68	109	253	181	80	215	43	2192

PEAK HR FACTOR:	0.852	0.773	0.746	0.790	0.859
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	Waterman Avenue Northbound			Waterman Avenue Southbound			Orange Show Road Eastbound			Orange Show Road Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
4:00 PM	39	144	24	22	176	21	30	86	34	14	70	13	673
4:15 PM	35	173	22	30	204	28	32	69	33	13	89	17	745
4:30 PM	39	183	35	37	201	34	42	115	46	24	80	14	850
4:45 PM	32	173	30	30	210	23	44	84	26	14	80	23	769
5:00 PM	65	177	32	22	231	37	36	136	35	42	118	18	949
5:15 PM	46	169	23	34	183	39	33	94	41	36	105	4	807
5:30 PM	45	184	15	18	210	25	30	81	38	18	51	7	722
5:45 PM	35	147	15	13	133	28	24	55	24	9	48	5	536
TOTAL VOLUMES:	336	1350	196	206	1548	235	271	720	277	170	641	101	6051

PM Peak Hr Begins at: 430 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	182	702	120	123	825	133	155	429	148	116	383	59	3375

PEAK HR FACTOR:	0.916	0.932	0.884	0.784	0.889
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Location: City of San Bernardino
 N/S: Waterman Avenue
 E/W: Dumas Street
 Contol: OWSC



File Name: SBCWADU
 Date: 12/14/2011
 Day: Wednesday

	Waterman Avenue Northbound			Waterman Avenue Southbound			Dumas Street Eastbound			Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2			2	0	0.5		0.5				6
7:00 AM	0	125			108	0	0		0				233
7:15 AM	0	139			185	1	1		2				328
7:30 AM	2	124			216	1	3		1				347
7:45 AM	0	145			266	1	0		1				413
8:00 AM	1	198			181	0	0		0				380
8:15 AM	1	170			164	1	1		1				338
8:30 AM	1	141			157	1	0		0				300
8:45 AM	0	148			137	1	2		0				288
TOTAL VOLUMES:	5	1190	0	0	1414	6	7	0	5	0	0	0	2627

AM Peak Hr Begins at: 730 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	4	637	0	0	827	3	4	0	3	0	0	0	1478

PEAK HR FACTOR:	0.805	0.777	0.438	0.000	0.895
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	Waterman Avenue Northbound			Waterman Avenue Southbound			Dumas Street Eastbound			Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2			2	0	0.5		0.5				6
4:00 PM	0	209			225	2	0		3				439
4:15 PM	1	224			227	6	0		3				461
4:30 PM	3	270			284	1	0		1				559
4:45 PM	2	226			259	2	2		2				493
5:00 PM	7	270			308	0	0		2				587
5:15 PM	6	245			268	0	0		1				520
5:30 PM	1	227			259	2	0		2				491
5:45 PM	2	196			171	0	0		0				369
TOTAL VOLUMES:	22	1867	0	0	2001	13	2	0	14	0	0	0	3919

PM Peak Hr Begins at: 430 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	18	1011	0	0	1119	3	2	0	6	0	0	0	2159

PEAK HR FACTOR:	0.929	0.911	0.500	0.000	0.920
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Location: City of San Bernardino
 N/S: Waterman Avenue
 E/W: Washington Street
 Contol: Signalized



File Name: SBCWAWA
 Date: 12/15/2011
 Day: Wednesday

	Waterman Avenue Northbound			Waterman Avenue Southbound			Washington Street Eastbound			Washington Street Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	1	0	1.5	0.5	1	2	2	0	1	2	1	12
7:00 AM	0	1	0	84	0	33	95	196	0	0	95	48	552
7:15 AM	0	0	0	104	1	44	114	215	0	4	84	87	653
7:30 AM	1	0	0	103	3	51	114	220	0	4	128	71	695
7:45 AM	0	0	0	115	1	29	164	332	0	2	162	96	901
8:00 AM	1	2	1	106	4	53	104	216	2	1	130	90	710
8:15 AM	0	0	0	104	1	51	99	214	3	0	88	63	623
8:30 AM	0	2	0	91	3	40	85	195	1	1	95	73	586
8:45 AM	0	1	0	69	5	47	97	201	0	1	106	71	598
TOTAL VOLUMES:	2	6	1	776	18	348	872	1789	6	13	888	599	5318

AM Peak Hr Begins at: 715 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	2	2	1	428	9	177	496	983	2	11	504	344	2959

PEAK HR FACTOR:	0.313	0.942	0.746	0.826	0.821
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	Waterman Avenue Northbound			Waterman Avenue Southbound			Washington Street Eastbound			Washington Street Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	1	0	1.5	0.5	1	2	2	0	1	2	1	12
4:00 PM	2	2	0	72	2	120	76	157	0	2	237	133	803
4:15 PM	1	2	2	76	3	126	121	133	0	1	232	109	806
4:30 PM	1	1	1	69	3	132	100	174	0	2	299	125	907
4:45 PM	2	3	2	62	3	121	107	149	1	1	254	114	819
5:00 PM	0	2	1	92	1	164	81	146	2	2	263	129	883
5:15 PM	1	1	0	79	0	187	97	151	2	0	174	153	845
5:30 PM	4	2	0	83	2	131	75	164	0	2	235	130	828
5:45 PM	3	0	0	78	2	107	105	155	2	2	154	74	682
TOTAL VOLUMES:	14	13	6	611	16	1088	762	1229	7	12	1848	967	6573

PM Peak Hr Begins at: 430 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	4	7	4	302	7	604	385	620	5	5	990	521	3454

PEAK HR FACTOR:	0.536	0.858	0.922	0.890	0.952
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Location: City of San Bernardino
 N/S: Tippecanoe Avenue
 E/W: Victoria Avenue
 Contol: Signalized



File Name: SBCTIVI
 Date: 12/14/2011
 Day: Wednesday

	Tippecanoe Avenue Northbound			Tippecanoe Avenue Southbound			Victoria Avenue Eastbound			Victoria Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	0	1	0	1	1	0	9
7:00 AM	0	111	7	6	113	0	0	0	0	9	0	8	254
7:15 AM	2	117	4	7	165	0	0	0	1	3	0	7	306
7:30 AM	0	92	3	4	186	0	0	0	0	7	0	5	297
7:45 AM	0	135	4	3	224	0	0	0	1	18	0	9	394
8:00 AM	0	114	2	3	196	2	1	0	0	19	0	9	346
8:15 AM	0	123	7	8	150	0	0	0	0	12	1	6	307
8:30 AM	1	121	13	5	121	1	0	0	1	10	0	6	279
8:45 AM	1	105	10	10	163	0	1	0	0	11	0	9	310
TOTAL VOLUMES:	4	918	50	46	1318	3	2	0	3	89	1	59	2493

AM Peak Hr Begins at: 730 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	0	464	16	18	756	2	1	0	1	56	1	29	1344

PEAK HR FACTOR:	0.863			0.855			0.500			0.768			0.853
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	Tippecanoe Avenue Northbound			Tippecanoe Avenue Southbound			Victoria Avenue Eastbound			Victoria Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	0	1	0	1	1	0	9
4:00 PM	0	197	9	8	190	0	1	1	1	12	0	5	424
4:15 PM	1	191	11	7	224	0	0	0	0	14	1	6	455
4:30 PM	0	210	12	12	207	0	0	0	0	15	0	7	463
4:45 PM	0	223	8	2	195	0	1	0	1	12	0	5	447
5:00 PM	1	232	14	13	227	0	1	0	1	11	0	7	507
5:15 PM	0	217	6	11	219	0	0	0	0	7	0	4	464
5:30 PM	0	184	5	7	193	0	0	0	0	11	0	7	407
5:45 PM	0	150	12	4	166	0	0	0	0	1	0	7	340
TOTAL VOLUMES:	2	1604	77	64	1621	0	3	1	3	83	1	48	3507

PM Peak Hr Begins at: 430 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	1	882	40	38	848	0	2	0	2	45	0	23	1881

PEAK HR FACTOR:	0.934			0.923			0.500			0.773			0.928
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Location: City of San Bernardino
 N/S: Tippecanoe Avenue
 E/W: Hospitality Lane
 Contol: Signalized



File Name: SBCTIHO
 Date: 12/14/2011
 Day: Wednesday

	Tippecanoe Avenue Northbound			Tippecanoe Avenue Southbound			Hospitality Lane Eastbound			Hospitality Lane Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	2	3	0	1	3	0	1.5	0.5	1	1	1	0	14
7:00 AM	44	108	11	8	88	10	8	1	9	6	17	13	323
7:15 AM	38	119	4	8	123	11	10	4	8	10	23	13	371
7:30 AM	44	101	2	4	124	12	16	5	15	14	32	14	383
7:45 AM	38	134	4	15	130	21	6	4	11	15	32	15	425
8:00 AM	49	104	6	7	124	12	11	9	11	14	29	17	393
8:15 AM	45	101	5	15	140	17	15	7	16	10	25	18	414
8:30 AM	36	113	5	14	107	10	26	5	22	11	27	10	386
8:45 AM	61	92	4	5	123	13	14	7	17	15	23	12	386
TOTAL VOLUMES:	355	872	41	76	959	106	106	42	109	95	208	112	3081

AM Peak Hr Begins at: 745 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	168	452	20	51	501	60	58	25	60	50	113	60	1618

PEAK HR FACTOR:	0.909			0.890			0.675			0.899			0.952
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	Tippecanoe Avenue Northbound			Tippecanoe Avenue Southbound			Hospitality Lane Eastbound			Hospitality Lane Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	2	3	0	1	3	0	1.5	0.5	1	1	1	0	14
4:00 PM	129	141	10	18	172	18	50	32	82	14	23	10	699
4:15 PM	129	142	16	15	173	31	37	24	91	18	16	7	699
4:30 PM	135	150	18	7	210	32	54	33	85	19	12	4	759
4:45 PM	89	141	21	12	171	32	63	35	90	12	12	11	689
5:00 PM	107	128	11	20	204	34	71	46	88	10	20	5	744
5:15 PM	112	143	7	16	209	34	43	33	70	20	27	10	724
5:30 PM	131	126	16	16	173	39	48	44	98	13	16	4	724
5:45 PM	131	113	13	9	153	39	44	14	75	12	23	8	634
TOTAL VOLUMES:	963	1084	112	113	1465	259	410	261	679	118	149	59	5672

PM Peak Hr Begins at: 430 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	443	562	57	55	794	132	231	147	333	61	71	30	2916

PEAK HR FACTOR:	0.876			0.947			0.867			0.711			0.960
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Location: City of San Bernardino
 N/S: Tippecanoe Avenue
 E/W: I-10 WB Ramps
 Contol: Signalized



File Name: SBCTI10W
 Date: 12/14/2011
 Day: Wednesday

Passenger Vehicles, Large 2 Axle Vehicles, 3 Axle Vehicles, 4+ Axle Trucks

	Tippecanoe Avenue Northbound			Tippecanoe Avenue Southbound			I-10 WB Ramps Eastbound			I-10 WB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
7:00 AM	87	105	0	0	62	64	0	0	0	123	16	80	537
7:15 AM	87	133	0	0	92	70	0	0	0	127	7	79	595
7:30 AM	71	85	0	0	108	67	0	0	0	113	5	76	525
7:45 AM	111	163	0	0	99	75	0	0	0	145	3	41	637
8:00 AM	60	144	0	0	119	82	0	0	0	123	3	77	608
8:15 AM	55	143	0	0	104	79	0	0	0	108	2	82	573
8:30 AM	71	115	0	0	109	72	0	0	0	108	2	97	574
8:45 AM	56	129	0	0	110	104	0	0	0	100	14	76	589
TOTAL VOLUMES:	598	1017	0	0	803	613	0	0	0	947	52	608	4638

AM Peak Hr Begins at: 745 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	297	565	0	0	431	308	0	0	0	484	10	297	2392

PEAK HR FACTOR:	0.786			0.919			0.000			0.955			0.939
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Passenger Vehicles, Large 2 Axle Vehicles, 3 Axle Vehicles, 4+ Axle Trucks

	Tippecanoe Avenue Northbound			Tippecanoe Avenue Southbound			I-10 WB Ramps Eastbound			I-10 WB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
4:00 PM	110	202	0	0	250	132	0	0	0	62	7	69	832
4:15 PM	103	205	0	0	225	159	0	0	0	47	4	110	853
4:30 PM	93	216	0	0	215	155	0	0	0	62	2	114	857
4:45 PM	118	199	0	0	268	102	0	0	0	40	6	111	844
5:00 PM	114	211	0	0	247	158	0	0	0	78	2	92	902
5:15 PM	120	190	0	0	262	142	0	0	0	60	3	112	889
5:30 PM	116	163	0	0	237	158	0	0	0	76	5	105	860
5:45 PM	94	190	0	0	260	107	0	0	0	77	1	103	832
TOTAL VOLUMES:	868	1576	0	0	1964	1113	0	0	0	502	30	816	6869

PM Peak Hr Begins at: 445 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	468	763	0	0	1014	560	0	0	0	254	16	420	3495

PEAK HR FACTOR:	0.947			0.972			0.000			0.927			0.969
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Location: City of San Bernardino
 N/S: Anderson Street
 E/W: I-10 EB Ramps
 Contol: Signalized



File Name: SBCTI10E
 Date: 12/14/2011
 Day: Wednesday

Passenger Vehicles, Large 2 Axle Vehicles, 3 Axle Vehicles, 4+ Axle Trucks

	Anderson Street Northbound			Anderson Street Southbound			I-10 EB Ramps Eastbound			I-10 EB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
7:00 AM	0	95	36	27	158	0	103	0	81	0	0	0	500
7:15 AM	0	137	65	20	188	0	88	0	86	0	0	0	584
7:30 AM	0	119	32	39	179	0	50	0	62	0	0	0	481
7:45 AM	0	187	50	14	230	0	80	0	47	0	0	0	608
8:00 AM	0	122	36	28	212	0	69	0	27	0	0	0	494
8:15 AM	0	135	48	34	172	0	56	0	61	0	0	0	506
8:30 AM	0	107	38	37	181	0	69	0	71	0	0	0	503
8:45 AM	0	119	34	45	164	0	52	0	49	0	0	0	463
TOTAL VOLUMES:	0	1021	339	244	1484	0	567	0	484	0	0	0	4139

AM Peak Hr Begins at: 700 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	538	183	100	755	0	321	0	276	0	0	0	2173

PEAK HR FACTOR:	0.761	0.876	0.811	0.000	0.894
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Passenger Vehicles, Large 2 Axle Vehicles, 3 Axle Vehicles, 4+ Axle Trucks

	Anderson Street Northbound			Anderson Street Southbound			I-10 EB Ramps Eastbound			I-10 EB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
4:00 PM	0	178	61	86	218	0	123	1	84	0	0	0	751
4:15 PM	0	201	64	63	203	0	124	1	84	0	0	0	740
4:30 PM	0	178	72	91	185	0	138	12	83	0	0	0	759
4:45 PM	0	183	73	103	210	0	126	0	80	0	0	0	775
5:00 PM	0	198	78	95	225	0	124	0	66	0	0	0	786
5:15 PM	0	176	85	81	229	0	125	0	63	0	0	0	759
5:30 PM	0	161	71	69	239	0	117	0	69	0	0	0	726
5:45 PM	0	159	69	93	245	0	145	1	78	0	0	0	790
TOTAL VOLUMES:	0	1434	573	681	1754	0	1022	15	607	0	0	0	6086

PM Peak Hr Begins at: 430 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	735	308	370	849	0	513	12	292	0	0	0	3079

PEAK HR FACTOR:	0.945	0.952	0.877	0.000	0.979
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Location: City of Loma Linda
 N/S: Anderson Avenue
 E/W: Academy Drive
 Contol: Signalized



File Name: LLAANAC
 Date: 12/15/2011
 Day: Thursday

	Anderson Avenue Northbound			Anderson Avenue Southbound			Academy Drive Eastbound			Academy Drive Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	1	1	1	1	1	1.5	0.5	13
7:00 AM	11	102	4	4	212	28	6	2	7	9	10	8	403
7:15 AM	20	90	1	7	256	48	17	5	13	13	27	10	507
7:30 AM	40	123	9	7	212	128	67	23	51	29	77	8	774
7:45 AM	82	125	5	3	213	106	95	67	85	23	79	13	896
8:00 AM	30	91	0	8	281	82	85	41	68	16	52	8	762
8:15 AM	4	110	6	5	247	15	18	6	14	18	2	10	455
8:30 AM	2	81	5	4	228	6	10	3	6	18	4	4	371
8:45 AM	3	119	1	4	206	13	6	2	0	12	7	8	381
TOTAL VOLUMES:	192	841	31	42	1855	426	304	149	244	138	258	69	4549

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	172	429	15	25	962	364	264	136	217	81	235	39	2939

PEAK HR FACTOR:	0.726			0.910			0.624			0.772			0.820
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	Anderson Avenue Northbound			Anderson Avenue Southbound			Academy Drive Eastbound			Academy Drive Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	1	1	1	1	1	1.5	0.5	13
4:00 PM	18	209	10	14	126	24	25	21	8	2	2	10	469
4:15 PM	11	179	12	11	167	19	16	4	16	8	7	4	454
4:30 PM	12	229	10	9	147	15	20	11	17	12	5	4	491
4:45 PM	7	218	16	9	152	17	20	12	16	8	5	5	485
5:00 PM	13	220	20	19	129	26	36	13	14	6	7	8	511
5:15 PM	9	212	15	21	148	26	29	12	15	16	8	9	520
5:30 PM	8	193	9	17	152	29	23	13	14	7	10	7	482
5:45 PM	29	161	9	9	160	42	20	8	13	14	31	6	502
TOTAL VOLUMES:	107	1621	101	109	1181	198	189	94	113	73	75	53	3914

PM Peak Hr Begins at: 500 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	59	786	53	66	589	123	108	46	56	43	56	30	2015

PEAK HR FACTOR:	0.887			0.922			0.833			0.632			0.969
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Location: City of Redlands
 N/S: California Street
 E/W: I-10 WB Ramps
 Contol: Signalized



File Name: SBCTI10W
 Date: 12/14/2011
 Day: Wednesday

Passenger Vehicles, Large 2 Axle Vehicles, 3 Axle Vehicles, 4+ Axle Trucks

	California Street Northbound			California Street Southbound			I-10 WB Ramps Eastbound			I-10 WB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	0.5	0.5	1	9
7:00 AM	109	70	0	0	21	23	0	0	0	96	0	35	354
7:15 AM	115	124	0	0	38	26	0	0	0	105	1	67	476
7:30 AM	145	112	0	0	25	34	0	0	0	109	2	52	479
7:45 AM	99	144	0	1	46	32	0	0	0	78	2	72	474
8:00 AM	97	166	0	0	50	40	0	0	0	81	12	78	524
8:15 AM	140	157	0	0	25	29	0	0	0	102	1	74	528
8:30 AM	97	126	0	0	31	40	0	0	0	112	0	94	500
8:45 AM	90	122	0	0	30	39	0	0	0	104	0	76	461
TOTAL VOLUMES:	892	1021	0	1	266	263	0	0	0	787	18	548	3796

AM Peak Hr Begins at: 745 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	433	593	0	1	152	141	0	0	0	373	15	318	2026

PEAK HR FACTOR:	0.864	0.817	0.000	0.857	0.959
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Passenger Vehicles, Large 2 Axle Vehicles, 3 Axle Vehicles, 4+ Axle Trucks

	California Street Northbound			California Street Southbound			I-10 WB Ramps Eastbound			I-10 WB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	0.5	0.5	1	9
4:00 PM	144	97	1	0	122	116	0	0	0	92	1	30	603
4:15 PM	135	96	1	0	123	122	0	0	0	94	0	41	612
4:30 PM	122	89	0	0	142	182	0	0	0	89	0	21	645
4:45 PM	117	108	0	0	120	98	0	0	0	73	1	13	530
5:00 PM	151	98	0	0	189	147	0	0	0	81	2	20	688
5:15 PM	163	78	0	0	152	125	0	0	0	60	1	15	594
5:30 PM	137	79	1	0	98	104	0	0	0	82	3	12	516
5:45 PM	106	101	0	2	82	84	0	0	0	85	0	13	473
TOTAL VOLUMES:	1075	746	3	2	1028	978	0	0	0	656	8	165	4661

PM Peak Hr Begins at: 415 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	525	391	1	0	574	549	0	0	0	337	3	95	2475

PEAK HR FACTOR:	0.921	0.836	0.000	0.806	0.899
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Location: City of Redlands
 N/S: California Street
 E/W: I-10 EB Ramps
 Contol: Signalized



File Name: REDCA10E
 Date: 12/14/2011
 Day: Wednesday

Passenger Vehicles, Large 2 Axle Vehicles, 3 Axle Vehicles, 4+ Axle Trucks

	California Street Northbound			California Street Southbound			I-10 EB Ramps Eastbound			I-10 EB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
7:00 AM	0	118	69	10	101	0	57	0	68	0	0	0	423
7:15 AM	0	150	82	11	122	0	87	0	88	0	0	0	540
7:30 AM	1	162	63	8	123	0	85	1	92	0	0	0	535
7:45 AM	0	152	82	18	112	0	101	0	109	0	0	0	574
8:00 AM	0	141	49	15	120	0	126	0	104	0	0	0	555
8:15 AM	0	158	45	17	116	0	100	0	69	0	0	0	505
8:30 AM	0	160	54	31	105	0	103	0	70	0	0	0	523
8:45 AM	0	129	49	17	106	0	80	0	88	0	0	0	469
TOTAL VOLUMES:	1	1170	493	127	905	0	739	1	688	0	0	0	4124

AM Peak Hr Begins at: 715 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	1	605	276	52	477	0	399	1	393	0	0	0	2204

PEAK HR FACTOR:	0.942	0.980	0.862	0.000	0.960
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Passenger Vehicles, Large 2 Axle Vehicles, 3 Axle Vehicles, 4+ Axle Trucks

	California Street Northbound			California Street Southbound			I-10 EB Ramps Eastbound			I-10 EB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
4:00 PM	0	202	125	58	148	0	50	3	110	0	0	0	696
4:15 PM	0	176	104	58	155	0	57	1	97	0	0	0	648
4:30 PM	0	170	129	57	143	0	41	2	131	0	0	0	673
4:45 PM	0	175	105	66	151	0	57	1	131	0	0	0	686
5:00 PM	0	199	128	59	164	0	39	3	84	0	0	0	676
5:15 PM	0	201	105	46	178	0	24	0	78	0	0	0	632
5:30 PM	0	187	104	35	167	0	16	0	72	0	0	0	581
5:45 PM	0	171	78	26	155	0	41	0	88	0	0	0	559
TOTAL VOLUMES:	0	1481	878	405	1261	0	325	10	791	0	0	0	5151

PM Peak Hr Begins at: 400 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	723	463	239	597	0	205	7	469	0	0	0	2703

PEAK HR FACTOR:	0.907	0.963	0.901	0.000	0.971
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Location: City of Redlands
 N/S: California Street
 E/W: Wal-Mart Driveway
 Contol: OWSC



File Name: REDCADW
 Date: 12/14/2011
 Day: Wednesday

	California Street Northbound			California Street Southbound			Wal-Mart Driveway Eastbound			Wal-Mart Driveway Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	3	0	1	2	0	0	0	0	0	1	0	7
7:00 AM	0	159	1	40	133	0	0	0	0	0	0	11	344
7:15 AM	0	179	1	39	147	0	0	0	0	0	0	21	387
7:30 AM	0	181	4	47	153	0	0	0	0	0	0	17	402
7:45 AM	0	209	1	42	166	0	0	0	0	0	0	23	441
8:00 AM	0	157	4	39	146	0	0	0	0	0	0	13	359
8:15 AM	1	184	7	37	142	0	0	0	0	1	0	16	388
8:30 AM	0	159	2	40	135	0	0	0	0	1	0	11	348
8:45 AM	0	140	3	47	136	0	0	0	0	0	0	18	344
TOTAL VOLUMES:	1	1368	23	331	1158	0	0	0	0	2	0	130	3013

AM Peak Hr Begins at: 730 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	1	731	16	165	607	0	0	0	0	1	0	69	1590

PEAK HR FACTOR:	0.890	0.928	0.000	0.761	0.901
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	California Street Northbound			California Street Southbound			Wal-Mart Driveway Eastbound			Wal-Mart Driveway Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	3	0	1	2	0	0	0	0	0	1	0	7
4:00 PM	0	277	5	55	190	0	0	0	0	1	0	32	560
4:15 PM	0	246	7	69	153	0	0	0	0	0	0	34	509
4:30 PM	0	238	8	69	187	0	0	0	0	1	0	31	534
4:45 PM	0	251	10	73	201	0	0	0	0	1	0	40	576
5:00 PM	0	273	14	71	167	0	0	0	0	0	0	40	565
5:15 PM	0	278	6	68	171	0	0	0	0	0	0	30	553
5:30 PM	0	230	9	65	155	0	0	0	0	0	0	39	498
5:45 PM	0	215	5	91	169	0	0	0	0	0	0	33	513
TOTAL VOLUMES:	0	2008	64	561	1393	0	0	0	0	3	0	279	4308

PM Peak Hr Begins at: 430 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	0	1040	38	281	726	0	0	0	0	2	0	141	2228

PEAK HR FACTOR:	0.939	0.919	0.000	0.872	0.967
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Location: City of Redlands
 N/S: California Street
 E/W: Redlands Boulevard
 Contol: Signalized



File Name: REDCARE
 Date: 12/14/2011
 Day: Wednesday

	California Street Northbound			California Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0.3	0.3	0.3	1	0.5	0.5	1	1.5	0.5	1	2	0	9
7:00 AM	14	81	1	45	64	20	29	34	10	9	51	45	403
7:15 AM	21	90	1	49	69	34	22	25	15	12	53	61	452
7:30 AM	17	97	2	65	89	20	25	23	42	15	73	68	536
7:45 AM	31	86	2	72	60	23	17	32	56	9	72	81	541
8:00 AM	31	74	5	70	63	18	25	58	20	11	67	62	504
8:15 AM	15	95	3	64	68	11	23	70	15	6	48	72	490
8:30 AM	14	67	7	59	57	17	13	39	10	16	55	65	419
8:45 AM	15	59	2	73	54	12	26	51	12	4	54	50	412
TOTAL VOLUMES:	158	649	23	497	524	155	180	332	180	82	473	504	3757

AM Peak Hr Begins at: 730 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	94	352	12	271	280	72	90	183	133	41	260	283	2071

PEAK HR FACTOR:	0.962			0.895			0.940			0.901			0.957
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	California Street Northbound			California Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0.3	0.3	0.3	1	0.5	0.5	1	1.5	0.5	1	2	0	9
4:00 PM	19	81	15	84	63	23	45	105	19	22	88	114	678
4:15 PM	9	80	10	70	73	19	46	100	21	20	92	85	625
4:30 PM	7	80	9	77	71	19	30	112	31	24	111	103	674
4:45 PM	13	89	11	89	83	25	40	99	28	20	89	94	680
5:00 PM	11	81	9	61	72	27	36	122	32	24	101	137	713
5:15 PM	8	94	5	64	63	24	50	122	38	27	112	105	712
5:30 PM	7	83	16	69	68	17	46	105	35	16	82	78	622
5:45 PM	10	70	10	58	71	28	46	122	23	16	93	72	619
TOTAL VOLUMES:	84	658	85	572	564	182	339	887	227	169	768	788	5323

PM Peak Hr Begins at: 430 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	39	344	34	291	289	95	156	455	129	95	413	439	2779

PEAK HR FACTOR:	0.923			0.857			0.881			0.904			0.974
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Location: City of Redlands
 N/S: Alabama Street
 E/W: I-10 WB Ramps
 Contol: Signalized



File Name: REDAL10W
 Date: 12/15/2011
 Day: Thursday

	Alabama Street Northbound			Alabama Street Southbound			I-10 WB Ramps Eastbound			I-10 WB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	1.5	0.5	0	0	0	0.5	1	0.5	7
7:00 AM	71	71	0	0	55	31	0	0	0	43	54	33	358
7:15 AM	76	76	0	0	67	41	0	0	0	50	66	29	405
7:30 AM	96	99	0	0	75	34	0	0	0	54	87	48	493
7:45 AM	92	98	0	0	118	39	0	0	0	68	76	54	545
8:00 AM	78	126	0	0	69	20	0	0	0	50	67	47	457
8:15 AM	76	113	0	0	72	37	0	0	0	71	73	44	486
8:30 AM	70	97	0	0	83	30	0	0	0	72	59	48	459
8:45 AM	65	141	0	0	114	37	0	0	0	80	62	64	563
TOTAL VOLUMES:	624	821	0	0	653	269	0	0	0	488	544	367	3766

AM Peak Hr Begins at: 730 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	342	436	0	0	334	130	0	0	0	243	303	193	1981

PEAK HR FACTOR:	0.953			0.739			0.000			0.933			0.909
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	Alabama Street Northbound			Alabama Street Southbound			I-10 WB Ramps Eastbound			I-10 WB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	1.5	0.5	0	0	0	0.5	1	0.5	7
4:00 PM	105	258	0	0	205	96	0	0	0	46	74	49	833
4:15 PM	85	288	0	0	197	105	0	0	0	37	91	47	850
4:30 PM	93	254	0	0	201	106	0	0	0	40	79	50	823
4:45 PM	95	245	0	0	185	78	0	0	0	41	63	71	778
5:00 PM	110	254	0	0	199	95	0	0	0	38	97	34	827
5:15 PM	111	253	0	0	194	98	0	0	0	40	60	40	796
5:30 PM	98	230	0	0	195	96	0	0	0	39	72	38	768
5:45 PM	101	233	0	0	190	75	0	0	0	38	78	31	746
TOTAL VOLUMES:	798	2015	0	0	1566	749	0	0	0	319	614	360	6421

PM Peak Hr Begins at: 400 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	378	1045	0	0	788	385	0	0	0	164	307	217	3284

PEAK HR FACTOR:	0.954			0.955			0.000			0.983			0.966
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Location: City of Redlands
 N/S: Alabama Street
 E/W: I-10 EB Ramps
 Contol: Signalized



File Name: REDAL10E
 Date: 12/15/2011
 Day: Thursday

	Alabama Street Northbound			Alabama Street Southbound			I-10 EB Ramps Eastbound			I-10 EB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	1.5	0.5	0	0	0	0.5	1	0.5	7
7:00 AM	0	120	18	4	94	0	31	0	71	0	0	0	338
7:15 AM	0	112	19	11	107	0	50	1	72	0	0	0	372
7:30 AM	0	151	29	11	120	0	52	2	93	0	0	0	458
7:45 AM	0	140	27	15	177	0	58	0	116	0	0	0	533
8:00 AM	0	167	32	8	115	0	63	0	75	0	0	0	460
8:15 AM	0	132	32	15	128	0	56	0	90	0	0	0	453
8:30 AM	0	126	22	15	144	0	55	0	74	0	0	0	436
8:45 AM	0	119	32	22	180	0	86	1	99	0	0	0	539
TOTAL VOLUMES:	0	1067	211	101	1065	0	451	4	690	0	0	0	3589

AM Peak Hr Begins at: 730 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	590	120	49	540	0	229	2	374	0	0	0	1904

PEAK HR FACTOR:	0.892	0.767	0.869	0.000	0.893
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	Alabama Street Northbound			Alabama Street Southbound			I-10 EB Ramps Eastbound			I-10 EB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	1.5	0.5	0	0	0	0.5	1	0.5	7
4:00 PM	0	256	63	47	214	0	103	2	98	0	0	0	783
4:15 PM	0	275	71	46	181	0	105	4	131	0	0	0	813
4:30 PM	0	256	52	49	186	0	91	2	111	0	0	0	747
4:45 PM	0	258	77	51	187	0	106	2	116	0	0	0	797
5:00 PM	0	259	93	53	176	0	92	1	127	0	0	0	801
5:15 PM	0	275	65	64	196	0	91	2	127	0	0	0	820
5:30 PM	0	247	52	58	152	0	94	3	111	0	0	0	717
5:45 PM	0	228	43	48	158	0	97	1	102	0	0	0	677
TOTAL VOLUMES:	0	2054	516	416	1450	0	779	17	923	0	0	0	6155

PM Peak Hr Begins at: 430 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	1048	287	217	745	0	380	7	481	0	0	0	3165

PEAK HR FACTOR:	0.948	0.925	0.969	0.000	0.965
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Location: City of Redlands
 N/S: Alabama Street
 E/W: Industrial Avenue
 Contol: Signalized



File Name: REDALIN
 Date: 12/15/2011
 Day: Thursday

	Alabama Street Northbound			Alabama Street Southbound			Industrial Avenue Eastbound			Industrial Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	1	1	1	0	1	1	0	11
7:00 AM	4	126	1	8	132	15	5	4	5	1	1	8	310
7:15 AM	8	132	4	7	154	19	11	2	8	3	3	8	359
7:30 AM	5	146	0	10	169	28	16	0	8	0	1	6	389
7:45 AM	6	147	11	13	217	30	6	0	9	4	8	9	460
8:00 AM	4	188	5	13	172	26	9	0	8	2	6	8	441
8:15 AM	6	127	5	18	173	25	19	5	7	5	1	13	404
8:30 AM	3	128	3	24	164	24	15	5	4	5	1	16	392
8:45 AM	10	127	9	35	198	30	9	4	7	3	7	10	449
TOTAL VOLUMES:	46	1121	38	128	1379	197	90	20	56	23	28	78	3204

AM Peak Hr Begins at: 745 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	19	590	24	68	726	105	49	10	28	16	16	46	1697

PEAK HR FACTOR:	0.803			0.864			0.702			0.886			0.922
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	Alabama Street Northbound			Alabama Street Southbound			Industrial Avenue Eastbound			Industrial Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	1	1	1	0	1	1	0	11
4:00 PM	6	217	19	83	211	26	18	13	10	16	12	79	710
4:15 PM	13	240	21	78	209	19	27	13	4	15	11	83	733
4:30 PM	10	206	25	72	197	23	25	18	10	19	14	86	705
4:45 PM	16	237	19	67	193	30	24	12	7	13	10	70	698
5:00 PM	14	241	17	77	192	29	36	14	10	12	15	79	736
5:15 PM	9	237	22	69	213	40	17	17	11	19	17	80	751
5:30 PM	20	206	18	56	177	27	23	9	8	22	11	73	650
5:45 PM	24	177	17	49	181	28	28	8	13	14	10	60	609
TOTAL VOLUMES:	112	1761	158	551	1573	222	198	104	73	130	100	610	5592

PM Peak Hr Begins at: 430 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	49	921	83	285	795	122	102	61	38	63	56	315	2890

PEAK HR FACTOR:	0.968			0.933			0.838			0.912			0.962
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Location: City of Redlands
 N/S: Alabama Street
 E/W: Redlands Boulevard
 Contol: Signalized



File Name: REDALRE
 Date: 12/15/2011
 Day: Thursday

Passenger Vehicles, Large 2 Axle Vehicles, 3 Axle Vehicles, 4+ Axle Trucks

	Alabama Street Northbound			Alabama Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
7:00 AM	11	82	6	21	87	23	17	37	7	7	38	21	357
7:15 AM	17	113	13	28	111	28	19	38	6	15	66	15	469
7:30 AM	10	119	9	17	102	27	14	29	8	11	88	15	449
7:45 AM	23	119	11	26	141	35	28	28	6	15	54	16	502
8:00 AM	19	133	12	18	134	43	29	48	9	15	76	25	561
8:15 AM	15	91	8	16	98	52	29	46	6	15	52	19	447
8:30 AM	23	89	13	25	93	30	32	61	10	13	74	19	482
8:45 AM	21	75	14	14	129	47	41	62	15	21	60	19	518
TOTAL VOLUMES:	139	821	86	165	895	285	209	349	67	112	508	149	3785

AM Peak Hr Begins at: 800 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	78	388	47	73	454	172	131	217	40	64	262	82	2008

PEAK HR FACTOR:	0.782			0.896			0.822			0.879			0.895
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Passenger Vehicles, Large 2 Axle Vehicles, 3 Axle Vehicles, 4+ Axle Trucks

	Alabama Street Northbound			Alabama Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
4:00 PM	29	147	28	35	130	63	60	151	28	33	95	41	840
4:15 PM	36	155	28	23	142	41	67	168	26	26	102	51	865
4:30 PM	27	119	20	41	129	42	69	162	21	21	105	45	801
4:45 PM	26	148	23	31	121	58	69	131	18	35	72	49	781
5:00 PM	23	155	21	45	125	34	59	179	10	27	107	69	854
5:15 PM	22	129	26	32	128	56	65	167	31	35	89	54	834
5:30 PM	27	118	17	36	118	55	68	144	23	25	93	54	778
5:45 PM	25	111	17	31	132	47	64	121	22	24	78	39	711
TOTAL VOLUMES:	215	1082	180	274	1025	396	521	1223	179	226	741	402	6464

PM Peak Hr Begins at: 415 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	112	577	92	140	517	175	264	640	75	109	386	214	3301

PEAK HR FACTOR:	0.892			0.981			0.938			0.873			0.954
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Location: City of Redlands
 N/S: Tennessee Street
 E/W: Redlands Boulevard
 Contol: Signalized



File Name: REDTERE
 Date: 12/15/2011
 Day: Thursday

Passenger Vehicles, Large 2 Axle Vehicles, 3 Axle Vehicles, 4+ Axle Trucks

	Tennessee Street Northbound			Tennessee Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
7:00 AM	8	113	3	25	64	5	2	22	2	3	31	10	288
7:15 AM	17	113	5	43	83	3	4	28	5	5	59	13	378
7:30 AM	11	120	2	26	137	4	5	23	5	13	66	12	424
7:45 AM	8	169	9	35	175	3	4	17	7	9	36	15	487
8:00 AM	19	134	6	25	107	2	1	22	8	6	51	17	398
8:15 AM	9	130	2	39	113	8	2	39	8	6	37	18	411
8:30 AM	16	109	3	32	93	7	2	28	10	4	36	18	358
8:45 AM	10	114	8	41	116	5	3	36	7	4	49	17	410
TOTAL VOLUMES:	98	1002	38	266	888	37	23	215	52	50	365	120	3154

AM Peak Hr Begins at: 730 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	47	553	19	125	532	17	12	101	28	34	190	62	1720

PEAK HR FACTOR:	0.832			0.791			0.719			0.786			0.883
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Passenger Vehicles, Large 2 Axle Vehicles, 3 Axle Vehicles, 4+ Axle Trucks

	Tennessee Street Northbound			Tennessee Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
4:00 PM	12	139	16	37	119	6	59	149	28	12	78	38	693
4:15 PM	8	105	13	24	100	9	64	168	25	11	75	43	645
4:30 PM	12	121	15	24	123	7	70	162	20	10	64	39	667
4:45 PM	16	128	9	23	123	4	69	131	18	12	62	45	640
5:00 PM	13	157	11	25	127	11	58	177	11	12	69	57	728
5:15 PM	22	107	9	30	138	5	64	164	29	6	77	42	693
5:30 PM	13	129	8	19	110	5	67	141	23	17	50	51	633
5:45 PM	16	114	4	39	151	9	64	121	22	10	51	36	637
TOTAL VOLUMES:	112	1000	85	221	991	56	515	1213	176	90	526	351	5336

PM Peak Hr Begins at: 430 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	63	513	44	102	511	27	261	634	78	40	272	183	2728

PEAK HR FACTOR:	0.856			0.925			0.946			0.897			0.937
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Location: City of Redlands
 N/S: Texas Street
 E/W: Stuart Avenue
 Contol: TWSC



File Name: REDTEST
 Date: 12/15/2011
 Day: Thursday

	Texas Street Northbound			Texas Street Southbound			Stuart Avenue Eastbound			Stuart Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	0	0	1	0	0	1	0	6
7:00 AM	4	39	5	0	49	9	1	0	3	1	3	2	116
7:15 AM	9	36	2	2	76	22	0	0	2	4	5	2	160
7:30 AM	9	52	5	2	83	14	3	0	2	2	5	3	180
7:45 AM	10	69	1	7	135	18	7	1	3	4	4	2	261
8:00 AM	18	85	8	12	90	25	5	3	11	6	11	3	277
8:15 AM	19	66	5	5	73	25	8	0	10	3	7	4	225
8:30 AM	11	43	9	4	50	20	5	2	10	2	9	6	171
8:45 AM	6	51	4	10	43	17	4	4	4	7	5	2	157
TOTAL VOLUMES:	86	441	39	42	599	150	33	10	45	29	49	24	1547

AM Peak Hr Begins at: 730 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	56	272	19	26	381	82	23	4	26	15	27	12	943

PEAK HR FACTOR:	0.782			0.764			0.697			0.675			0.851
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	Texas Street Northbound			Texas Street Southbound			Stuart Avenue Eastbound			Stuart Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	0	0	1	0	0	1	0	6
4:00 PM	10	62	21	17	78	16	11	16	7	10	17	10	275
4:15 PM	2	75	8	10	50	6	4	2	3	4	8	3	175
4:30 PM	3	100	7	4	74	1	1	5	10	8	4	5	222
4:45 PM	5	109	6	5	75	4	0	1	15	3	3	2	228
5:00 PM	4	143	6	3	68	4	0	2	8	4	3	8	253
5:15 PM	4	102	5	4	59	3	2	2	19	5	5	3	213
5:30 PM	8	117	3	1	44	3	0	3	13	2	3	3	200
5:45 PM	7	77	8	3	49	3	0	4	9	10	6	4	180
TOTAL VOLUMES:	43	785	64	47	497	40	18	35	84	46	49	38	1746

PM Peak Hr Begins at: 430 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	16	454	24	16	276	12	3	10	52	20	15	18	916

PEAK HR FACTOR:	0.807			0.905			0.707			0.779			0.905
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Location: City of Redlands
 N/S: Texas Street
 E/W: Oriental Avenue
 Contol: TWSC



File Name: REDTEOR
 Date: 12/15/2011
 Day: Thursday

	Texas Street Northbound			Texas Street Southbound			Oriental Avenue Eastbound			Oriental Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	0	0	1	0	0	1	0	6
7:00 AM	0	91	3	2	87	1	4	0	1	2	0	2	193
7:15 AM	1	88	3	3	47	0	1	0	1	2	0	1	147
7:30 AM	1	103	4	0	87	3	2	2	3	4	0	4	213
7:45 AM	1	125	4	2	90	0	2	1	1	3	1	1	231
8:00 AM	0	150	3	2	84	0	1	0	1	6	0	2	249
8:15 AM	0	109	3	0	74	0	1	0	0	7	0	4	198
8:30 AM	0	128	0	1	59	0	0	0	1	0	0	2	191
8:45 AM	0	89	2	0	61	0	1	0	0	4	0	3	160
TOTAL VOLUMES:	3	883	22	10	589	4	12	3	8	28	1	19	1582

AM Peak Hr Begins at: 730 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	2	487	14	4	335	3	6	3	5	20	1	11	891

PEAK HR FACTOR:	0.822	0.929	0.500	0.727	0.895
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	Texas Street Northbound			Texas Street Southbound			Oriental Avenue Eastbound			Oriental Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	0	0	1	0	0	1	0	6
4:00 PM	0	100	3	2	57	1	4	0	1	2	0	2	172
4:15 PM	1	63	3	3	47	0	1	0	1	2	0	1	122
4:30 PM	1	82	4	0	57	3	2	2	3	4	0	4	162
4:45 PM	1	92	4	2	60	0	2	1	1	3	1	1	168
5:00 PM	0	130	3	2	84	0	1	0	1	6	0	2	229
5:15 PM	0	115	3	0	74	0	1	0	0	7	0	4	204
5:30 PM	0	123	0	1	59	0	0	0	1	0	0	2	186
5:45 PM	0	79	2	0	61	0	1	0	0	4	0	3	150
TOTAL VOLUMES:	3	784	22	10	499	4	12	3	8	28	1	19	1393

PM Peak Hr Begins at: 445 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	1	460	10	5	277	0	4	1	3	16	1	9	787

PEAK HR FACTOR:	0.885	0.820	0.500	0.591	0.859
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Location: City of Redlands
 N/S: Eureka Street
 E/W: Pearl Avenue
 Contol: Signalized



File Name: REDORPE
 Date: 12/15/2011
 Day: Thursday

	Eureka Street Northbound			Eureka Street Southbound			Pearl Avenue Eastbound			Pearl Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	1	1	0.5	0.5	0	0.5	0.5	1	1	0	1	7
7:00 AM	0	3	10	4	1	0	24	99	88	5	0	1	235
7:15 AM	0	8	8	2	13	0	19	129	114	13	0	5	311
7:30 AM	0	10	18	1	6	0	20	103	116	8	0	1	283
7:45 AM	0	4	17	0	16	0	21	104	145	8	0	2	317
8:00 AM	0	9	20	1	5	0	22	98	115	9	0	1	280
8:15 AM	0	15	14	3	4	0	15	102	83	11	0	2	249
8:30 AM	0	9	12	2	10	0	21	102	87	5	0	3	251
8:45 AM	0	15	7	2	13	0	30	120	120	11	0	4	322
TOTAL VOLUMES:	0	73	106	15	68	0	172	857	868	70	0	19	2248

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	0	31	63	4	40	0	82	434	490	38	0	9	1191

PEAK HR FACTOR:	0.810	0.688	0.931	0.653	0.939
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	Eureka Street Northbound			Eureka Street Southbound			Pearl Avenue Eastbound			Pearl Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	1	1	0.5	0.5	0	0.5	0.5	1	1	0	1	7
4:00 PM	0	26	23	12	23	0	36	109	119	12	0	11	371
4:15 PM	0	25	27	5	18	0	35	163	106	10	0	2	391
4:30 PM	0	17	32	5	11	0	30	165	121	10	0	6	397
4:45 PM	0	27	29	3	11	0	46	136	110	14	0	3	379
5:00 PM	0	36	70	2	14	0	39	148	126	15	0	3	453
5:15 PM	0	36	57	2	14	0	44	175	109	6	0	5	448
5:30 PM	0	35	59	4	12	0	45	144	113	8	0	3	423
5:45 PM	0	16	44	7	4	0	41	141	114	7	0	5	379
TOTAL VOLUMES:	0	218	341	40	107	0	316	1181	918	82	0	38	3241

PM Peak Hr Begins at: 500 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	0	123	230	15	44	0	169	608	462	36	0	16	1703

PEAK HR FACTOR:	0.833	0.922	0.944	0.722	0.940
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Location: City of Redlands
 N/S: Eureka Street
 E/W: Stuart Avenue
 Control: TWSC



File Name: REDUEST
 Date: 12/15/2011
 Day: Thursday

	Eureka Street Northbound			Eureka Street Southbound			Stuart Avenue Eastbound			Stuart Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	0	1	0	0	1	0	8
7:00 AM	0	11	0	2	85	6	3	1	0	1	3	0	112
7:15 AM	1	14	1	7	120	13	0	1	0	2	2	1	162
7:30 AM	0	25	1	1	121	9	2	2	1	2	1	1	166
7:45 AM	1	18	1	6	148	10	3	5	0	1	4	0	197
8:00 AM	6	20	1	8	103	15	9	6	1	2	0	1	172
8:15 AM	4	24	4	3	85	12	3	7	2	1	3	0	148
8:30 AM	1	19	3	11	72	17	2	6	3	1	5	0	140
8:45 AM	5	17	3	18	112	17	3	5	0	3	1	2	186
TOTAL VOLUMES:	18	148	14	56	846	99	25	33	7	13	19	5	1283

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	8	77	4	22	492	47	14	14	2	7	7	3	697

PEAK HR FACTOR:	0.824			0.855			0.469			0.850			0.885
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	Eureka Street Northbound			Eureka Street Southbound			Stuart Avenue Eastbound			Stuart Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	0	1	0	0	1	0	8
4:00 PM	3	46	10	18	138	11	3	5	1	6	4	4	249
4:15 PM	1	42	3	7	110	9	4	3	4	2	6	4	195
4:30 PM	3	45	8	15	114	6	0	7	3	3	6	4	214
4:45 PM	1	46	8	11	121	5	1	9	2	9	3	1	217
5:00 PM	4	79	37	11	133	4	4	5	2	7	6	3	295
5:15 PM	4	78	26	11	106	11	4	6	2	9	4	1	262
5:30 PM	3	88	18	6	119	3	1	4	2	11	3	1	259
5:45 PM	4	49	10	10	104	10	4	6	4	11	8	1	221
TOTAL VOLUMES:	23	473	120	89	945	59	21	45	20	58	40	19	1912

PM Peak Hr Begins at: 500 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	15	294	91	38	462	28	13	21	10	38	21	6	1037

PEAK HR FACTOR:	0.833			0.892			0.786			0.813			0.879
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Location: City of Redlands
 N/S: Eureka Street
 E/W: Oriental Avenue
 Control: Signalized



File Name: REDEUOR
 Date: 12/15/2011
 Day: Thursday

	Eureka Street Northbound			Eureka Street Southbound			Oriental Avenue Eastbound			Oriental Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	0	1	0	0	1	0	8
7:00 AM	2	14	0	0	74	5	0	1	0	0	1	0	97
7:15 AM	1	15	0	3	107	5	1	0	1	0	0	0	133
7:30 AM	1	22	1	3	112	12	0	1	1	0	0	0	153
7:45 AM	2	21	0	0	131	15	1	0	0	0	0	0	170
8:00 AM	1	27	0	2	104	11	3	1	3	0	0	0	152
8:15 AM	4	25	0	2	87	8	2	0	2	0	0	0	130
8:30 AM	0	24	0	1	75	11	0	0	1	0	0	0	112
8:45 AM	2	21	0	1	108	3	0	0	3	0	0	0	138
TOTAL VOLUMES:	13	169	1	12	798	70	7	3	11	0	1	0	1085

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	5	85	1	8	454	43	5	2	5	0	0	0	608

PEAK HR FACTOR:	0.813			0.865			0.429			0.000			0.894
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	Eureka Street Northbound			Eureka Street Southbound			Oriental Avenue Eastbound			Oriental Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	0	1	0	0	1	0	8
4:00 PM	5	53	16	17	127	8	0	0	0	0	0	0	226
4:15 PM	3	43	13	32	78	5	0	0	0	0	0	0	174
4:30 PM	1	50	9	19	98	2	2	1	1	0	0	1	184
4:45 PM	3	35	9	9	123	5	7	0	4	1	0	1	197
5:00 PM	2	120	7	7	138	5	1	1	2	2	0	7	292
5:15 PM	2	104	3	11	109	8	5	0	4	1	2	7	256
5:30 PM	0	104	3	3	131	1	1	0	2	1	1	3	250
5:45 PM	0	49	5	7	99	2	2	0	2	4	0	7	177
TOTAL VOLUMES:	16	558	65	105	903	36	18	2	15	9	3	26	1756

PM Peak Hr Begins at: 445 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	7	363	22	30	501	19	14	1	12	5	3	18	995

PEAK HR FACTOR:	0.760			0.917			0.614			0.650			0.852
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Location: City of Redlands
 N/S: Eureka Street
 E/W: Redlands Boulevard
 Control: Signalized



File Name: REDEURE
 Date: 12/15/2011
 Day: Thursday

	Eureka Street Northbound			Eureka Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	0	1	2	0	1	2	0	10
7:00 AM	3	7	2	10	42	18	1	20	4	4	35	1	147
7:15 AM	1	10	2	12	71	19	2	21	5	3	49	0	195
7:30 AM	5	24	5	13	82	16	1	27	2	4	99	2	280
7:45 AM	1	16	6	15	94	25	1	41	0	5	79	4	287
8:00 AM	1	21	3	14	54	21	1	42	3	2	89	5	256
8:15 AM	5	22	3	15	45	21	6	39	5	0	68	5	234
8:30 AM	4	19	4	14	41	8	0	56	5	4	69	3	227
8:45 AM	2	12	3	24	80	15	4	36	6	0	77	7	266
TOTAL VOLUMES:	22	131	28	117	509	143	16	282	30	22	565	27	1892

AM Peak Hr Begins at: 730 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	12	83	17	57	275	83	9	149	10	11	335	16	1057

PEAK HR FACTOR:	0.824	0.774	0.840	0.862	0.921
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	Eureka Street Northbound			Eureka Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	0	1	2	0	1	2	0	10
4:00 PM	11	38	12	30	72	12	16	160	7	19	97	15	489
4:15 PM	17	30	10	24	56	9	17	142	9	11	116	11	452
4:30 PM	11	29	15	22	54	11	19	176	7	9	83	10	446
4:45 PM	6	34	15	29	79	11	15	161	10	14	98	14	486
5:00 PM	10	67	12	36	86	11	20	195	15	13	108	15	588
5:15 PM	7	61	14	29	81	12	16	161	12	10	77	14	494
5:30 PM	5	61	14	27	98	4	15	145	13	8	68	10	468
5:45 PM	4	30	8	27	65	5	8	111	5	13	82	13	371
TOTAL VOLUMES:	71	350	100	224	591	75	126	1251	78	97	729	102	3794

PM Peak Hr Begins at: 445 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	28	223	55	121	344	38	66	662	50	45	351	53	2036

PEAK HR FACTOR:	0.860	0.945	0.846	0.825	0.866
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Location: City of Redlands
 N/S: Orange Street
 E/W: Colton Avenue
 Contol: Signalized



File Name: REDORCO
 Date: 12/15/2011
 Day: Thursday

	Orange Street Northbound			Orange Street Southbound			Colton Avenue Eastbound			Colton Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	1	1	1	1	0	11
7:00 AM	5	33	4	17	70	10	5	21	11	35	44	12	267
7:15 AM	4	37	3	20	143	13	11	21	16	41	48	26	383
7:30 AM	2	47	6	24	122	14	12	37	20	63	47	19	413
7:45 AM	3	50	14	15	158	15	13	29	18	50	70	23	458
8:00 AM	4	52	10	17	121	16	14	30	9	43	70	14	400
8:15 AM	10	55	9	8	87	14	15	45	17	30	53	10	353
8:30 AM	3	33	5	11	107	12	7	38	10	35	56	15	332
8:45 AM	13	44	8	15	113	9	17	36	17	30	61	18	381
TOTAL VOLUMES:	44	351	59	127	921	103	94	257	118	327	449	137	2987

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	13	186	33	76	544	58	50	117	63	197	235	82	1654

PEAK HR FACTOR:	0.866	0.902	0.833	0.899	0.903
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	Orange Street Northbound			Orange Street Southbound			Colton Avenue Eastbound			Colton Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	1	1	1	1	0	11
4:00 PM	14	74	16	21	101	11	32	104	33	30	60	15	511
4:15 PM	15	80	10	22	115	9	32	96	41	30	56	14	520
4:30 PM	21	77	20	25	126	9	25	92	36	37	64	26	558
4:45 PM	13	82	28	17	101	12	41	92	32	33	69	28	548
5:00 PM	11	62	20	21	108	13	43	106	41	48	55	26	554
5:15 PM	18	79	26	22	116	9	45	105	49	30	46	26	571
5:30 PM	10	57	27	32	98	9	38	102	35	40	41	20	509
5:45 PM	20	69	23	18	107	12	28	101	31	47	45	18	519
TOTAL VOLUMES:	122	580	170	178	872	84	284	798	298	295	436	173	4290

PM Peak Hr Begins at: 430 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	63	300	94	85	451	43	154	395	158	148	234	106	2231

PEAK HR FACTOR:	0.929	0.905	0.888	0.938	0.977
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Location: City of Redlands
 N/S: Orange Street
 E/W: Pearl Avenue
 Contol: Signalized



File Name: REDORPE
 Date: 12/15/2011
 Day: Thursday

	Orange Street Northbound			Orange Street Southbound			Pearl Avenue Eastbound			Pearl Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	2	0	0	1	1	0	1	0	8
7:00 AM	1	116	1	2	34	2	43	56	20	0	6	43	324
7:15 AM	0	172	4	3	53	3	39	89	21	3	11	77	475
7:30 AM	2	191	0	2	67	2	41	64	28	1	12	68	478
7:45 AM	0	151	5	3	88	6	52	48	31	2	9	37	432
8:00 AM	0	148	2	1	68	4	37	67	25	10	8	50	420
8:15 AM	1	134	4	1	42	4	30	59	30	19	6	31	361
8:30 AM	3	131	3	6	57	3	37	54	29	6	7	33	369
8:45 AM	1	118	3	7	72	3	35	64	40	13	9	29	394
TOTAL VOLUMES:	8	1161	22	25	481	27	314	501	224	54	68	368	3253

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	2	662	11	9	276	15	169	268	105	16	40	232	1805

PEAK HR FACTOR:	0.874			0.773			0.909			0.791			0.944
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	Orange Street Northbound			Orange Street Southbound			Pearl Avenue Eastbound			Pearl Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	2	0	0	1	1	0	1	0	8
4:00 PM	2	206	10	3	98	1	32	97	20	6	15	42	532
4:15 PM	5	215	18	1	97	5	43	92	52	8	13	66	615
4:30 PM	5	195	17	7	112	0	63	88	61	7	8	65	628
4:45 PM	9	208	18	6	93	3	63	79	41	12	11	63	606
5:00 PM	4	228	23	8	96	3	70	102	41	15	11	56	657
5:15 PM	2	248	16	4	82	2	64	109	74	13	12	48	674
5:30 PM	1	192	21	6	91	3	59	91	50	8	11	48	581
5:45 PM	3	199	18	9	73	3	42	106	50	11	10	64	588
TOTAL VOLUMES:	31	1691	141	44	742	20	436	764	389	80	91	452	4881

PM Peak Hr Begins at: 430 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	20	879	74	25	383	8	260	378	217	47	42	232	2565

PEAK HR FACTOR:	0.914			0.874			0.865			0.933			0.951
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Location: City of Redlands
 N/S: Orange Street
 E/W: Stuart Avenue
 Control: Signalized



File Name: REDORST
 Date: 12/15/2011
 Day: Thursday

	Orange Street Northbound			Orange Street Southbound			Stuart Avenue Eastbound			Stuart Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	0	0	1	0	0	1	0	6
7:00 AM	0	120	6	0	47	0	0	2	2	4	0	2	183
7:15 AM	2	181	11	1	76	1	0	0	7	6	3	7	295
7:30 AM	1	178	10	2	76	2	1	2	1	9	2	10	294
7:45 AM	1	126	11	0	95	1	6	0	3	10	4	1	258
8:00 AM	1	145	18	0	76	2	1	4	6	9	0	8	270
8:15 AM	3	116	10	4	71	3	5	2	4	2	2	8	230
8:30 AM	4	100	15	2	73	4	6	2	10	9	2	8	235
8:45 AM	7	102	25	5	106	0	3	7	11	14	1	7	288
TOTAL VOLUMES:	19	1068	106	14	620	13	22	19	44	63	14	51	2053

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	5	630	50	3	323	6	8	6	17	34	9	26	1117

PEAK HR FACTOR:	0.883			0.865			0.705			0.821			0.947
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	Orange Street Northbound			Orange Street Southbound			Stuart Avenue Eastbound			Stuart Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	0	0	1	0	0	1	0	6
4:00 PM	20	195	28	10	128	4	15	39	9	24	72	18	562
4:15 PM	4	182	39	5	133	0	6	5	10	29	11	25	449
4:30 PM	4	174	44	15	132	3	4	10	16	25	9	13	449
4:45 PM	1	178	27	9	103	2	7	18	7	35	9	21	417
5:00 PM	1	186	40	8	141	0	31	31	11	31	15	17	512
5:15 PM	2	198	32	18	131	5	30	18	10	36	14	20	514
5:30 PM	3	162	35	9	122	4	8	15	10	25	13	27	433
5:45 PM	3	171	25	12	113	2	14	7	13	17	17	21	415
TOTAL VOLUMES:	38	1446	270	86	1003	20	115	143	86	222	160	162	3751

PM Peak Hr Begins at: 430 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	8	736	143	50	507	10	72	77	44	127	47	71	1892

PEAK HR FACTOR:	0.956			0.920			0.661			0.875			0.920
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Location: City of Redlands
 N/S: Orange Street
 E/W: Oriental Avenue
 Control: OWSC



File Name: REDOROR
 Date: 12/15/2011
 Day: Thursday

	Orange Street Northbound			Orange Street Southbound			Oriental Avenue Eastbound			Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	0	0	1	0	0	0	0	5
7:00 AM	0	122	0	0	52	1	1	0	1	0	0	0	177
7:15 AM	0	185	0	0	85	1	1	0	0	0	0	0	272
7:30 AM	1	179	0	0	83	0	0	0	1	0	0	0	264
7:45 AM	0	145	0	0	105	0	0	0	0	0	0	0	250
8:00 AM	0	157	0	0	93	0	2	0	0	0	0	0	252
8:15 AM	1	123	0	0	84	0	1	0	1	0	0	0	210
8:30 AM	0	123	0	0	96	2	1	0	0	0	0	0	222
8:45 AM	0	132	0	0	118	1	0	0	0	0	0	0	251
TOTAL VOLUMES:	2	1166	0	0	716	5	6	0	3	0	0	0	1898

AM Peak Hr Begins at: 715 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	1	666	0	0	366	1	3	0	1	0	0	0	1038

PEAK HR FACTOR:	0.901	0.874	0.500	0.000	0.954
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	Orange Street Northbound			Orange Street Southbound			Oriental Avenue Eastbound			Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	0	0	1	0	0	0	0	5
4:00 PM	2	209	0	0	145	11	22	0	5	0	0	0	394
4:15 PM	3	214	0	0	168	7	7	0	6	0	0	0	405
4:30 PM	0	216	0	0	154	8	12	0	10	0	0	0	400
4:45 PM	5	188	0	0	147	6	4	0	2	0	0	0	352
5:00 PM	3	210	0	0	173	6	15	0	2	0	0	0	409
5:15 PM	2	216	0	0	171	10	11	0	6	0	0	0	416
5:30 PM	3	195	0	0	156	1	5	0	4	0	0	0	364
5:45 PM	3	182	0	0	133	8	13	0	7	0	0	0	346
TOTAL VOLUMES:	21	1630	0	0	1247	57	89	0	42	0	0	0	3086

PM Peak Hr Begins at: 430 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	10	830	0	0	645	30	42	0	20	0	0	0	1577

PEAK HR FACTOR:	0.963	0.932	0.705	0.000	0.948
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Location: City of Redlands
 N/S: Orange Street
 E/W: Redlands Boulevard
 Control: Signalized



File Name: REDORRE
 Date: 12/15/2011
 Day: Thursday

	Orange Street Northbound			Orange Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
7:00 AM	2	93	4	7	36	3	5	23	1	3	35	23	235
7:15 AM	4	159	5	8	61	9	7	19	5	3	36	25	341
7:30 AM	12	138	6	13	58	7	13	19	5	4	43	26	344
7:45 AM	9	109	3	15	68	18	9	42	16	2	57	36	384
8:00 AM	7	118	2	8	74	5	13	23	11	6	58	21	346
8:15 AM	9	66	5	12	61	6	14	18	13	4	50	36	294
8:30 AM	5	73	3	11	54	10	15	49	7	6	53	35	321
8:45 AM	10	74	4	23	73	5	10	37	11	7	58	38	350
TOTAL VOLUMES:	58	830	32	97	485	63	86	230	69	35	390	240	2615

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	32	524	16	44	261	39	42	103	37	15	194	108	1415

PEAK HR FACTOR:	0.851			0.851			0.679			0.834			0.921
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	Orange Street Northbound			Orange Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
4:00 PM	12	111	10	33	84	20	44	118	27	18	83	58	618
4:15 PM	14	117	11	31	107	22	39	119	26	14	93	67	660
4:30 PM	21	106	13	33	93	26	51	137	20	11	59	66	636
4:45 PM	15	97	10	42	85	19	48	118	19	11	84	49	597
5:00 PM	13	111	9	41	94	27	45	153	20	15	71	63	662
5:15 PM	12	107	7	44	104	20	57	141	24	18	52	59	645
5:30 PM	3	94	6	36	103	26	40	143	12	11	47	55	576
5:45 PM	10	77	9	38	92	12	51	83	16	12	83	51	534
TOTAL VOLUMES:	100	820	75	298	762	172	375	1012	164	110	572	468	4928

PM Peak Hr Begins at: 415 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	63	431	43	147	379	94	183	527	85	51	307	245	2555

PEAK HR FACTOR:	0.945			0.957			0.912			0.866			0.965
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Location: City of Redlands
 N/S: 6th Street
 E/W: I-10 WB Off Ramp
 Contol: TWSC



File Name: RED610W
 Date: 12/15/2011
 Day: Thursday

	6th Street Northbound			6th Street Southbound			Private Drive Eastbound			I-10 WB Off Ramp Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	1	0	0	1	0	0	1	0	1	0	1	5
7:00 AM	0	24	0	0	50	0	0	0	0	57	1	33	165
7:15 AM	0	39	0	0	71	0	0	0	0	38	7	49	204
7:30 AM	0	41	0	0	76	0	0	0	0	34	4	45	200
7:45 AM	0	25	0	0	73	0	0	0	0	53	4	49	204
8:00 AM	0	42	0	0	63	0	0	0	0	56	2	45	208
8:15 AM	0	23	0	0	56	0	0	0	0	50	4	46	179
8:30 AM	0	25	0	0	57	0	0	0	0	49	1	40	172
8:45 AM	0	35	0	0	64	0	0	0	0	58	0	29	186
TOTAL VOLUMES:	0	254	0	0	510	0	0	0	0	395	23	336	1518

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	0	147	0	0	283	0	0	0	0	181	17	188	816

PEAK HR FACTOR:	0.875			0.931			0.000			0.910			0.981
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	6th Street Northbound			6th Street Southbound			Private Drive Eastbound			I-10 WB Off Ramp Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	1	0	0	1	0	0	1	0	1	0	1	5
4:00 PM	0	59	0	0	96	0	0	0	0	44	0	45	244
4:15 PM	0	73	0	0	92	0	0	0	0	51	3	35	254
4:30 PM	0	75	0	0	113	0	0	0	0	50	4	40	282
4:45 PM	0	80	0	0	80	0	0	0	0	60	2	49	271
5:00 PM	0	88	0	0	102	0	0	0	0	36	1	42	269
5:15 PM	0	61	0	0	93	0	0	0	0	42	1	32	229
5:30 PM	0	64	0	0	117	0	0	0	0	47	3	31	262
5:45 PM	0	65	0	0	90	0	0	0	0	46	2	33	236
TOTAL VOLUMES:	0	565	0	0	783	0	0	0	0	376	16	307	2047

PM Peak Hr Begins at: 415 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	0	316	0	0	387	0	0	0	0	197	10	166	1076

PEAK HR FACTOR:	0.898			0.856			0.000			0.840			0.954
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Location: City of Redlands
 N/S: 6th Street
 E/W: Pearl Avenue
 Contol: AWSC



File Name: RED6PE
 Date: 12/15/2011
 Day: Thursday

	6th Street Northbound			6th Street Southbound			Pearl Avenue Eastbound			I-10 EB On Ramp Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	1	0	1	2	0	0	1	0	0	1	0	7
7:00 AM	29	12	1	19	50	29	9	6	36	0	0	0	191
7:15 AM	79	29	3	25	63	20	15	5	77	0	0	0	316
7:30 AM	64	24	6	31	51	25	19	9	27	0	0	0	256
7:45 AM	20	13	8	36	76	22	12	9	28	0	0	1	225
8:00 AM	32	19	13	28	72	27	19	11	37	0	0	0	258
8:15 AM	24	18	3	24	44	27	7	13	35	0	0	0	195
8:30 AM	23	12	10	25	52	25	8	15	30	0	0	0	200
8:45 AM	24	16	9	22	71	28	10	8	47	0	0	0	235
TOTAL VOLUMES:	295	143	53	210	479	203	99	76	317	0	0	1	1876

AM Peak Hr Begins at: 715 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	195	85	30	120	262	94	65	34	169	0	0	1	1055

PEAK HR FACTOR:	0.698	0.888	0.691	0.250	0.835
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	6th Street Northbound			6th Street Southbound			Pearl Avenue Eastbound			I-10 EB On Ramp Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	1	0	1	2	0	0	1	0	0	1	0	7
4:00 PM	47	34	35	40	64	29	23	53	59	0	0	0	384
4:15 PM	48	31	27	51	75	26	35	50	49	0	0	0	392
4:30 PM	47	44	35	63	69	26	24	51	44	0	0	0	403
4:45 PM	46	42	33	59	44	31	30	52	45	0	0	0	382
5:00 PM	48	51	24	61	58	24	38	52	37	0	0	0	393
5:15 PM	47	33	22	57	51	23	39	53	42	0	0	0	367
5:30 PM	39	32	23	50	75	31	26	46	28	0	0	0	350
5:45 PM	42	37	32	47	58	29	36	40	57	0	0	0	378
TOTAL VOLUMES:	364	304	231	428	494	219	251	397	361	0	0	0	3049

PM Peak Hr Begins at: 415 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	189	168	119	234	246	107	127	205	175	0	0	0	1570

PEAK HR FACTOR:	0.944	0.929	0.946	0.000	0.974
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Location: City of Redlands
 N/S: 6th Street
 E/W: Stuart Avenue
 Contol: TWSC



File Name: RED6ST
 Date: 12/15/2011
 Day: Thursday

	6th Street Northbound			6th Street Southbound			Stuart Avenue Eastbound			Stuart Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	1	0	1	2	0	0	1	0	0	1	0	7
7:00 AM	2	38	1	13	60	2	1	1	1	1	2	6	128
7:15 AM	1	79	3	45	83	5	0	2	3	4	1	23	249
7:30 AM	1	66	0	5	56	1	1	0	4	2	3	22	161
7:45 AM	4	41	3	15	86	3	1	1	3	4	3	4	168
8:00 AM	3	53	0	10	95	3	3	4	3	5	0	10	189
8:15 AM	3	36	1	10	66	1	0	0	7	3	0	8	135
8:30 AM	2	40	0	9	73	5	0	1	2	1	1	12	146
8:45 AM	8	42	2	15	92	8	1	0	2	0	1	10	181
TOTAL VOLUMES:	24	395	10	122	611	28	7	9	25	20	11	95	1357

AM Peak Hr Begins at: 715 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	9	239	6	75	320	12	5	7	13	15	7	59	767

PEAK HR FACTOR:	0.765	0.765	0.625	0.723	0.770
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	6th Street Northbound			6th Street Southbound			Stuart Avenue Eastbound			Stuart Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	1	0	1	2	0	0	1	0	0	1	0	7
4:00 PM	17	108	2	13	74	12	6	4	11	2	2	24	275
4:15 PM	13	94	8	10	74	14	7	7	14	9	3	18	271
4:30 PM	15	112	6	9	87	10	6	5	10	2	5	20	287
4:45 PM	14	121	5	11	84	4	6	3	10	5	0	11	274
5:00 PM	18	137	1	6	80	7	4	2	12	2	1	6	276
5:15 PM	11	98	2	7	79	5	6	5	3	2	1	14	233
5:30 PM	10	81	3	8	74	9	3	1	6	1	1	10	207
5:45 PM	6	95	2	9	79	8	6	2	2	3	2	13	227
TOTAL VOLUMES:	104	846	29	73	631	69	44	29	68	26	15	116	2050

PM Peak Hr Begins at: 415 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	60	464	20	36	325	35	23	17	46	18	9	55	1108

PEAK HR FACTOR:	0.872	0.934	0.768	0.683	0.965
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Location: City of Redlands
 N/S: Redlands Boulevard
 E/W: Citrus Avenue
 Contol: Signalized



File Name: REDRECI
 Date: 12/15/2011
 Day: Thursday

Passenger Vehicles, Large 2 Axle Vehicles, 3 Axle Vehicles, 4+ Axle Trucks

	Redlands Boulevard Northbound			Redlands Boulevard Southbound			Citrus Avenue Eastbound			Citrus Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	1	0	2	0	0	2	0	9
7:00 AM	27	67	2	23	38	4	2	59	14	12	55	52	355
7:15 AM	47	121	13	70	49	5	6	113	30	16	92	101	663
7:30 AM	41	94	2	21	42	12	6	28	24	8	55	62	395
7:45 AM	43	68	9	13	39	5	3	35	13	13	82	31	354
8:00 AM	33	93	10	16	40	7	3	40	24	17	70	36	389
8:15 AM	40	62	6	7	30	9	7	32	13	11	52	26	295
8:30 AM	29	58	8	12	38	2	5	28	20	8	40	27	275
8:45 AM	34	56	2	17	31	1	8	21	16	7	48	30	271
TOTAL VOLUMES:	294	619	52	179	307	45	40	356	154	92	494	365	2997

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	164	376	34	120	170	29	18	216	91	54	299	230	1801

PEAK HR FACTOR:	0.793			0.643			0.545			0.697			0.679
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Passenger Vehicles, Large 2 Axle Vehicles, 3 Axle Vehicles, 4+ Axle Trucks

	Redlands Boulevard Northbound			Redlands Boulevard Southbound			Citrus Avenue Eastbound			Citrus Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	1	0	2	0	0	2	0	9
4:00 PM	23	56	7	36	89	8	8	64	36	10	44	21	402
4:15 PM	15	67	7	38	103	8	4	64	40	9	54	39	448
4:30 PM	18	61	13	31	100	10	10	61	36	10	46	37	433
4:45 PM	23	58	6	41	97	8	11	62	47	7	72	26	458
5:00 PM	24	68	15	32	138	14	13	78	52	8	49	30	521
5:15 PM	18	56	11	34	119	25	36	76	44	11	49	34	513
5:30 PM	10	65	15	46	96	30	40	76	42	15	36	26	497
5:45 PM	19	76	13	43	109	32	36	60	45	14	53	25	525
TOTAL VOLUMES:	150	507	87	301	851	135	158	541	342	84	403	238	3797

PM Peak Hr Begins at: 500 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	71	265	54	155	462	101	125	290	183	48	187	115	2056

PEAK HR FACTOR:	0.903			0.976			0.946			0.931			0.979
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Location: City of Redlands
 N/S: Church Street
 E/W: Stuart Avenue
 Contol: OWSC



File Name: REDCHST
 Date: 12/15/2011
 Day: Thursday

	Church Street Northbound			Church Street Southbound			Stuart Avenue Eastbound			Stuart Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	1	0	0	1	0	0	1	0	0	0	0	3
7:00 AM	10	48	0	0	59	6	2	0	15	0	0	0	140
7:15 AM	17	71	0	0	80	15	9	0	21	0	0	0	213
7:30 AM	9	61	0	0	50	15	7	0	2	0	0	0	144
7:45 AM	5	54	0	0	77	10	5	0	6	0	0	0	157
8:00 AM	5	70	0	0	71	9	1	0	5	0	0	0	161
8:15 AM	3	35	0	0	61	4	1	0	1	0	0	0	105
8:30 AM	2	44	0	0	40	4	1	0	3	0	0	0	94
8:45 AM	2	23	0	0	35	9	0	0	8	0	0	0	77
TOTAL VOLUMES:	53	406	0	0	473	72	26	0	61	0	0	0	1091

AM Peak Hr Begins at: 715 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	36	256	0	0	278	49	22	0	34	0	0	0	675

PEAK HR FACTOR:	0.830	0.861	0.467	0.000	0.792
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	Church Street Northbound			Church Street Southbound			Stuart Avenue Eastbound			Stuart Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	1	0	0	1	0	0	1	0	0	0	0	3
4:00 PM	1	58	0	0	75	4	8	0	8	0	0	0	154
4:15 PM	3	62	0	0	71	11	14	0	7	0	0	0	168
4:30 PM	3	75	0	0	66	3	15	0	6	0	0	0	168
4:45 PM	3	84	0	0	64	6	11	0	7	0	0	0	175
5:00 PM	1	65	0	0	64	2	21	0	10	0	0	0	163
5:15 PM	4	71	0	0	67	7	16	0	6	0	0	0	171
5:30 PM	4	55	0	0	82	3	5	0	6	0	0	0	155
5:45 PM	2	60	0	0	69	8	8	0	3	0	0	0	150
TOTAL VOLUMES:	21	530	0	0	558	44	98	0	53	0	0	0	1304

PM Peak Hr Begins at: 430 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	11	295	0	0	261	18	63	0	29	0	0	0	677

PEAK HR FACTOR:	0.879	0.943	0.742	0.000	0.967
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Location: City of Redlands
 N/S: University Avenue
 E/W: I-10 WB On Ramp / Central Avenue
 Contol: OWSC



File Name: REDUN10W
 Date: 12/15/2011
 Day: Thursday

	University Avenue Northbound			University Avenue Southbound			I-10 WB On Ramp Eastbound			Central Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	0	0	0	0	0	1	0	5
7:00 AM	109	59	7	1	25	207	0	0	0	0	1	5	414
7:15 AM	102	102	6	1	38	227	0	0	0	0	3	7	486
7:30 AM	114	115	4	2	35	227	0	0	0	0	2	7	506
7:45 AM	99	100	3	2	33	215	0	0	1	0	1	6	460
8:00 AM	125	103	8	3	31	134	0	0	0	1	6	2	413
8:15 AM	121	103	5	4	21	143	0	0	0	0	5	4	406
8:30 AM	104	93	13	2	30	129	0	0	0	0	4	1	376
8:45 AM	82	109	8	3	27	115	0	0	0	0	3	4	351
TOTAL VOLUMES:	856	784	54	18	240	1397	0	0	1	1	25	36	3412

AM Peak Hr Begins at: 700 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	424	376	20	6	131	876	0	0	1	0	7	25	1866

PEAK HR FACTOR:	0.880	0.952	0.250	0.800	0.922
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	University Avenue Northbound			University Avenue Southbound			WB On Ramp / Central Ave Eastbound			I-10 EB On Ramp Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	0	0	0	0	0	1	0	5
4:00 PM	91	137	8	1	44	84	0	0	0	0	4	1	370
4:15 PM	71	144	18	3	52	94	0	0	0	1	2	4	389
4:30 PM	83	143	9	4	49	100	0	0	0	0	8	6	402
4:45 PM	78	143	17	1	46	100	0	0	0	1	6	4	396
5:00 PM	88	138	13	4	47	94	0	0	0	1	7	3	395
5:15 PM	65	163	12	1	43	103	0	0	0	0	5	5	397
5:30 PM	75	153	6	4	50	115	0	0	0	0	5	6	414
5:45 PM	79	147	11	1	40	114	0	0	0	1	5	2	400
TOTAL VOLUMES:	630	1168	94	19	371	804	0	0	0	4	42	31	3163

PM Peak Hr Begins at: 500 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	307	601	42	10	180	426	0	0	0	2	22	16	1606

PEAK HR FACTOR:	0.990	0.911	0.000	0.909	0.970
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Location: City of Redlands
 N/S: University Avenue
 E/W: I-10 EB Off Ramp
 Contol: OWSC



File Name: REDUN10E
 Date: 12/15/2011
 Day: Thursday

	University Avenue Northbound			University Avenue Southbound			I-10 EB Off Ramp Eastbound			Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	0	1	0	1	0	0	0	6
7:00 AM	0	121	0	0	31	0	46	0	136	0	0	0	334
7:15 AM	0	145	0	0	36	0	73	0	181	0	0	0	435
7:30 AM	0	155	0	0	32	0	73	0	86	0	0	0	346
7:45 AM	0	153	0	0	36	0	59	0	81	0	0	0	329
8:00 AM	0	163	0	0	29	0	69	0	75	0	0	0	336
8:15 AM	0	155	0	0	26	0	75	0	73	0	0	0	329
8:30 AM	0	142	0	0	29	0	74	0	67	0	0	0	312
8:45 AM	0	118	0	0	33	0	87	0	56	0	0	0	294
TOTAL VOLUMES:	0	1152	0	0	252	0	556	0	755	0	0	0	2715

AM Peak Hr Begins at: 715 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	616	0	0	133	0	274	0	423	0	0	0	1446

PEAK HR FACTOR:	0.945	0.924	0.686	0.000	0.831
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	University Avenue Northbound			University Avenue Southbound			I-10 EB Off Ramp Eastbound			Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	0	1	0	1	0	0	0	6
4:00 PM	0	113	0	0	39	0	108	0	118	0	0	0	378
4:15 PM	0	135	0	0	55	0	101	0	145	0	0	0	436
4:30 PM	0	124	0	0	53	0	119	1	141	0	0	0	438
4:45 PM	0	119	0	0	44	0	115	0	152	0	0	0	430
5:00 PM	0	127	0	0	53	0	103	0	137	0	0	0	420
5:15 PM	0	135	0	0	46	0	110	0	146	0	0	0	437
5:30 PM	0	133	0	0	55	0	106	0	142	0	0	0	436
5:45 PM	0	121	0	0	38	0	111	0	145	0	0	0	415
TOTAL VOLUMES:	0	1007	0	0	383	0	873	1	1126	0	0	0	3390

PM Peak Hr Begins at: 430 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	505	0	0	196	0	447	1	576	0	0	0	1725

PEAK HR FACTOR:	0.935	0.925	0.959	0.000	0.985
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Appendix B

Vehicle Classification Data

Location: City of San Bernardino
 N/S: Tippecanoe Avenue
 E/W: I-10 WB Ramps
 Contol: Signalized



File Name: SBCTI10W
 Date: 12/14/2011
 Day: Wednesday

Passenger Vehicles

	Tippecanoe Avenue Northbound			Tippecanoe Avenue Southbound			I-10 WB Ramps Eastbound			I-10 WB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
7:00 AM	83	101	0	0	61	60	0	0	0	123	16	77	521
7:15 AM	86	124	0	0	86	58	0	0	0	127	7	78	566
7:30 AM	70	80	0	0	101	60	0	0	0	113	3	71	498
7:45 AM	108	158	0	0	98	67	0	0	0	145	3	40	619
8:00 AM	59	135	0	0	111	69	0	0	0	123	3	77	577
8:15 AM	54	133	0	0	99	69	0	0	0	108	2	76	541
8:30 AM	68	105	0	0	106	62	0	0	0	106	2	94	543
8:45 AM	55	117	0	0	102	92	0	0	0	96	14	76	552
TOTAL VOLUMES:	583	953	0	0	764	537	0	0	0	941	50	589	4417

AM Peak Hr Begins at: 745 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	289	531	0	0	414	267	0	0	0	482	10	287	2280

PEAK HR FACTOR:	0.771	0.946	0.000	0.959	0.921
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Passenger Vehicles

	Tippecanoe Avenue Northbound			Tippecanoe Avenue Southbound			I-10 WB Ramps Eastbound			I-10 WB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
4:00 PM	107	198	0	0	247	127	0	0	0	62	7	67	815
4:15 PM	102	197	0	0	222	150	0	0	0	45	3	110	829
4:30 PM	93	211	0	0	213	146	0	0	0	61	2	113	839
4:45 PM	115	197	0	0	263	100	0	0	0	40	6	111	832
5:00 PM	111	205	0	0	245	153	0	0	0	77	2	92	885
5:15 PM	119	186	0	0	256	140	0	0	0	60	3	112	876
5:30 PM	113	158	0	0	235	153	0	0	0	76	5	105	845
5:45 PM	92	183	0	0	258	105	0	0	0	76	1	101	816
TOTAL VOLUMES:	852	1535	0	0	1939	1074	0	0	0	497	29	811	6737

PM Peak Hr Begins at: 445 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	458	746	0	0	999	546	0	0	0	253	16	420	3438

PEAK HR FACTOR:	0.953	0.970	0.000	0.926	0.971
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Location: City of San Bernardino
 N/S: Tippecanoe Avenue
 E/W: I-10 WB Ramps
 Contol: Signalized



File Name: SBCTI10W
 Date: 12/14/2011
 Day: Wednesday

Large 2 Axle Vehicles

	Tippecanoe Avenue Northbound			Tippecanoe Avenue Southbound			I-10 WB Ramps Eastbound			I-10 WB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
7:00 AM	2	2	0	0	1	1	0	0	0	0	0	1	7
7:15 AM	1	5	0	0	5	3	0	0	0	0	0	0	14
7:30 AM	0	3	0	0	5	2	0	0	0	0	1	2	13
7:45 AM	2	1	0	0	1	1	0	0	0	0	0	1	6
8:00 AM	1	1	0	0	6	3	0	0	0	0	0	0	11
8:15 AM	1	6	0	0	5	3	0	0	0	0	0	3	18
8:30 AM	3	4	0	0	1	2	0	0	0	1	0	1	12
8:45 AM	1	4	0	0	6	6	0	0	0	1	0	0	18
TOTAL VOLUMES:	11	26	0	0	30	21	0	0	0	2	1	8	99

AM Peak Hr Begins at: 800 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	6	15	0	0	18	14	0	0	0	2	0	4	59

PEAK HR FACTOR:	0.750	0.667	0.000	0.500	0.819
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Large 2 Axle Vehicles

	Tippecanoe Avenue Northbound			Tippecanoe Avenue Southbound			I-10 WB Ramps Eastbound			I-10 WB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
4:00 PM	0	1	0	0	2	1	0	0	0	0	0	0	4
4:15 PM	1	5	0	0	2	1	0	0	0	1	1	0	11
4:30 PM	0	3	0	0	2	4	0	0	0	1	0	0	10
4:45 PM	1	1	0	0	3	2	0	0	0	0	0	0	7
5:00 PM	3	4	0	0	1	4	0	0	0	1	0	0	13
5:15 PM	1	1	0	0	3	2	0	0	0	0	0	0	7
5:30 PM	3	4	0	0	2	3	0	0	0	0	0	0	12
5:45 PM	0	4	0	0	2	0	0	0	0	1	0	1	8
TOTAL VOLUMES:	9	23	0	0	17	17	0	0	0	4	1	1	72

PM Peak Hr Begins at: 415 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	5	13	0	0	8	11	0	0	0	3	1	0	41

PEAK HR FACTOR:	0.643	0.792	0.000	0.500	0.788
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Location: City of San Bernardino
 N/S: Tippecanoe Avenue
 E/W: I-10 WB Ramps
 Contol: Signalized



File Name: SBCTI10W
 Date: 12/14/2011
 Day: Wednesday

3 Axle Vehicles

	Tippecanoe Avenue Northbound			Tippecanoe Avenue Southbound			I-10 WB Ramps Eastbound			I-10 WB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
7:00 AM	2	0	0	0	0	0	0	0	0	0	0	0	2
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	
7:30 AM	1	0	0	0	1	0	0	0	0	0	0	0	2
7:45 AM	1	0	0	0	0	1	0	0	0	0	0	0	2
8:00 AM	0	0	0	0	1	0	0	0	0	0	0	0	1
8:15 AM	0	0	0	0	0	2	0	0	0	0	0	0	2
8:30 AM	0	0	0	0	1	0	0	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	1	0	0	0	1	0	0	2
TOTAL VOLUMES:	4	0	0	0	3	4	0	0	0	1	0	0	12

AM Peak Hr Begins at: 730 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	2	0	0	0	2	3	0	0	0	0	0	0	7

PEAK HR FACTOR:	0.500	0.625	0.000	0.000	0.875
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3 Axle Vehicles

	Tippecanoe Avenue Northbound			Tippecanoe Avenue Southbound			I-10 WB Ramps Eastbound			I-10 WB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
4:00 PM	1	1	0	0	1	1	0	0	0	0	0	0	4
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	
4:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
5:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	
5:45 PM	1	1	0	0	0	0	0	0	0	0	0	0	2
TOTAL VOLUMES:	2	3	0	0	2	2	0	0	0	0	0	0	9

PM Peak Hr Begins at: 400 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	1	1	0	0	2	2	0	0	0	0	0	0	6

PEAK HR FACTOR:	0.250	0.500	0.000	0.000	0.375
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Location: City of San Bernardino
 N/S: Tippecanoe Avenue
 E/W: I-10 WB Ramps
 Contol: Signalized



File Name: SBCTI10W
 Date: 12/14/2011
 Day: Wednesday

4+ Axle Trucks

	Tippecanoe Avenue Northbound			Tippecanoe Avenue Southbound			I-10 WB Ramps Eastbound			I-10 WB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
7:00 AM	0	2	0	0	0	3	0	0	0	0	0	2	7
7:15 AM	0	4	0	0	1	9	0	0	0	0	0	1	15
7:30 AM	0	2	0	0	1	5	0	0	0	0	1	3	12
7:45 AM	0	4	0	0	0	6	0	0	0	0	0	0	10
8:00 AM	0	8	0	0	1	10	0	0	0	0	0	0	19
8:15 AM	0	4	0	0	0	5	0	0	0	0	0	3	12
8:30 AM	0	6	0	0	1	8	0	0	0	1	0	2	18
8:45 AM	0	8	0	0	2	5	0	0	0	2	0	0	17
TOTAL VOLUMES:	0	38	0	0	6	51	0	0	0	3	1	11	110

AM Peak Hr Begins at: 800 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	26	0	0	4	28	0	0	0	3	0	5	66

PEAK HR FACTOR:	0.813	0.727	0.000	0.667	0.868
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4+ Axle Trucks

	Tippecanoe Avenue Northbound			Tippecanoe Avenue Southbound			I-10 WB Ramps Eastbound			I-10 WB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
4:00 PM	2	2	0	0	0	3	0	0	0	0	0	2	9
4:15 PM	0	3	0	0	1	8	0	0	0	1	0	0	13
4:30 PM	0	2	0	0	0	4	0	0	0	0	0	1	7
4:45 PM	2	1	0	0	1	0	0	0	0	0	0	0	4
5:00 PM	0	1	0	0	1	1	0	0	0	0	0	0	3
5:15 PM	0	3	0	0	3	0	0	0	0	0	0	0	6
5:30 PM	0	1	0	0	0	2	0	0	0	0	0	0	3
5:45 PM	1	2	0	0	0	2	0	0	0	0	0	1	6
TOTAL VOLUMES:	5	15	0	0	6	20	0	0	0	1	0	4	51

PM Peak Hr Begins at: 400 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	4	8	0	0	2	15	0	0	0	1	0	3	33

PEAK HR FACTOR:	0.750	0.472	0.000	0.500	0.635
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Location: City of San Bernardino
 N/S: Anderson Street
 E/W: I-10 EB Ramps
 Contol: Signalized



File Name: SBCTI10E
 Date: 12/14/2011
 Day: Wednesday

Passenger Vehicles

	Anderson Street Northbound			Anderson Street Southbound			I-10 EB Ramps Eastbound			I-10 EB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
7:00 AM	0	92	35	27	157	0	98	0	81	0	0	0	490
7:15 AM	0	134	63	20	184	0	80	0	86	0	0	0	567
7:30 AM	0	115	30	39	172	0	47	0	62	0	0	0	465
7:45 AM	0	185	50	14	228	0	73	0	47	0	0	0	597
8:00 AM	0	122	35	28	206	0	62	0	26	0	0	0	479
8:15 AM	0	127	46	34	166	0	50	0	61	0	0	0	484
8:30 AM	0	104	36	35	179	0	60	0	70	0	0	0	484
8:45 AM	0	114	32	44	153	0	44	0	49	0	0	0	436
TOTAL VOLUMES:	0	993	327	241	1445	0	514	0	482	0	0	0	4002

AM Peak Hr Begins at: 700 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	526	178	100	741	0	298	0	276	0	0	0	2119

PEAK HR FACTOR:	0.749	0.869	0.802	0.000	0.887
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Passenger Vehicles

	Anderson Street Northbound			Anderson Street Southbound			I-10 EB Ramps Eastbound			I-10 EB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
4:00 PM	0	174	60	85	215	0	119	1	83	0	0	0	737
4:15 PM	0	198	64	61	200	0	119	1	84	0	0	0	727
4:30 PM	0	177	72	89	183	0	136	12	81	0	0	0	750
4:45 PM	0	180	73	101	208	0	122	0	76	0	0	0	760
5:00 PM	0	191	77	94	223	0	121	0	64	0	0	0	770
5:15 PM	0	174	85	78	225	0	121	0	62	0	0	0	745
5:30 PM	0	161	71	69	239	0	117	0	69	0	0	0	726
5:45 PM	0	156	69	93	242	0	137	1	76	0	0	0	774
TOTAL VOLUMES:	0	1411	571	670	1735	0	992	15	595	0	0	0	5989

PM Peak Hr Begins at: 430 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	722	307	362	839	0	500	12	283	0	0	0	3025

PEAK HR FACTOR:	0.960	0.947	0.868	0.000	0.982
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Location: City of San Bernardino
 N/S: Anderson Street
 E/W: I-10 EB Ramps
 Contol: Signalized



File Name: SBCTI10E
 Date: 12/14/2011
 Day: Wednesday

Large 2 Axle Vehicles

	Anderson Street Northbound			Anderson Street Southbound			I-10 EB Ramps Eastbound			I-10 EB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
7:00 AM	0	1	1	0	1	0	4	0	0	0	0	0	7
7:15 AM	0	3	2	0	4	0	4	0	0	0	0	0	13
7:30 AM	0	3	2	0	5	0	0	0	0	0	0	0	10
7:45 AM	0	2	0	0	2	0	2	0	0	0	0	0	6
8:00 AM	0	0	1	0	5	0	1	0	0	0	0	0	7
8:15 AM	0	6	1	0	4	0	1	0	0	0	0	0	12
8:30 AM	0	3	2	0	2	0	3	0	1	0	0	0	11
8:45 AM	0	5	2	1	6	0	0	0	0	0	0	0	14
TOTAL VOLUMES:	0	23	11	1	29	0	15	0	1	0	0	0	80

AM Peak Hr Begins at: 800 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	14	6	1	17	0	5	0	1	0	0	0	44

PEAK HR FACTOR:	0.714	0.643	0.375	0.000	0.786
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Large 2 Axle Vehicles

	Anderson Street Northbound			Anderson Street Southbound			I-10 EB Ramps Eastbound			I-10 EB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
4:00 PM	0	1	1	0	3	0	1	0	1	0	0	0	7
4:15 PM	0	3	0	2	2	0	1	0	0	0	0	0	8
4:30 PM	0	1	0	1	2	0	1	0	2	0	0	0	7
4:45 PM	0	2	0	1	2	0	3	0	3	0	0	0	11
5:00 PM	0	7	1	0	2	0	1	0	2	0	0	0	13
5:15 PM	0	2	0	1	3	0	1	0	1	0	0	0	8
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	2	0	0	3	0	5	0	0	0	0	0	10
TOTAL VOLUMES:	0	18	2	5	17	0	13	0	9	0	0	0	64

PM Peak Hr Begins at: 430 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	12	1	3	9	0	6	0	8	0	0	0	39

PEAK HR FACTOR:	0.406	0.750	0.583	0.000	0.750
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Location: City of San Bernardino
 N/S: Anderson Street
 E/W: I-10 EB Ramps
 Contol: Signalized



File Name: SBCTI10E
 Date: 12/14/2011
 Day: Wednesday

3 Axle Vehicles

	Anderson Street Northbound			Anderson Street Southbound			I-10 EB Ramps Eastbound			I-10 EB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
7:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	2
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	
7:30 AM	0	1	0	0	1	0	0	0	0	0	0	0	2
7:45 AM	0	0	0	0	0	0	1	0	0	0	0	0	1
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	
8:15 AM	0	0	0	0	2	0	1	0	0	0	0	0	3
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	
8:45 AM	0	0	0	0	1	0	0	0	0	0	0	0	1
TOTAL VOLUMES:	0	3	0	0	4	0	2	0	0	0	0	0	9

AM Peak Hr Begins at: 730 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	1	0	0	3	0	2	0	0	0	0	0	6

PEAK HR FACTOR:	0.250	0.375	0.500	0.000	0.500								
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3 Axle Vehicles

	Anderson Street Northbound			Anderson Street Southbound			I-10 EB Ramps Eastbound			I-10 EB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
4:00 PM	0	1	0	1	0	0	1	0	0	0	0	0	3
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	
4:45 PM	0	0	0	1	0	0	0	0	0	0	0	0	1
5:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	
5:45 PM	0	0	0	0	0	0	1	0	0	0	0	0	1
TOTAL VOLUMES:	0	1	0	2	0	0	3	0	0	0	0	0	6

PM Peak Hr Begins at: 400 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	1	0	2	0	0	1	0	0	0	0	0	4

PEAK HR FACTOR:	0.250	0.500	0.250	0.000	0.333								
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Location: City of San Bernardino
 N/S: Anderson Street
 E/W: I-10 EB Ramps
 Contol: Signalized



File Name: SBCTI10E
 Date: 12/14/2011
 Day: Wednesday

4+ Axle Trucks

	Anderson Street Northbound			Anderson Street Southbound			I-10 EB Ramps Eastbound			I-10 EB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
7:00 AM	0	0	0	0	0	0	1	0	0	0	0	0	1
7:15 AM	0	0	0	0	0	0	4	0	0	0	0	0	4
7:30 AM	0	0	0	0	1	0	3	0	0	0	0	0	4
7:45 AM	0	0	0	0	0	0	4	0	0	0	0	0	4
8:00 AM	0	0	0	0	1	0	6	0	1	0	0	0	8
8:15 AM	0	2	1	0	0	0	4	0	0	0	0	0	7
8:30 AM	0	0	0	2	0	0	6	0	0	0	0	0	8
8:45 AM	0	0	0	0	4	0	8	0	0	0	0	0	12
TOTAL VOLUMES:	0	2	1	2	6	0	36	0	1	0	0	0	48

AM Peak Hr Begins at: 800 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	2	1	2	5	0	24	0	1	0	0	0	35

PEAK HR FACTOR:	0.250	0.438	0.781	0.000	0.729
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4+ Axle Trucks

	Anderson Street Northbound			Anderson Street Southbound			I-10 EB Ramps Eastbound			I-10 EB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
4:00 PM	0	2	0	0	0	0	2	0	0	0	0	0	4
4:15 PM	0	0	0	0	1	0	4	0	0	0	0	0	5
4:30 PM	0	0	0	1	0	0	1	0	0	0	0	0	2
4:45 PM	0	1	0	0	0	0	1	0	1	0	0	0	3
5:00 PM	0	0	0	1	0	0	1	0	0	0	0	0	2
5:15 PM	0	0	0	2	1	0	3	0	0	0	0	0	6
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	1	0	0	0	0	2	0	2	0	0	0	5
TOTAL VOLUMES:	0	4	0	4	2	0	14	0	3	0	0	0	27

PM Peak Hr Begins at: 400 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	3	0	1	1	0	8	0	1	0	0	0	14

PEAK HR FACTOR:	0.375	0.500	0.563	0.000	0.700
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Location: City of Redlands
 N/S: California Street
 E/W: I-10 WB Ramps
 Contol: Signalized



File Name: SBCTI10W
 Date: 12/14/2011
 Day: Wednesday

Passenger Vehicles

	California Street Northbound			California Street Southbound			I-10 WB Ramps Eastbound			I-10 WB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	0.5	0.5	1	9
7:00 AM	107	64	0	0	20	13	0	0	0	95	0	33	332
7:15 AM	107	111	0	0	37	23	0	0	0	102	1	64	445
7:30 AM	138	100	0	0	25	30	0	0	0	107	2	51	453
7:45 AM	96	137	0	0	43	22	0	0	0	74	1	70	443
8:00 AM	89	145	0	0	50	34	0	0	0	78	12	75	483
8:15 AM	128	143	0	0	24	23	0	0	0	93	1	71	483
8:30 AM	91	107	0	0	27	33	0	0	0	106	0	90	454
8:45 AM	82	107	0	0	28	31	0	0	0	102	0	75	425
TOTAL VOLUMES:	838	914	0	0	254	209	0	0	0	757	17	529	3518

AM Peak Hr Begins at: 745 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	404	532	0	0	144	112	0	0	0	351	14	306	1863

PEAK HR FACTOR:	0.863	0.762	0.000	0.856	0.964
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Passenger Vehicles

	California Street Northbound			California Street Southbound			I-10 WB Ramps Eastbound			I-10 WB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	0.5	0.5	1	9
4:00 PM	136	89	1	0	121	111	0	0	0	90	1	28	577
4:15 PM	130	83	1	0	120	117	0	0	0	89	0	39	579
4:30 PM	114	77	0	0	140	175	0	0	0	87	0	19	612
4:45 PM	114	100	0	0	119	93	0	0	0	72	1	11	510
5:00 PM	145	86	0	0	186	141	0	0	0	80	2	17	657
5:15 PM	161	72	0	0	151	116	0	0	0	60	1	12	573
5:30 PM	132	75	1	0	96	97	0	0	0	81	3	11	496
5:45 PM	102	93	0	2	82	80	0	0	0	85	0	11	455
TOTAL VOLUMES:	1034	675	3	2	1015	930	0	0	0	644	8	148	4459

PM Peak Hr Begins at: 415 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	503	346	1	0	565	526	0	0	0	328	3	86	2358

PEAK HR FACTOR:	0.920	0.834	0.000	0.814	0.897
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Location: City of Redlands
 N/S: California Street
 E/W: I-10 WB Ramps
 Contol: Signalized



File Name: SBCTI10W
 Date: 12/14/2011
 Day: Wednesday

Large 2 Axle Vehicles

	California Street Northbound			California Street Southbound			I-10 WB Ramps Eastbound			I-10 WB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	0.5	0.5	1	9
7:00 AM	2	1	0	0	0	4	0	0	0	1	0	0	8
7:15 AM	2	2	0	0	1	2	0	0	0	3	0	1	11
7:30 AM	4	4	0	0	0	0	0	0	0	2	0	0	10
7:45 AM	1	1	0	1	3	0	0	0	0	4	1	0	11
8:00 AM	4	5	0	0	0	3	0	0	0	2	0	1	15
8:15 AM	6	3	0	0	1	2	0	0	0	5	0	1	18
8:30 AM	3	3	0	0	4	2	0	0	0	1	0	2	15
8:45 AM	3	2	0	0	0	4	0	0	0	2	0	1	12
TOTAL VOLUMES:	25	21	0	1	9	17	0	0	0	20	1	6	100

AM Peak Hr Begins at: 800 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	16	13	0	0	5	11	0	0	0	10	0	5	60

PEAK HR FACTOR:	0.806			0.667			0.000			0.625			0.833
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Large 2 Axle Vehicles

	California Street Northbound			California Street Southbound			I-10 WB Ramps Eastbound			I-10 WB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	0.5	0.5	1	9
4:00 PM	2	1	0	0	0	0	0	0	0	0	0	1	4
4:15 PM	1	4	0	0	2	1	0	0	0	5	0	1	14
4:30 PM	1	2	0	0	0	0	0	0	0	2	0	1	6
4:45 PM	1	3	0	0	0	0	0	0	0	0	0	1	5
5:00 PM	0	4	0	0	0	2	0	0	0	1	0	2	9
5:15 PM	1	2	0	0	1	3	0	0	0	0	0	0	7
5:30 PM	1	1	0	0	0	1	0	0	0	0	0	0	3
5:45 PM	3	3	0	0	0	0	0	0	0	0	0	1	7
TOTAL VOLUMES:	10	20	0	0	3	7	0	0	0	8	0	7	55

PM Peak Hr Begins at: 415 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	3	13	0	0	2	3	0	0	0	8	0	5	34

PEAK HR FACTOR:	0.800			0.417			0.000			0.542			0.607
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Location: City of Redlands
 N/S: California Street
 E/W: I-10 WB Ramps
 Contol: Signalized



File Name: SBCTI10W
 Date: 12/14/2011
 Day: Wednesday

3 Axle Vehicles

	California Street Northbound			California Street Southbound			I-10 WB Ramps Eastbound			I-10 WB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	0.5	0.5	1	9
7:00 AM	0	1	0	0	0	1	0	0	0	0	0	0	2
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	1
7:30 AM	1	1	0	0	0	1	0	0	0	0	0	0	3
7:45 AM	1	3	0	0	0	1	0	0	0	0	0	1	6
8:00 AM	2	4	0	0	0	1	0	0	0	1	0	1	9
8:15 AM	1	2	0	0	0	1	0	0	0	1	0	0	5
8:30 AM	0	5	0	0	0	0	0	0	0	1	0	1	7
8:45 AM	1	2	0	0	0	1	0	0	0	0	0	0	4
TOTAL VOLUMES:	6	18	0	0	0	6	0	0	0	3	0	4	37

AM Peak Hr Begins at: 745 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	4	14	0	0	0	3	0	0	0	3	0	3	27

PEAK HR FACTOR:	0.750	0.750	0.000	0.750	0.750	0.750	0.000	0.000	0.000	0.750	0.000	0.750	0.750
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3 Axle Vehicles

	California Street Northbound			California Street Southbound			I-10 WB Ramps Eastbound			I-10 WB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	0.5	0.5	1	9
4:00 PM	1	1	0	0	0	0	0	0	0	0	0	0	2
4:15 PM	1	2	0	0	0	1	0	0	0	0	0	1	5
4:30 PM	1	0	0	0	0	2	0	0	0	0	0	1	4
4:45 PM	0	0	0	0	0	1	0	0	0	1	0	0	2
5:00 PM	1	1	0	0	0	0	0	0	0	0	0	0	2
5:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	1
5:30 PM	0	0	0	0	0	1	0	0	0	1	0	0	2
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	4	4	0	0	0	6	0	0	0	2	0	2	18

PM Peak Hr Begins at: 415 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	3	3	0	0	0	4	0	0	0	1	0	2	13

PEAK HR FACTOR:	0.500	0.500	0.000	0.500	0.500	0.500	0.000	0.000	0.000	0.500	0.000	0.650	0.650
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Location: City of Redlands
 N/S: California Street
 E/W: I-10 WB Ramps
 Contol: Signalized



File Name: SBCTI10W
 Date: 12/14/2011
 Day: Wednesday

4+ Axle Trucks

	California Street Northbound			California Street Southbound			I-10 WB Ramps Eastbound			I-10 WB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	0.5	0.5	1	9
7:00 AM	0	4	0	0	1	5	0	0	0	0	0	2	12
7:15 AM	6	11	0	0	0	1	0	0	0	0	0	1	19
7:30 AM	2	7	0	0	0	3	0	0	0	0	0	1	13
7:45 AM	1	3	0	0	0	9	0	0	0	0	0	1	14
8:00 AM	2	12	0	0	0	2	0	0	0	0	0	1	17
8:15 AM	5	9	0	0	0	3	0	0	0	3	0	2	22
8:30 AM	3	11	0	0	0	5	0	0	0	4	0	1	24
8:45 AM	4	11	0	0	2	3	0	0	0	0	0	0	20
TOTAL VOLUMES:	23	68	0	0	3	31	0	0	0	7	0	9	141

AM Peak Hr Begins at: 800 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	14	43	0	0	2	13	0	0	0	7	0	4	83

PEAK HR FACTOR:	0.950	0.750	0.000	0.550	0.865
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4+ Axle Trucks

	California Street Northbound			California Street Southbound			I-10 WB Ramps Eastbound			I-10 WB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	0.5	0.5	1	9
4:00 PM	5	6	0	0	1	5	0	0	0	2	0	1	20
4:15 PM	3	7	0	0	1	3	0	0	0	0	0	0	14
4:30 PM	6	10	0	0	2	5	0	0	0	0	0	0	23
4:45 PM	2	5	0	0	1	4	0	0	0	0	0	1	13
5:00 PM	5	7	0	0	3	4	0	0	0	0	0	1	20
5:15 PM	1	4	0	0	0	5	0	0	0	0	0	3	13
5:30 PM	4	3	0	0	2	5	0	0	0	0	0	1	15
5:45 PM	1	5	0	0	0	4	0	0	0	0	0	1	11
TOTAL VOLUMES:	27	47	0	0	10	35	0	0	0	2	0	8	129

PM Peak Hr Begins at: 415 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	16	29	0	0	7	16	0	0	0	0	0	2	70

PEAK HR FACTOR:	0.703	0.821	0.000	0.500	0.761
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Location: City of Redlands
 N/S: California Street
 E/W: I-10 EB Ramps
 Contol: Signalized



File Name: REDCA10E
 Date: 12/14/2011
 Day: Wednesday

Passenger Vehicles

	California Street Northbound			California Street Southbound			I-10 EB Ramps Eastbound			I-10 EB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
7:00 AM	0	114	66	10	98	0	50	0	64	0	0	0	402
7:15 AM	0	142	79	11	119	0	77	0	85	0	0	0	513
7:30 AM	1	156	60	8	121	0	73	1	91	0	0	0	511
7:45 AM	0	146	77	17	107	0	93	0	105	0	0	0	545
8:00 AM	0	131	46	14	118	0	109	0	99	0	0	0	517
8:15 AM	0	147	42	14	108	0	90	0	64	0	0	0	465
8:30 AM	0	146	50	28	102	0	90	0	66	0	0	0	482
8:45 AM	0	120	47	13	105	0	68	0	81	0	0	0	434
TOTAL VOLUMES:	1	1102	467	115	878	0	650	1	655	0	0	0	3869

AM Peak Hr Begins at: 715 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	1	575	262	50	465	0	352	1	380	0	0	0	2086

PEAK HR FACTOR:	0.939	0.975	0.881	0.000	0.957
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Passenger Vehicles

	California Street Northbound			California Street Southbound			I-10 EB Ramps Eastbound			I-10 EB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
4:00 PM	0	196	123	58	144	0	40	3	110	0	0	0	674
4:15 PM	0	169	103	57	151	0	45	1	95	0	0	0	621
4:30 PM	0	162	124	55	141	0	30	2	129	0	0	0	643
4:45 PM	0	167	99	66	150	0	52	1	129	0	0	0	664
5:00 PM	0	189	125	59	160	0	33	3	84	0	0	0	653
5:15 PM	0	193	105	46	176	0	24	0	78	0	0	0	622
5:30 PM	0	178	104	35	165	0	16	0	72	0	0	0	570
5:45 PM	0	163	77	26	155	0	32	0	86	0	0	0	539
TOTAL VOLUMES:	0	1417	860	402	1242	0	272	10	783	0	0	0	4986

PM Peak Hr Begins at: 400 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	694	449	236	586	0	167	7	463	0	0	0	2602

PEAK HR FACTOR:	0.896	0.951	0.875	0.000	0.965
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Location: City of Redlands
 N/S: California Street
 E/W: I-10 EB Ramps
 Contol: Signalized



File Name: REDCA10E
 Date: 12/14/2011
 Day: Wednesday

Large 2 Axle Vehicles

	California Street Northbound			California Street Southbound			I-10 EB Ramps Eastbound			I-10 EB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
7:00 AM	0	1	2	0	2	0	2	0	1	0	0	0	8
7:15 AM	0	2	2	0	3	0	2	0	1	0	0	0	10
7:30 AM	0	3	1	0	2	0	3	0	1	0	0	0	10
7:45 AM	0	3	2	1	5	0	1	0	2	0	0	0	14
8:00 AM	0	4	1	0	2	0	6	0	1	0	0	0	14
8:15 AM	0	5	0	2	4	0	2	0	2	0	0	0	15
8:30 AM	0	3	1	3	1	0	1	0	1	0	0	0	10
8:45 AM	0	4	2	1	1	0	1	0	2	0	0	0	11
TOTAL VOLUMES:	0	25	11	7	20	0	18	0	11	0	0	0	92

AM Peak Hr Begins at: 745 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	15	4	6	12	0	10	0	6	0	0	0	53

PEAK HR FACTOR:	0.950	0.750	0.571	0.000	0.883
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Large 2 Axle Vehicles

	California Street Northbound			California Street Southbound			I-10 EB Ramps Eastbound			I-10 EB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
4:00 PM	0	2	0	0	2	0	2	0	0	0	0	0	6
4:15 PM	0	3	0	0	4	0	2	0	0	0	0	0	9
4:30 PM	0	1	0	0	2	0	3	0	2	0	0	0	8
4:45 PM	0	3	0	0	0	0	2	0	1	0	0	0	6
5:00 PM	0	2	1	0	1	0	1	0	0	0	0	0	5
5:15 PM	0	2	0	0	1	0	0	0	0	0	0	0	3
5:30 PM	0	2	0	0	0	0	0	0	0	0	0	0	2
5:45 PM	0	4	0	0	0	0	4	0	1	0	0	0	9
TOTAL VOLUMES:	0	19	1	0	10	0	14	0	4	0	0	0	48

PM Peak Hr Begins at: 400 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	9	0	0	8	0	9	0	3	0	0	0	29

PEAK HR FACTOR:	0.750	0.500	0.600	0.000	0.806
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Location: City of Redlands
 N/S: California Street
 E/W: I-10 EB Ramps
 Contol: Signalized



File Name: REDCA10E
 Date: 12/14/2011
 Day: Wednesday

3 Axle Vehicles

	California Street Northbound			California Street Southbound			I-10 EB Ramps Eastbound			I-10 EB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
7:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	1
7:15 AM	0	0	0	0	0	0	1	0	1	0	0	0	2
7:30 AM	0	1	1	0	0	0	0	0	0	0	0	0	2
7:45 AM	0	2	0	0	0	0	2	0	0	0	0	0	4
8:00 AM	0	3	0	1	0	0	2	0	1	0	0	0	7
8:15 AM	0	3	0	0	1	0	1	0	1	0	0	0	6
8:30 AM	0	5	1	0	1	0	0	0	0	0	0	0	7
8:45 AM	0	2	0	0	0	0	2	0	0	0	0	0	4
TOTAL VOLUMES:	0	17	2	1	2	0	8	0	3	0	0	0	33

AM Peak Hr Begins at: 800 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	13	1	1	2	0	5	0	2	0	0	0	24

PEAK HR FACTOR:	0.583	0.750	0.583	0.000	0.857
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3 Axle Vehicles

	California Street Northbound			California Street Southbound			I-10 EB Ramps Eastbound			I-10 EB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
4:00 PM	0	2	0	0	0	0	0	0	0	0	0	0	2
4:15 PM	0	1	0	0	0	0	1	0	0	0	0	0	2
4:30 PM	0	1	0	0	0	0	1	0	0	0	0	0	2
4:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
5:00 PM	0	2	0	0	0	0	0	0	0	0	0	0	2
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	0	6	0	0	2	0	2	0	0	0	0	0	10

PM Peak Hr Begins at: 415 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	4	0	0	1	0	2	0	0	0	0	0	7

PEAK HR FACTOR:	0.500	0.250	0.500	0.000	0.875
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Location: City of Redlands
 N/S: California Street
 E/W: I-10 EB Ramps
 Contol: Signalized



File Name: REDCA10E
 Date: 12/14/2011
 Day: Wednesday

4+ Axle Trucks

	California Street Northbound			California Street Southbound			I-10 EB Ramps Eastbound			I-10 EB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
7:00 AM	0	2	1	0	1	0	5	0	3	0	0	0	12
7:15 AM	0	6	1	0	0	0	7	0	1	0	0	0	15
7:30 AM	0	2	1	0	0	0	9	0	0	0	0	0	12
7:45 AM	0	1	3	0	0	0	5	0	2	0	0	0	11
8:00 AM	0	3	2	0	0	0	9	0	3	0	0	0	17
8:15 AM	0	3	3	1	3	0	7	0	2	0	0	0	19
8:30 AM	0	6	2	0	1	0	12	0	3	0	0	0	24
8:45 AM	0	3	0	3	0	0	9	0	5	0	0	0	20
TOTAL VOLUMES:	0	26	13	4	5	0	63	0	19	0	0	0	130

AM Peak Hr Begins at: 800 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	15	7	4	4	0	37	0	13	0	0	0	80

PEAK HR FACTOR:	0.688	0.500	0.833	0.000	0.833
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4+ Axle Trucks

	California Street Northbound			California Street Southbound			I-10 EB Ramps Eastbound			I-10 EB Ramps Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	0	3	1	0	0	0	1.5	0.5	1	10
4:00 PM	0	2	2	0	2	0	8	0	0	0	0	0	14
4:15 PM	0	3	1	1	0	0	9	0	2	0	0	0	16
4:30 PM	0	6	5	2	0	0	7	0	0	0	0	0	20
4:45 PM	0	5	6	0	0	0	3	0	1	0	0	0	15
5:00 PM	0	6	2	0	3	0	5	0	0	0	0	0	16
5:15 PM	0	6	0	0	1	0	0	0	0	0	0	0	7
5:30 PM	0	7	0	0	1	0	0	0	0	0	0	0	8
5:45 PM	0	4	1	0	0	0	5	0	1	0	0	0	11
TOTAL VOLUMES:	0	39	17	3	7	0	37	0	4	0	0	0	107

PM Peak Hr Begins at: 415 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	20	14	3	3	0	24	0	3	0	0	0	67

PEAK HR FACTOR:	0.773	0.500	0.614	0.000	0.838
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Location: City of Redlands
 N/S: Alabama Street
 E/W: Redlands Boulevard
 Contol: Signalized



File Name: REDALRE
 Date: 12/15/2011
 Day: Thursday

Passenger Vehicles

	Alabama Street Northbound			Alabama Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
7:00 AM	11	81	6	21	84	22	14	35	7	7	37	21	346
7:15 AM	16	109	12	28	102	26	15	37	5	14	64	15	443
7:30 AM	10	116	9	16	98	25	12	28	7	10	84	15	430
7:45 AM	22	116	11	26	133	33	25	25	6	15	54	16	482
8:00 AM	19	129	12	15	127	42	29	48	8	15	75	24	543
8:15 AM	14	87	8	15	94	50	25	42	6	14	51	19	425
8:30 AM	23	86	13	24	92	28	31	57	9	13	73	19	468
8:45 AM	20	74	14	13	125	46	39	59	15	21	58	19	503
TOTAL VOLUMES:	135	798	85	158	855	272	190	331	63	109	496	148	3640

AM Peak Hr Begins at: 800 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	76	376	47	67	438	166	124	206	38	63	257	81	1939

PEAK HR FACTOR:	0.780			0.912			0.814			0.879			0.893
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Passenger Vehicles

	Alabama Street Northbound			Alabama Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
4:00 PM	29	144	28	35	127	62	59	148	28	33	94	40	827
4:15 PM	35	153	28	22	140	41	64	167	25	25	100	48	848
4:30 PM	27	116	20	41	126	42	69	161	20	21	103	44	790
4:45 PM	25	145	22	31	119	58	69	130	18	35	72	49	773
5:00 PM	23	155	21	45	123	34	58	177	10	27	105	69	847
5:15 PM	22	128	26	29	127	55	64	164	29	35	88	53	820
5:30 PM	27	116	17	36	117	55	67	140	23	25	93	54	770
5:45 PM	22	105	17	31	130	47	64	120	22	24	78	39	699
TOTAL VOLUMES:	210	1062	179	270	1009	394	514	1207	175	225	733	396	6374

PM Peak Hr Begins at: 415 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	110	569	91	139	508	175	260	635	73	108	380	210	3258

PEAK HR FACTOR:	0.891			0.983			0.945			0.868			0.960
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Location: City of Redlands
 N/S: Alabama Street
 E/W: Redlands Boulevard
 Contol: Signalized



File Name: REDALRE
 Date: 12/15/2011
 Day: Thursday

Large 2 Axle Vehicles

	Alabama Street Northbound			Alabama Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
7:00 AM	0	0	0	0	1	1	2	1	0	0	1	0	6
7:15 AM	1	4	1	0	7	1	1	0	1	0	2	0	18
7:30 AM	0	1	0	0	4	1	1	1	1	1	3	0	13
7:45 AM	1	2	0	0	4	1	2	3	0	0	0	0	13
8:00 AM	0	4	0	2	2	1	0	0	1	0	1	1	12
8:15 AM	1	1	0	1	3	2	2	4	0	1	1	0	16
8:30 AM	0	1	0	1	0	1	1	4	1	0	1	0	10
8:45 AM	1	0	0	0	2	0	2	3	0	0	2	0	10
TOTAL VOLUMES:	4	13	1	4	23	8	11	16	4	2	11	1	98

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	2	11	1	2	17	4	4	4	3	1	6	1	56

PEAK HR FACTOR:	0.583			0.719			0.550			0.500			0.778
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Large 2 Axle Vehicles

	Alabama Street Northbound			Alabama Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
4:00 PM	0	2	0	0	2	1	0	3	0	0	1	1	10
4:15 PM	1	1	0	1	2	0	2	1	1	1	1	2	13
4:30 PM	0	1	0	0	2	0	0	1	1	0	1	1	7
4:45 PM	1	1	1	0	1	0	0	1	0	0	0	0	5
5:00 PM	0	0	0	0	2	0	0	2	0	0	2	0	6
5:15 PM	0	1	0	3	1	0	0	2	2	0	1	0	10
5:30 PM	0	1	0	0	1	0	1	4	0	0	0	0	7
5:45 PM	3	3	0	0	1	0	0	1	0	0	0	0	8
TOTAL VOLUMES:	5	10	1	4	12	1	3	15	4	1	6	4	66

PM Peak Hr Begins at: 400 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	2	5	1	1	7	1	2	6	2	1	3	4	35

PEAK HR FACTOR:	0.667			0.750			0.625			0.500			0.673
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Location: City of Redlands
 N/S: Alabama Street
 E/W: Redlands Boulevard
 Contol: Signalized



File Name: REDALRE
 Date: 12/15/2011
 Day: Thursday

3 Axle Vehicles

	Alabama Street Northbound			Alabama Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
7:00 AM	0	0	0	0	1	0	0	1	0	0	0	0	2
7:15 AM	0	0	0	0	2	0	0	0	0	0	0	0	2
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	
7:45 AM	0	1	0	0	2	0	0	0	0	0	0	0	3
8:00 AM	0	0	0	0	1	0	0	0	0	0	0	0	1
8:15 AM	0	3	0	0	0	0	0	0	0	0	0	0	3
8:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL VOLUMES:	0	5	0	0	6	0	0	1	0	0	0	0	12

AM Peak Hr Begins at: 745 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	0	5	0	0	3	0	0	0	0	0	0	0	8

PEAK HR FACTOR:	0.417			0.375			0.000			0.000			0.667
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3 Axle Vehicles

	Alabama Street Northbound			Alabama Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	
4:30 PM	0	1	0	0	1	0	0	0	0	0	0	0	2
4:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	1
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	
5:45 PM	0	2	0	0	1	0	0	0	0	0	0	0	3
TOTAL VOLUMES:	0	4	0	0	2	0	0	0	0	0	0	1	7

PM Peak Hr Begins at: 515 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	0	2	0	0	1	0	0	0	0	0	0	1	4

PEAK HR FACTOR:	0.250			0.250			0.000			0.250			0.333
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Location: City of Redlands
 N/S: Alabama Street
 E/W: Redlands Boulevard
 Contol: Signalized



File Name: REDALRE
 Date: 12/15/2011
 Day: Thursday

4+ Axle Trucks

	Alabama Street Northbound			Alabama Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
7:00 AM	0	1	0	0	1	0	1	0	0	0	0	0	3
7:15 AM	0	0	0	0	0	1	3	1	0	1	0	0	6
7:30 AM	0	2	0	1	0	1	1	0	0	0	1	0	6
7:45 AM	0	0	0	0	2	1	1	0	0	0	0	0	4
8:00 AM	0	0	0	1	4	0	0	0	0	0	0	0	5
8:15 AM	0	0	0	0	1	0	2	0	0	0	0	0	3
8:30 AM	0	1	0	0	1	1	0	0	0	0	0	0	3
8:45 AM	0	1	0	1	2	1	0	0	0	0	0	0	5
TOTAL VOLUMES:	0	5	0	3	11	5	8	1	0	1	1	0	35

AM Peak Hr Begins at: 715 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	2	0	2	6	3	5	1	0	1	1	0	21

PEAK HR FACTOR:	0.250	0.550	0.375	0.500	0.875
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4+ Axle Trucks

	Alabama Street Northbound			Alabama Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
4:00 PM	0	1	0	0	1	0	1	0	0	0	0	0	3
4:15 PM	0	1	0	0	0	0	1	0	0	0	1	1	4
4:30 PM	0	1	0	0	0	0	0	0	0	0	1	0	2
4:45 PM	0	1	0	0	1	0	0	0	0	0	0	0	2
5:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	1	1	1	0	0	0	0	3
5:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
TOTAL VOLUMES:	0	6	0	0	2	1	4	1	0	0	2	1	17

PM Peak Hr Begins at: 400 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	4	0	0	2	0	2	0	0	0	2	1	11

PEAK HR FACTOR:	1.000	0.500	0.500	0.375	0.688
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Location: City of Redlands
 N/S: Tennessee Street
 E/W: Redlands Boulevard
 Contol: Signalized



File Name: REDTERE
 Date: 12/15/2011
 Day: Thursday

Passenger Vehicles

	Tennessee Street Northbound			Tennessee Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
7:00 AM	8	111	2	24	60	4	1	21	2	2	31	10	276
7:15 AM	16	111	4	43	82	3	4	27	5	5	59	13	372
7:30 AM	10	119	1	26	135	4	5	20	5	13	66	12	416
7:45 AM	8	157	9	34	174	3	4	16	7	9	34	15	470
8:00 AM	19	134	6	24	104	2	1	22	8	6	49	14	389
8:15 AM	9	127	2	37	112	8	2	39	7	6	36	17	402
8:30 AM	15	105	3	32	92	7	2	27	9	4	34	18	348
8:45 AM	10	111	8	41	114	5	3	35	5	4	49	17	402
TOTAL VOLUMES:	95	975	35	261	873	36	22	207	48	49	358	116	3075

AM Peak Hr Begins at: 730 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	46	537	18	121	525	17	12	97	27	34	185	58	1677

PEAK HR FACTOR:	0.864			0.786			0.708			0.761			0.892
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Passenger Vehicles

	Tennessee Street Northbound			Tennessee Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
4:00 PM	12	136	16	36	117	6	59	148	28	12	78	37	685
4:15 PM	8	103	12	23	96	9	64	167	25	11	75	43	636
4:30 PM	12	118	13	24	122	7	69	161	20	10	63	38	657
4:45 PM	16	126	9	23	122	4	69	130	18	12	62	45	636
5:00 PM	13	156	11	25	127	11	58	177	10	12	69	56	725
5:15 PM	22	107	9	30	138	5	64	164	29	6	77	41	692
5:30 PM	13	128	8	19	108	5	67	140	23	16	50	50	627
5:45 PM	16	114	4	39	150	9	64	120	22	10	51	36	635
TOTAL VOLUMES:	112	988	82	219	980	56	514	1207	175	89	525	346	5293

PM Peak Hr Begins at: 430 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	63	507	42	102	509	27	260	632	77	40	271	180	2710

PEAK HR FACTOR:	0.850			0.922			0.943			0.896			0.934
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Location: City of Redlands
 N/S: Tennessee Street
 E/W: Redlands Boulevard
 Contol: Signalized



File Name: REDTERE
 Date: 12/15/2011
 Day: Thursday

Large 2 Axle Vehicles

	Tennessee Street Northbound			Tennessee Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
7:00 AM	0	1	1	1	2	1	0	1	0	1	0	0	8
7:15 AM	1	2	1	0	0	0	0	1	0	0	0	0	5
7:30 AM	1	1	1	0	1	0	0	3	0	0	0	0	7
7:45 AM	0	7	0	1	1	0	0	0	0	0	2	0	11
8:00 AM	0	0	0	1	2	0	0	0	0	0	1	3	7
8:15 AM	0	2	0	2	1	0	0	0	1	0	0	0	6
8:30 AM	1	2	0	0	1	0	0	1	1	0	0	0	6
8:45 AM	0	3	0	0	2	0	0	0	2	0	0	0	7
TOTAL VOLUMES:	3	18	3	5	10	1	0	6	4	1	3	3	57

AM Peak Hr Begins at: 730 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	1	10	1	4	5	0	0	3	1	0	3	3	31

PEAK HR FACTOR:	0.429			0.750			0.333			0.375			0.705
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Large 2 Axle Vehicles

	Tennessee Street Northbound			Tennessee Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
4:00 PM	0	3	0	0	0	0	0	1	0	0	0	1	5
4:15 PM	0	2	1	1	3	0	0	1	0	0	0	0	8
4:30 PM	0	2	2	0	1	0	1	1	0	0	0	1	8
4:45 PM	0	2	0	0	1	0	0	1	0	0	0	0	4
5:00 PM	0	1	0	0	0	0	0	0	1	0	0	1	3
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	
5:30 PM	0	1	0	0	2	0	0	1	0	1	0	1	6
5:45 PM	0	0	0	0	1	0	0	1	0	0	0	0	2
TOTAL VOLUMES:	0	11	3	1	8	0	1	6	1	1	0	4	36

PM Peak Hr Begins at: 400 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	0	9	3	1	5	0	1	4	0	0	0	2	25

PEAK HR FACTOR:	0.750			0.375			0.625			0.500			0.781
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Location: City of Redlands
 N/S: Tennessee Street
 E/W: Redlands Boulevard
 Contol: Signalized



File Name: REDTERE
 Date: 12/15/2011
 Day: Thursday

3 Axle Vehicles

	Tennessee Street Northbound			Tennessee Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
7:00 AM	0	1	0	0	0	0	1	0	0	1	0	0	2
7:15 AM	0	0	0	0	1	0	0	0	0	0	0	0	1
7:30 AM	0	0	0	0	1	0	0	0	0	0	0	0	1
7:45 AM	0	5	0	0	0	0	0	0	0	0	0	0	5
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	1	0	0	0	0	0	0	0	0	1	0	2
8:30 AM	0	2	0	0	0	0	0	0	0	0	0	0	2
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	0	9	0	0	2	0	1	0	0	0	1	0	13

AM Peak Hr Begins at: 745 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	8	0	0	0	0	0	0	0	0	1	0	9

PEAK HR FACTOR:	0.400	0.000	0.000	0.250	0.450
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3 Axle Vehicles

	Tennessee Street Northbound			Tennessee Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
4:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
4:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	2	0	0	0	0	0	0	0	2

PM Peak Hr Begins at: 400 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	0	0	0	2	0	0	0	0	0	0	0	2

PEAK HR FACTOR:	0.000	0.500	0.000	0.000	0.500
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Location: City of Redlands
 N/S: Tennessee Street
 E/W: Redlands Boulevard
 Contol: Signalized



File Name: REDTERE
 Date: 12/15/2011
 Day: Thursday

4+ Axle Trucks

	Tennessee Street Northbound			Tennessee Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
7:00 AM	0	0	0	0	2	0	0	0	0	0	0	0	2
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	
7:45 AM	0	0	0	0	0	0	0	1	0	0	0	0	1
8:00 AM	0	0	0	0	1	0	0	0	0	0	1	0	2
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	1
8:30 AM	0	0	0	0	0	0	0	0	0	0	2	0	2
8:45 AM	0	0	0	0	0	0	0	1	0	0	0	0	1
TOTAL VOLUMES:	0	0	0	0	3	0	0	2	0	0	3	1	9

AM Peak Hr Begins at: 800 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	0	0	0	0	1	0	0	1	0	0	3	1	6

PEAK HR FACTOR:	0.000	0.250	0.250	0.500	0.750
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4+ Axle Trucks

	Tennessee Street Northbound			Tennessee Street Southbound			Redlands Boulevard Eastbound			Redlands Boulevard Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	1	2	0	1	2	0	1	2	0	1	2	0	12
4:00 PM	0	0	0	1	1	0	0	0	0	0	0	0	2
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	
4:30 PM	0	1	0	0	0	0	0	0	0	0	1	0	2
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	1
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL VOLUMES:	0	1	0	1	1	0	0	0	0	0	1	1	5

PM Peak Hr Begins at: 400 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	0	1	0	1	1	0	0	0	0	0	1	0	4

PEAK HR FACTOR:	0.250	0.250	0.000	0.250	0.500
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Location: City of Redlands
 N/S: Redlands Boulevard
 E/W: Citrus Avenue
 Contol: Signalized



File Name: REDRECI
 Date: 12/15/2011
 Day: Thursday

Passenger Vehicles

	Redlands Boulevard Northbound			Redlands Boulevard Southbound			Citrus Avenue Eastbound			Citrus Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	1	0	2	0	0	2	0	9
7:00 AM	26	65	2	21	35	4	2	59	14	12	53	51	344
7:15 AM	46	120	12	70	49	5	6	113	30	16	91	100	658
7:30 AM	41	93	2	21	40	12	6	28	24	7	55	61	390
7:45 AM	43	66	9	12	35	5	3	34	13	13	82	31	346
8:00 AM	32	93	10	16	36	7	3	39	23	17	70	35	381
8:15 AM	40	59	6	7	29	8	7	30	12	11	50	26	285
8:30 AM	29	55	8	11	37	2	5	27	20	8	40	25	267
8:45 AM	33	56	2	16	31	1	8	19	16	6	48	29	265
TOTAL VOLUMES:	290	607	51	174	292	44	40	349	152	90	489	358	2936

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	162	372	33	119	160	29	18	214	90	53	298	227	1775

PEAK HR FACTOR:	0.796			0.621			0.540			0.698			0.674
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Passenger Vehicles

	Redlands Boulevard Northbound			Redlands Boulevard Southbound			Citrus Avenue Eastbound			Citrus Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	1	0	2	0	0	2	0	9
4:00 PM	23	56	7	36	89	6	8	63	36	10	44	21	399
4:15 PM	15	67	7	36	102	8	4	62	40	9	54	39	443
4:30 PM	18	61	13	31	99	10	10	59	36	9	45	37	428
4:45 PM	23	58	6	40	97	8	11	62	47	7	72	26	457
5:00 PM	24	68	15	32	137	14	12	78	52	8	48	29	517
5:15 PM	18	56	11	34	119	25	36	76	44	11	49	33	512
5:30 PM	10	64	15	46	95	29	40	76	41	15	36	26	493
5:45 PM	19	76	13	43	108	32	36	59	45	14	53	25	523
TOTAL VOLUMES:	150	506	87	298	846	132	157	535	341	83	401	236	3772

PM Peak Hr Begins at: 500 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	71	264	54	155	459	100	124	289	182	48	186	113	2045

PEAK HR FACTOR:	0.900			0.975			0.947			0.933			0.978
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Location: City of Redlands
 N/S: Redlands Boulevard
 E/W: Citrus Avenue
 Contol: Signalized



File Name: REDRECI
 Date: 12/15/2011
 Day: Thursday

Large 2 Axle Vehicles

	Redlands Boulevard Northbound			Redlands Boulevard Southbound			Citrus Avenue Eastbound			Citrus Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	1	0	2	0	0	2	0	9
7:00 AM	1	2	0	2	2	0	0	0	0	0	2	1	10
7:15 AM	1	1	1	0	0	0	0	0	0	0	1	1	5
7:30 AM	0	1	0	0	1	0	0	0	0	0	0	1	3
7:45 AM	0	1	0	1	3	0	0	1	0	0	0	0	6
8:00 AM	0	0	0	0	4	0	0	1	1	0	0	1	7
8:15 AM	0	3	0	0	1	1	0	2	1	0	2	0	10
8:30 AM	0	2	0	0	1	0	0	1	0	0	0	2	6
8:45 AM	1	0	0	1	0	0	0	2	0	1	0	0	5
TOTAL VOLUMES:	3	10	1	4	12	1	0	7	2	1	5	6	52

AM Peak Hr Begins at: 745 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	6	0	1	9	1	0	5	2	0	2	3	29

PEAK HR FACTOR:	0.500	0.688	0.583	0.625	0.725
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Large 2 Axle Vehicles

	Redlands Boulevard Northbound			Redlands Boulevard Southbound			Citrus Avenue Eastbound			Citrus Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	1	0	2	0	0	2	0	9
4:00 PM	0	0	0	0	0	2	0	1	0	0	0	0	3
4:15 PM	0	0	0	2	1	0	0	2	0	0	0	0	5
4:30 PM	0	0	0	0	1	0	0	2	0	1	1	0	5
4:45 PM	0	0	0	1	0	0	0	0	0	0	0	0	1
5:00 PM	0	0	0	0	1	0	1	0	0	0	1	1	4
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	1
5:30 PM	0	1	0	0	1	1	0	0	1	0	0	0	4
5:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
TOTAL VOLUMES:	0	1	0	3	5	3	1	5	1	1	2	2	24

PM Peak Hr Begins at: 415 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	0	0	3	3	0	1	4	0	1	2	1	15

PEAK HR FACTOR:	0.000	0.500	0.625	0.500	0.750
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Location: City of Redlands
 N/S: Redlands Boulevard
 E/W: Citrus Avenue
 Contol: Signalized



File Name: REDRECI
 Date: 12/15/2011
 Day: Thursday

3 Axle Vehicles

	Redlands Boulevard Northbound			Redlands Boulevard Southbound			Citrus Avenue Eastbound			Citrus Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	1	0	2	0	0	2	0	9
7:00 AM	0	0	0	0	1	0	0	0	0	0	0	0	1
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	
7:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	1
7:45 AM	0	1	0	0	1	0	0	0	0	0	0	0	2
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	
8:30 AM	0	1	0	1	0	0	0	0	0	0	0	0	2
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	1
TOTAL VOLUMES:	0	2	0	1	2	0	0	0	0	1	0	1	7

AM Peak Hr Begins at: 745 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	2	0	1	1	0	0	0	0	0	0	0	4

PEAK HR FACTOR:	0.500	0.500	0.000	0.000	0.500								
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3 Axle Vehicles

	Redlands Boulevard Northbound			Redlands Boulevard Southbound			Citrus Avenue Eastbound			Citrus Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	1	0	2	0	0	2	0	9
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL VOLUMES:	0	0	0	0	0	0	0	0	0	0	0	0	0

PM Peak Hr Begins at: 0 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	0	0	0	0	0	0	0	0	0	0	0	0

PEAK HR FACTOR:	0.000	0.000	0.000	0.000	0.000								
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Location: City of Redlands
 N/S: Redlands Boulevard
 E/W: Citrus Avenue
 Contol: Signalized



File Name: REDRECI
 Date: 12/15/2011
 Day: Thursday

4+ Axle Trucks

	Redlands Boulevard Northbound			Redlands Boulevard Southbound			Citrus Avenue Eastbound			Citrus Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	1	0	2	0	0	2	0	9
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	1
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	
7:30 AM	0	0	0	0	1	0	0	0	0	0	0	0	
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	
8:00 AM	1	0	0	0	0	0	0	0	0	0	0	0	
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL VOLUMES:	1	0	0	0	1	0	0	0	0	0	0	0	2

AM Peak Hr Begins at: 730 AM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	1	0	0	0	1	0	0	0	0	0	0	0	2

PEAK HR FACTOR:	0.250			0.250			0.000			0.000			0.500
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4+ Axle Trucks

	Redlands Boulevard Northbound			Redlands Boulevard Southbound			Citrus Avenue Eastbound			Citrus Avenue Westbound			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
# OF LANES:	0	2	0	0	2	1	0	2	0	0	2	0	9
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	1
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	
5:45 PM	0	0	0	0	0	0	0	1	0	0	0	0	
TOTAL VOLUMES:	0	0	0	0	0	0	0	1	0	0	0	0	1

PM Peak Hr Begins at: 545 PM

PEAK VOLUMES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	0	0	0	0	0	0	0	1	0	0	0	0	1

PEAK HR FACTOR:	0.000			0.000			0.250			0.000			0.250
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Appendix C

Volume Development Sheets

No.	Intersection	2011 AM TURNING MOVEMENT COUNTS											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill Street	-	-	-	80	-	68	54	391	-	-	316	28
2	Waterman Avenue and 9th Street	42	410	49	61	608	39	42	167	44	78	201	51
3	Waterman Avenue and Mill Street	71	452	76	73	551	59	79	267	110	102	196	57
4	Waterman Avenue and Orange Show Road	65	529	40	46	563	68	109	253	181	80	215	43
5	Waterman Avenue and Dumas Street	4	637	-	-	827	3	4	-	3	-	-	-
6	Waterman Avenue and Washington Street	2	2	1	428	9	177	496	983	2	11	504	344
7	Tippecanoe Avenue and Victoria Avenue	0	464	16	18	756	2	1	0	1	56	1	29
8	Tippecanoe Avenue and Hospitality Lane	168	452	20	51	501	60	58	25	60	50	113	60
9	Tippecanoe Avenue and I-10 West Ramps	297	565	-	-	431	308	-	-	-	484	10	297
10	Anderson Avenue and I-10 East Ramps	-	538	183	100	755	-	321	0	276	-	-	-
11	Anderson Avenue and Academy Drive	172	429	15	25	962	364	264	136	217	81	235	39
12	California Street and I-10 West Ramps	433	593	-	-	152	141	-	-	-	373	15	318
13	California Street and I-10 East Ramps	-	605	276	52	477	-	399	1	393	-	-	-
14	California Street and Walmart Driveway	-	731	16	165	607	-	-	-	-	1	-	69
15	California Street and Redlands Boulevard	94	352	12	271	280	72	90	183	133	41	260	283
16	Alabama Street and I-10 West Ramps	342	436	-	-	334	130	-	-	-	243	303	193
17	Alabama Street and I-10 East Ramps	-	590	120	49	540	-	229	2	374	-	-	-
18	Alabama Street and Industrial Avenue	19	590	24	68	726	105	49	10	28	16	16	46
19	Alabama Street and Redlands Boulevard	78	388	47	73	454	172	131	217	40	64	262	82
20	Tennessee Street and Redlands Boulevard	47	553	19	125	532	17	12	101	28	34	190	62
21	Texas Street and Stuart Avenue	56	272	19	26	381	82	23	4	26	15	27	12
22	Texas Street and Oriental Avenue	2	487	14	4	335	3	6	3	5	20	1	11
23	Eureka Street and Pearl Avenue	-	31	63	4	40	-	82	434	490	38	-	9
24	Eureka Street and Stuart Avenue	8	77	4	22	492	47	14	14	2	7	7	3
25	Eureka Street and Oriental Avenue	5	85	1	8	454	43	5	2	5	0	0	0
26	Eureka Street and Redlands Boulevard	12	83	17	57	275	83	9	149	10	11	335	16
27	Orange Street and Colton Avenue	13	186	33	76	544	58	50	117	63	197	235	82
28	Orange Street and Pearl Avenue	2	662	11	9	276	15	169	268	105	16	40	232
29	Orange Street and Stuart Avenue	5	630	50	3	323	6	8	6	17	34	9	26
30	Orange Street and Oriental Avenue	1	666	-	-	366	1	3	-	1	-	-	-
31	Orange Street and Redlands Boulevard	32	524	16	44	261	39	42	103	37	15	194	108
32	6th Street and I-10 West Ramps	-	147	-	-	283	-	-	-	-	181	17	188
33	6th Street and Pearl Avenue	195	85	30	120	262	94	65	34	169	-	-	-
34	6th Street and Stuart Avenue	9	239	6	75	320	12	5	7	13	15	7	59
35	Redlands Boulevard and Citrus Avenue	164	376	34	120	170	29	18	216	91	54	299	230
36	Church Street and Stuart Avenue	36	256	-	-	278	49	22	-	34	-	-	-
37	University Street and I-10 West Ramps	424	376	20	6	131	876	-	-	-	0	7	25
38	University Street and I-10 East Ramps	-	616	-	-	133	-	274	-	423	-	-	-

No.	Intersection	2011 PM TURNING MOVEMENT COUNTS											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill Street	-	-	-	98	-	142	67	543	-	-	566	34
2	Waterman Avenue and 9th Street	90	854	140	67	735	77	121	279	63	122	240	75
3	Waterman Avenue and Mill Street	128	801	94	102	750	125	133	299	168	134	295	97
4	Waterman Avenue and Orange Show Road	182	702	120	123	825	133	155	429	148	116	383	59
5	Waterman Avenue and Dumas Street	18	1011	-	-	1119	3	2	-	6	-	-	-
6	Waterman Avenue and Washington Street	4	7	4	302	7	604	385	620	5	5	990	521
7	Tippecanoe Avenue and Victoria Avenue	1	882	40	38	848	0	2	0	2	45	0	23
8	Tippecanoe Avenue and Hospitality Lane	443	562	57	55	794	132	231	147	333	61	71	30
9	Tippecanoe Avenue and I-10 West Ramps	468	763	-	-	1014	560	-	-	-	254	16	420
10	Anderson Avenue and I-10 East Ramps	-	735	308	370	849	-	513	12	292	-	-	-
11	Anderson Avenue and Academy Drive	59	786	53	66	589	123	108	46	56	43	56	30
12	California Street and I-10 West Ramps	525	391	-	-	574	549	-	-	-	337	3	95
13	California Street and I-10 East Ramps	-	723	463	239	597	-	205	7	469	-	-	-
14	California Street and Walmart Driveway	-	1040	38	281	726	-	-	-	-	2	-	141
15	California Street and Redlands Boulevard	39	344	34	291	289	95	156	455	129	95	413	439
16	Alabama Street and I-10 West Ramps	378	1045	-	-	788	385	-	-	-	164	307	217
17	Alabama Street and I-10 East Ramps	-	1048	287	217	745	-	380	7	481	-	-	-
18	Alabama Street and Industrial Avenue	49	921	83	285	795	122	102	61	38	63	56	315
19	Alabama Street and Redlands Boulevard	112	577	92	140	517	175	264	640	75	109	386	214
20	Tennessee Street and Redlands Boulevard	63	513	44	102	511	27	261	634	78	40	272	183
21	Texas Street and Stuart Avenue	16	454	24	16	276	12	3	10	52	20	15	18
22	Texas Street and Oriental Avenue	1	460	10	5	277	0	4	1	3	16	1	9
23	Eureka Street and Pearl Avenue	-	123	230	15	44	-	169	608	462	36	-	16
24	Eureka Street and Stuart Avenue	15	294	91	38	462	28	13	21	10	38	21	6
25	Eureka Street and Oriental Avenue	7	363	22	30	501	19	14	1	12	5	3	18
26	Eureka Street and Redlands Boulevard	28	223	55	121	344	38	66	662	50	45	351	53
27	Orange Street and Colton Avenue	63	300	94	85	451	43	154	395	158	148	234	106
28	Orange Street and Pearl Avenue	20	879	74	25	383	8	260	378	217	47	42	232
29	Orange Street and Stuart Avenue	8	736	143	50	507	10	72	77	44	127	47	71
30	Orange Street and Oriental Avenue	10	830	-	-	645	30	42	-	20	-	-	-
31	Orange Street and Redlands Boulevard	63	431	43	147	379	94	183	527	85	51	307	245
32	6th Street and I-10 West Ramps	-	316	-	-	387	-	-	-	-	197	10	166
33	6th Street and Pearl Avenue	189	168	119	234	246	107	127	205	175	-	-	-
34	6th Street and Stuart Avenue	60	464	20	36	325	35	23	17	46	18	9	55
35	Redlands Boulevard and Citrus Avenue	71	265	54	155	462	101	125	290	183	48	187	115
36	Church Street and Stuart Avenue	11	295	-	-	261	18	63	-	29	-	-	-
37	University Street and I-10 West Ramps	307	601	42	10	180	426	-	-	-	2	22	16
38	University Street and I-10 East Ramps	-	505	-	-	196	-	447	-	576	-	-	-

No.	INTERSECTION	2011 AM TURNING MOVEMENT COUNTS - AUTO											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	76	-	65	51	373	-	-	301	27
2	Waterman Ave and 9th St	40	391	47	58	580	37	40	159	42	74	192	49
3	Waterman Ave and Mill St	68	431	72	70	525	56	75	254	105	97	187	54
4	Waterman Ave and Orange Show Rd	62	504	38	44	537	65	104	241	173	76	205	41
5	Waterman Ave and Dumas St	4	607	-	-	788	3	4	-	3	-	-	-
6	Waterman Ave and Washington St	2	2	1	408	9	169	473	937	2	10	480	328
7	Tippecanoe Ave and Victoria Ave	0	442	15	17	721	2	1	0	1	53	1	28
8	Tippecanoe Ave and Hospitality Lane	160	431	19	49	478	57	55	24	57	48	108	57
9	Tippecanoe Ave and I-10 WB Ramps	289	531	0	0	414	267	0	0	0	482	10	287
10	Anderson Ave and I-10 EB Ramps	0	526	178	100	741	0	298	0	276	0	0	0
11	Anderson Ave and Academy Dr	168	418	15	24	938	355	257	133	212	79	229	38
12	California St and I-10 WB Ramps	404	532	0	0	144	112	0	0	0	351	14	306
13	California St and I-10 EB Ramps	1	575	262	50	465	0	352	1	380	0	0	0
14	California St and Walmart Driveway	-	692	15	156	574	-	-	-	-	1	-	65
15	California St and Redlands Blvd	89	333	11	256	265	68	85	173	126	39	246	268
16	Alabama St and I-10 WB Ramps	330	421	-	-	323	126	-	-	-	235	293	186
17	Alabama St and I-10 EB Ramps	-	570	116	47	521	-	221	2	361	-	-	-
18	Alabama St and Industrial Ave	18	570	23	66	701	101	47	10	27	15	15	44
19	Alabama St and Redlands Blvd	76	376	47	67	438	166	124	206	38	63	257	81
20	Tennessee St and Redlands Blvd	46	537	18	121	525	17	12	97	27	34	185	58
21	Texas St and Stuart Ave	55	265	19	25	371	80	22	4	25	15	26	12
22	Texas St and Oriental Ave	2	475	14	4	327	3	6	3	5	19	1	11
23	Eureka St and Pearl Ave	-	30	61	4	39	-	80	423	478	37	-	9
24	Eureka St and Stuart Ave	8	75	4	21	480	46	14	14	2	7	7	3
26	Eureka St and Redlands Blvd	12	81	17	56	268	81	9	145	10	11	327	16
25	Eureka St and Oriental Ave	5	83	1	8	443	42	5	2	5	0	0	0
27	Orange St and Colton Ave	13	183	33	75	536	57	49	115	62	194	232	81
28	Orange St and Pearl Ave	2	652	11	9	272	15	167	264	103	16	39	229
29	Orange St and Stuart Ave	5	621	49	3	318	6	8	6	17	34	9	26
30	Orange St and Oriental Ave	1	656	-	-	361	1	3	-	1	-	-	-
31	Orange St and Redlands Blvd	32	516	16	43	257	38	41	102	36	15	191	106
32	6th St and I-10 WB Ramp	-	145	-	-	279	-	-	-	-	178	17	185
33	6th St and Pearl Ave	192	84	30	118	258	93	64	34	167	-	-	-
34	6th St and Stuart Ave	9	236	6	74	315	12	5	7	13	15	7	58
35	Redlands Blvd and Citrus Ave	162	372	33	119	160	29	18	214	90	53	298	227
36	Church St and Stuart Ave	35	252	-	-	274	48	22	-	34	-	-	-
37	University Ave and I-10 WB Ramps	418	371	20	6	129	863	-	-	-	0	7	25
38	University Ave and I-10 EB Ramps	-	607	-	-	131	-	270	-	417	-	-	-

No.	INTERSECTION	2011 PM TURNING MOVEMENT COUNTS - AUTO											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	96	-	140	66	534	-	-	557	33
2	Waterman Ave and 9th St	89	840	138	66	723	76	119	274	62	120	236	74
3	Waterman Ave and Mill St	126	788	92	100	738	123	131	294	165	132	290	95
4	Waterman Ave and Orange Show Rd	179	691	118	121	812	131	152	422	146	114	377	58
5	Waterman Ave and Dumas St	18	995	-	-	1101	3	2	-	6	-	-	-
6	Waterman Ave and Washington St	4	7	4	297	7	594	379	610	5	5	974	513
7	Tippecanoe Ave and Victoria Ave	1	868	39	37	834	0	2	0	2	44	0	23
8	Tippecanoe Ave and Hospitality Lane	436	553	56	54	781	130	227	145	328	60	70	30
9	Tippecanoe Ave and I-10 WB Ramps	458	746	0	0	999	546	0	0	0	253	16	420
10	Anderson Ave and I-10 EB Ramps	0	722	307	362	839	0	500	12	283	0	0	0
11	Anderson Ave and Academy Dr	58	772	52	65	579	121	106	45	55	42	55	29
12	California St and I-10 WB Ramps	503	346	1	0	565	526	0	0	0	328	3	86
13	California St and I-10 EB Ramps	0	694	449	236	586	0	167	7	463	0	0	0
14	California St and Walmart Driveway	-	1001	37	271	699	-	-	-	-	2	-	136
15	California St and Redlands Blvd	38	331	33	280	278	91	150	438	124	91	398	423
16	Alabama St and I-10 WB Ramps	373	1031	-	-	778	380	-	-	-	162	303	214
17	Alabama St and I-10 EB Ramps	-	1034	283	214	735	-	375	7	475	-	-	-
18	Alabama St and Industrial Ave	48	909	82	281	785	120	101	60	38	62	55	311
19	Alabama St and Redlands Blvd	110	569	91	139	508	175	260	635	73	108	380	210
20	Tennessee St and Redlands Blvd	63	507	42	102	509	27	260	632	77	40	271	180
21	Texas St and Stuart Ave	16	451	24	16	274	12	3	10	52	20	15	18
22	Texas St and Oriental Ave	1	457	10	5	275	0	4	1	3	16	1	9
23	Eureka St and Pearl Ave	-	122	228	15	44	-	168	604	459	36	-	16
24	Eureka St and Stuart Ave	15	292	90	38	459	28	13	21	10	38	21	6
26	Eureka St and Redlands Blvd	28	222	55	120	342	38	66	658	50	45	349	53
25	Eureka St and Oriental Ave	7	361	22	30	498	19	14	1	12	5	3	18
27	Orange St and Colton Ave	63	298	93	85	449	43	153	393	157	147	233	105
28	Orange St and Pearl Ave	20	874	74	25	381	8	259	376	216	47	42	231
29	Orange St and Stuart Ave	8	732	142	50	504	10	72	77	44	126	47	71
30	Orange St and Oriental Ave	10	826	-	-	642	30	42	-	20	-	-	-
31	Orange St and Redlands Blvd	63	429	43	146	377	93	182	524	85	51	305	244
32	6th St and I-10 WB Ramp	-	314	-	-	385	-	-	-	-	196	10	165
33	6th St and Pearl Ave	188	167	118	233	245	106	126	204	174	-	-	-
34	6th St and Stuart Ave	60	462	20	36	323	35	23	17	46	18	9	55
35	Redlands Blvd and Citrus Ave	71	264	54	155	459	100	124	289	182	48	186	113
36	Church St and Stuart Ave	11	293	-	-	260	18	63	-	29	-	-	-
37	University Ave and I-10 WB Ramps	305	598	42	10	179	424	-	-	-	2	22	16
38	University Ave and I-10 EB Ramps	-	502	-	-	195	-	445	-	573	-	-	-

No.	INTERSECTION	2011 AM TURNING MOVEMENT COUNTS - 2 AXLE TRUCKS											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St												
2	Waterman Ave and 9th St												
3	Waterman Ave and Mill St												
4	Waterman Ave and Orange Show Rd												
5	Waterman Ave and Dumas St												
6	Waterman Ave and Washington St												
7	Tippecanoe Ave and Victoria Ave												
8	Tippecanoe Ave and Hospitality Lane												
9	Tippecanoe Ave and I-10 WB Ramps	7	12	0	0	13	9	0	0	0	1	0	5
10	Anderson Ave and I-10 EB Ramps	0	9	5	0	12	0	10	0	0	0	0	0
11	Anderson Ave and Academy Dr												
12	California St and I-10 WB Ramps	14	12	0	1	8	7	0	0	0	12	1	4
13	California St and I-10 EB Ramps	0	12	6	1	12	0	12	0	5	0	0	0
14	California St and Walmart Driveway												
15	California St and Redlands Blvd												
16	Alabama St and I-10 WB Ramps												
17	Alabama St and I-10 EB Ramps												
18	Alabama St and Industrial Ave												
19	Alabama St and Redlands Blvd	2	6	0	4	7	4	5	11	2	1	5	1
20	Tennessee St and Redlands Blvd	1	10	1	4	5	0	0	3	1	0	3	3
21	Texas St and Stuart Ave												
22	Texas St and Oriental Ave												
23	Eureka St and Pearl Ave												
24	Eureka St and Stuart Ave												
25	Eureka St and Oriental Ave												
26	Eureka St and Redlands Blvd												
27	Orange St and Colton Ave												
28	Orange St and Pearl Ave												
29	Orange St and Stuart Ave												
30	Orange St and Oriental Ave												
31	Orange St and Redlands Blvd												
32	6th St and I-10 WB Ramp												
33	6th St and Pearl Ave												
34	6th St and Stuart Ave												
35	Redlands Blvd and Citrus Ave	1	3	1	1	8	0	0	2	1	0	1	3
36	Church St and Stuart Ave												
37	University Ave and I-10 WB Ramps												
38	University Ave and I-10 EB Ramps												

No.	INTERSECTION	2011 PM TURNING MOVEMENT COUNTS - 2 AXLE TRUCKS											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St												
2	Waterman Ave and 9th St												
3	Waterman Ave and Mill St												
4	Waterman Ave and Orange Show Rd												
5	Waterman Ave and Dumas St												
6	Waterman Ave and Washington St												
7	Tippecanoe Ave and Victoria Ave												
8	Tippecanoe Ave and Hospitality Lane												
9	Tippecanoe Ave and I-10 WB Ramps	8	10	0	0	9	11	0	0	0	1	0	0
10	Anderson Ave and I-10 EB Ramps	0	12	1	3	9	0	6	0	8	0	0	0
11	Anderson Ave and Academy Dr												
12	California St and I-10 WB Ramps	3	13	0	0	2	3	0	0	0	8	0	5
13	California St and I-10 EB Ramps	0	9	0	0	8	0	9	0	3	0	0	0
14	California St and Walmart Driveway												
15	California St and Redlands Blvd												
16	Alabama St and I-10 WB Ramps												
17	Alabama St and I-10 EB Ramps												
18	Alabama St and Industrial Ave												
19	Alabama St and Redlands Blvd	2	3	1	1	7	0	2	5	2	1	4	3
20	Tennessee St and Redlands Blvd	0	5	2	0	2	0	1	2	1	0	0	2
21	Texas St and Stuart Ave												
22	Texas St and Oriental Ave												
23	Eureka St and Pearl Ave												
24	Eureka St and Stuart Ave												
25	Eureka St and Oriental Ave												
26	Eureka St and Redlands Blvd												
27	Orange St and Colton Ave												
28	Orange St and Pearl Ave												
29	Orange St and Stuart Ave												
30	Orange St and Oriental Ave												
31	Orange St and Redlands Blvd												
32	6th St and I-10 WB Ramp												
33	6th St and Pearl Ave												
34	6th St and Stuart Ave												
35	Redlands Blvd and Citrus Ave	0	1	0	0	3	1	1	0	1	0	1	2
36	Church St and Stuart Ave												
37	University Ave and I-10 WB Ramps												
38	University Ave and I-10 EB Ramps												

No.	INTERSECTION	2011 AM TURNING MOVEMENT COUNTS - 3 AXLE TRUCKS											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St												
2	Waterman Ave and 9th St												
3	Waterman Ave and Mill St												
4	Waterman Ave and Orange Show Rd												
5	Waterman Ave and Dumas St												
6	Waterman Ave and Washington St												
7	Tippecanoe Ave and Victoria Ave												
8	Tippecanoe Ave and Hospitality Lane												
9	Tippecanoe Ave and I-10 WB Ramps	1	0	0	0	2	3	0	0	0	0	0	0
10	Anderson Ave and I-10 EB Ramps	0	3	0	0	1	0	1	0	0	0	0	0
11	Anderson Ave and Academy Dr												
12	California St and I-10 WB Ramps	4	14	0	0	0	3	0	0	0	3	0	3
13	California St and I-10 EB Ramps	0	6	1	1	0	0	5	0	2	0	0	0
14	California St and Walmart Driveway												
15	California St and Redlands Blvd												
16	Alabama St and I-10 WB Ramps												
17	Alabama St and I-10 EB Ramps												
18	Alabama St and Industrial Ave												
19	Alabama St and Redlands Blvd	0	4	0	0	1	0	0	0	0	0	0	0
20	Tennessee St and Redlands Blvd	0	6	0	0	1	0	0	0	0	0	1	0
21	Texas St and Stuart Ave												
22	Texas St and Oriental Ave												
23	Eureka St and Pearl Ave												
24	Eureka St and Stuart Ave												
25	Eureka St and Oriental Ave												
26	Eureka St and Redlands Blvd												
27	Orange St and Colton Ave												
28	Orange St and Pearl Ave												
29	Orange St and Stuart Ave												
30	Orange St and Oriental Ave												
31	Orange St and Redlands Blvd												
32	6th St and I-10 WB Ramp												
33	6th St and Pearl Ave												
34	6th St and Stuart Ave												
35	Redlands Blvd and Citrus Ave	0	1	0	0	1	0	0	0	0	1	0	0
36	Church St and Stuart Ave												
37	University Ave and I-10 WB Ramps												
38	University Ave and I-10 EB Ramps												

No.	INTERSECTION	2011 PM TURNING MOVEMENT COUNTS - 3 AXLE TRUCKS											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St												
2	Waterman Ave and 9th St												
3	Waterman Ave and Mill St												
4	Waterman Ave and Orange Show Rd												
5	Waterman Ave and Dumas St												
6	Waterman Ave and Washington St												
7	Tippecanoe Ave and Victoria Ave												
8	Tippecanoe Ave and Hospitality Lane												
9	Tippecanoe Ave and I-10 WB Ramps	0	1	0	0	1	0	0	0	0	0	0	0
10	Anderson Ave and I-10 EB Ramps	0	0	0	1	0	0	1	0	0	0	0	0
11	Anderson Ave and Academy Dr												
12	California St and I-10 WB Ramps	3	3	0	0	0	4	0	0	0	1	0	2
13	California St and I-10 EB Ramps	0	4	0	0	1	0	2	0	0	0	0	0
14	California St and Walmart Driveway												
15	California St and Redlands Blvd												
16	Alabama St and I-10 WB Ramps												
17	Alabama St and I-10 EB Ramps												
18	Alabama St and Industrial Ave												
19	Alabama St and Redlands Blvd	0	2	0	0	1	0	0	0	0	0	0	0
20	Tennessee St and Redlands Blvd	0	0	0	0	0	0	0	0	0	0	0	0
21	Texas St and Stuart Ave												
22	Texas St and Oriental Ave												
23	Eureka St and Pearl Ave												
24	Eureka St and Stuart Ave												
25	Eureka St and Oriental Ave												
26	Eureka St and Redlands Blvd												
27	Orange St and Colton Ave												
28	Orange St and Pearl Ave												
29	Orange St and Stuart Ave												
30	Orange St and Oriental Ave												
31	Orange St and Redlands Blvd												
32	6th St and I-10 WB Ramp												
33	6th St and Pearl Ave												
34	6th St and Stuart Ave												
35	Redlands Blvd and Citrus Ave	0	0	0	0	0	0	0	0	0	0	0	0
36	Church St and Stuart Ave												
37	University Ave and I-10 WB Ramps												
38	University Ave and I-10 EB Ramps												

No.	INTERSECTION	2011 AM TURNING MOVEMENT COUNTS - 4+ AXLE TRUCKS											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St												
2	Waterman Ave and 9th St												
3	Waterman Ave and Mill St												
4	Waterman Ave and Orange Show Rd												
5	Waterman Ave and Dumas St												
6	Waterman Ave and Washington St												
7	Tippecanoe Ave and Victoria Ave												
8	Tippecanoe Ave and Hospitality Lane												
9	Tippecanoe Ave and I-10 WB Ramps	0	22	0	0	2	29	0	0	0	1	0	5
10	Anderson Ave and I-10 EB Ramps	0	0	0	0	1	0	12	0	0	0	0	0
11	Anderson Ave and Academy Dr												
12	California St and I-10 WB Ramps	11	35	0	0	0	19	0	0	0	7	0	5
13	California St and I-10 EB Ramps	0	12	7	0	0	0	30	0	6	0	0	0
14	California St and Walmart Driveway												
15	California St and Redlands Blvd												
16	Alabama St and I-10 WB Ramps												
17	Alabama St and I-10 EB Ramps												
18	Alabama St and Industrial Ave												
19	Alabama St and Redlands Blvd	0	2	0	2	8	2	2	0	0	0	0	0
20	Tennessee St and Redlands Blvd	0	0	0	0	1	0	0	1	0	0	1	1
21	Texas St and Stuart Ave												
22	Texas St and Oriental Ave												
23	Eureka St and Pearl Ave												
24	Eureka St and Stuart Ave												
25	Eureka St and Oriental Ave												
26	Eureka St and Redlands Blvd												
27	Orange St and Colton Ave												
28	Orange St and Pearl Ave												
29	Orange St and Stuart Ave												
30	Orange St and Oriental Ave												
31	Orange St and Redlands Blvd												
32	6th St and I-10 WB Ramp												
33	6th St and Pearl Ave												
34	6th St and Stuart Ave												
35	Redlands Blvd and Citrus Ave	1	0	0	0	1	0	0	0	0	0	0	0
36	Church St and Stuart Ave												
37	University Ave and I-10 WB Ramps												
38	University Ave and I-10 EB Ramps												

No.	INTERSECTION	2011 PM TURNING MOVEMENT COUNTS - 4+ AXLE TRUCKS											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St												
2	Waterman Ave and 9th St												
3	Waterman Ave and Mill St												
4	Waterman Ave and Orange Show Rd												
5	Waterman Ave and Dumas St												
6	Waterman Ave and Washington St												
7	Tippecanoe Ave and Victoria Ave												
8	Tippecanoe Ave and Hospitality Lane												
9	Tippecanoe Ave and I-10 WB Ramps	2	6	0	0	5	3	0	0	0	0	0	0
10	Anderson Ave and I-10 EB Ramps	0	1	0	4	1	0	6	0	1	0	0	0
11	Anderson Ave and Academy Dr												
12	California St and I-10 WB Ramps	16	29	0	0	7	16	0	0	0	0	0	2
13	California St and I-10 EB Ramps	0	16	14	3	2	0	27	0	3	0	0	0
14	California St and Walmart Driveway												
15	California St and Redlands Blvd												
16	Alabama St and I-10 WB Ramps												
17	Alabama St and I-10 EB Ramps												
18	Alabama St and Industrial Ave												
19	Alabama St and Redlands Blvd	0	3	0	0	1	0	2	0	0	0	2	1
20	Tennessee St and Redlands Blvd	0	1	0	0	0	0	0	0	0	0	1	1
21	Texas St and Stuart Ave												
22	Texas St and Oriental Ave												
23	Eureka St and Pearl Ave												
24	Eureka St and Stuart Ave												
25	Eureka St and Oriental Ave												
26	Eureka St and Redlands Blvd												
27	Orange St and Colton Ave												
28	Orange St and Pearl Ave												
29	Orange St and Stuart Ave												
30	Orange St and Oriental Ave												
31	Orange St and Redlands Blvd												
32	6th St and I-10 WB Ramp												
33	6th St and Pearl Ave												
34	6th St and Stuart Ave												
35	Redlands Blvd and Citrus Ave	0	0	0	0	0	0	0	1	0	0	0	0
36	Church St and Stuart Ave												
37	University Ave and I-10 WB Ramps												
38	University Ave and I-10 EB Ramps												

No.	INTERSECTION	2011 AM TURNING MOVEMENT COUNTS - TOTAL TRUCKS												AM PEAK % TRUCK
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	-	-	-	4	-	3	3	18	-	-	15	1	0.0468
2	Waterman Ave and 9th St	2	19	2	3	28	2	2	8	2	4	9	2	0.0468
3	Waterman Ave and Mill St	3	21	4	3	26	3	4	13	5	5	9	3	0.0468
4	Waterman Ave and Orange Show Rd	3	25	2	2	26	3	5	12	8	4	10	2	0.0468
5	Waterman Ave and Dumas St	0	30	-	-	39	0	0	-	0	-	-	-	0.0468
6	Waterman Ave and Washington St	0	0	0	20	0	8	23	46	0	1	24	16	0.0468
7	Tippecanoe Ave and Victoria Ave	0	22	1	1	35	0	0	0	0	3	0	1	0.0468
8	Tippecanoe Ave and Hospitality Lane	8	21	1	2	23	3	3	1	3	2	5	3	0.0468
9	Tippecanoe Ave and I-10 WB Ramps	8	34	0	0	17	41	0	0	0	2	0	10	0.0468
10	Anderson Ave and I-10 EB Ramps	0	12	5	0	14	0	23	0	0	0	0	0	0.0249
11	Anderson Ave and Academy Dr	4	11	0	1	24	9	7	3	5	2	6	1	0.0249
12	California St and I-10 WB Ramps	29	61	0	1	8	29	0	0	0	22	1	12	0.0805
13	California St and I-10 EB Ramps	0	30	14	2	12	0	47	0	13	0	0	0	0.0536
14	California St and Walmart Driveway	-	39	1	9	33	-	-	-	-	0	-	4	0.0536
15	California St and Redlands Blvd	5	19	1	15	15	4	5	10	7	2	14	15	0.0536
16	Alabama St and I-10 WB Ramps	12	15	-	-	11	4	-	-	-	8	10	7	0.0344
17	Alabama St and I-10 EB Ramps	-	20	4	2	19	-	8	0	13	-	-	-	0.0344
18	Alabama St and Industrial Ave	1	20	1	2	25	4	2	0	1	1	1	2	0.0344
19	Alabama St and Redlands Blvd	2	12	0	6	16	6	7	11	2	1	5	1	0.0344
20	Tennessee St and Redlands Blvd	1	16	1	4	7	0	0	4	1	0	5	4	0.0250
21	Texas St and Stuart Ave	1	7	0	1	10	2	1	0	1	0	1	0	0.0250
22	Texas St and Oriental Ave	0	12	0	0	8	0	0	0	0	1	0	0	0.0250
23	Eureka St and Pearl Ave	-	1	2	0	1	-	2	11	12	1	-	0	0.0250
24	Eureka St and Stuart Ave	0	2	0	1	12	1	0	0	0	0	0	0	0.0250
25	Eureka St and Oriental Ave	0	2	0	0	11	1	0	0	0	0	0	0	0.0250
26	Eureka St and Redlands Blvd	0	2	0	1	7	2	0	4	0	0	8	0	0.0250
27	Orange St and Colton Ave	0	3	0	1	8	1	1	2	1	3	3	1	0.0144
28	Orange St and Pearl Ave	0	10	0	0	4	0	2	4	2	0	1	3	0.0144
29	Orange St and Stuart Ave	0	9	1	0	5	0	0	0	0	0	0	0	0.0144
30	Orange St and Oriental Ave	0	10	-	-	5	0	0	-	0	-	-	-	0.0144
31	Orange St and Redlands Blvd	0	8	0	1	4	1	1	1	1	0	3	2	0.0144
32	6th St and I-10 WB Ramp	-	2	-	-	4	-	-	-	-	3	0	3	0.0144
33	6th St and Pearl Ave	3	1	0	2	4	1	1	0	2	-	-	-	0.0144
34	6th St and Stuart Ave	0	3	0	1	5	0	0	0	0	0	0	1	0.0144
35	Redlands Blvd and Citrus Ave	2	4	1	1	10	0	0	2	1	1	1	3	0.0144
36	Church St and Stuart Ave	1	4	-	-	4	1	0	-	0	-	-	-	0.0144
37	University Ave and I-10 WB Ramps	6	5	0	0	2	13	-	-	-	0	0	0	0.0144
38	University Ave and I-10 EB Ramps	-	9	-	-	2	-	4	-	6	-	-	-	0.0144

No.	INTERSECTION	2011 PM TURNING MOVEMENT COUNTS - TOTAL TRUCKS												PM PEAK % TRUCK
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	-	-	-	2	-	2	1	9	-	-	9	1	0.0163
2	Waterman Ave and 9th St	1	14	2	1	12	1	2	5	1	2	4	1	0.0163
3	Waterman Ave and Mill St	2	13	2	2	12	2	2	5	3	2	5	2	0.0163
4	Waterman Ave and Orange Show Rd	3	11	2	2	13	2	3	7	2	2	6	1	0.0163
5	Waterman Ave and Dumas St	0	16	-	-	18	0	0	-	0	-	-	-	0.0163
6	Waterman Ave and Washington St	0	0	0	5	0	10	6	10	0	0	16	8	0.0163
7	Tippecanoe Ave and Victoria Ave	0	14	1	1	14	0	0	0	0	1	0	0	0.0163
8	Tippecanoe Ave and Hospitality Lane	7	9	1	1	13	2	4	2	5	1	1	0	0.0163
9	Tippecanoe Ave and I-10 WB Ramps	10	17	0	0	15	14	0	0	0	1	0	0	0.0163
10	Anderson Ave and I-10 EB Ramps	0	13	1	8	10	0	13	0	9	0	0	0	0.0175
11	Anderson Ave and Academy Dr	1	14	1	1	10	2	2	1	1	1	1	1	0.0175
12	California St and I-10 WB Ramps	22	45	0	0	9	23	0	0	0	9	0	9	0.0473
13	California St and I-10 EB Ramps	0	29	14	3	11	0	38	0	6	0	0	0	0.0374
14	California St and Walmart Driveway	-	39	1	10	27	-	-	-	-	0	-	5	0.0374
15	California St and Redlands Blvd	1	13	1	11	11	4	6	17	5	4	15	16	0.0374
16	Alabama St and I-10 WB Ramps	5	14	-	-	10	5	-	-	-	2	4	3	0.0130
17	Alabama St and I-10 EB Ramps	-	14	4	3	10	-	5	0	6	-	-	-	0.0130
18	Alabama St and Industrial Ave	1	12	1	4	10	2	1	1	0	1	1	4	0.0130
19	Alabama St and Redlands Blvd	2	8	1	1	9	0	4	5	2	1	6	4	0.0130
20	Tennessee St and Redlands Blvd	0	6	2	0	2	0	1	2	1	0	1	3	0.0066
21	Texas St and Stuart Ave	0	3	0	0	2	0	0	0	0	0	0	0	0.0066
22	Texas St and Oriental Ave	0	3	0	0	2	0	0	0	0	0	0	0	0.0066
23	Eureka St and Pearl Ave	-	1	2	0	0	-	1	4	3	0	-	0	0.0066
24	Eureka St and Stuart Ave	0	2	1	0	3	0	0	0	0	0	0	0	0.0066
25	Eureka St and Oriental Ave	0	2	0	0	3	0	0	0	0	0	0	0	0.0066
26	Eureka St and Redlands Blvd	0	1	0	1	2	0	0	4	0	0	2	0	0.0066
27	Orange St and Colton Ave	0	2	1	0	2	0	1	2	1	1	1	1	0.0054
28	Orange St and Pearl Ave	0	5	0	0	2	0	1	2	1	0	0	1	0.0054
29	Orange St and Stuart Ave	0	4	1	0	3	0	0	0	0	1	0	0	0.0054
30	Orange St and Oriental Ave	0	4	-	-	3	0	0	-	0	-	-	-	0.0054
31	Orange St and Redlands Blvd	0	2	0	1	2	1	1	3	0	0	2	1	0.0054
32	6th St and I-10 WB Ramp	-	2	-	-	2	-	-	-	-	1	0	1	0.0054
33	6th St and Pearl Ave	1	1	1	1	1	1	1	1	1	-	-	-	0.0054
34	6th St and Stuart Ave	0	2	0	0	2	0	0	0	0	0	0	0	0.0054
35	Redlands Blvd and Citrus Ave	0	1	0	0	3	1	1	1	1	0	1	2	0.0054
36	Church St and Stuart Ave	0	2	-	-	1	0	0	-	0	-	-	-	0.0054
37	University Ave and I-10 WB Ramps	2	3	0	0	1	2	-	-	-	0	0	0	0.0054
38	University Ave and I-10 EB Ramps	-	3	-	-	1	-	2	-	3	-	-	-	0.0054

No.	INTERSECTION	2011 AM TURNING MOVEMENT COUNTS - TOTAL PCE TRUCKS 2 AXLE = 1.5; 3 AXLE = 2; 4+ AXLE = 3												AVG PCE FACTOR AM
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	-	-	-	11	-	9	9	51	-	-	43	3	2.84
2	Waterman Ave and 9th St	6	54	6	9	80	6	6	23	6	11	26	6	2.84
3	Waterman Ave and Mill St	9	60	11	9	74	9	11	37	14	14	26	9	2.84
4	Waterman Ave and Orange Show Rd	9	71	6	6	74	9	14	34	23	11	28	6	2.84
5	Waterman Ave and Dumas St	0	85	-	-	111	0	0	-	0	-	-	-	2.84
6	Waterman Ave and Washington St	0	0	0	57	0	23	65	131	0	3	68	46	2.84
7	Tippecanoe Ave and Victoria Ave	0	63	3	3	100	0	0	0	0	9	0	3	2.84
8	Tippecanoe Ave and Hospitality Lane	23	60	3	6	65	9	9	3	9	6	14	9	2.84
9	Tippecanoe Ave and I-10 WB Ramps	13	84	0	0	30	107	0	0	0	5	0	23	2.84
10	Anderson Ave and I-10 EB Ramps	0	20	8	0	23	0	53	0	0	0	0	0	2.15
11	Anderson Ave and Academy Dr	9	24	0	2	52	19	15	6	11	4	13	2	2.15
12	California St and I-10 WB Ramps	62	151	0	2	12	74	0	0	0	45	2	27	2.76
13	California St and I-10 EB Ramps	0	66	32	4	18	0	118	0	30	0	0	0	2.73
14	California St and Walmart Driveway	-	106	3	25	90	-	-	-	-	0	-	11	2.73
15	California St and Redlands Blvd	14	52	3	41	41	11	14	27	19	5	38	41	2.73
16	Alabama St and I-10 WB Ramps	25	32	-	-	23	8	-	-	-	17	21	15	2.12
17	Alabama St and I-10 EB Ramps	-	42	8	4	40	-	17	0	28	-	-	-	2.12
18	Alabama St and Industrial Ave	2	42	2	4	53	8	4	0	2	2	2	4	2.12
19	Alabama St and Redlands Blvd	3	23	0	12	37	12	14	17	3	2	8	2	2.12
20	Tennessee St and Redlands Blvd	2	27	2	6	13	0	0	8	2	0	10	8	1.83
21	Texas St and Stuart Ave	2	13	0	2	18	4	2	0	2	0	2	0	1.83
22	Texas St and Oriental Ave	0	22	0	0	15	0	0	0	0	2	0	0	1.83
23	Eureka St and Pearl Ave	-	2	4	0	2	-	4	20	22	2	-	0	1.83
25	Eureka St and Oriental Ave	0	4	0	0	20	2	0	0	0	0	0	0	1.83
26	Eureka St and Redlands Blvd	0	4	0	2	13	4	0	7	0	0	15	0	1.83
24	Eureka St and Stuart Ave	0	4	0	2	22	2	0	0	0	0	0	0	1.83
27	Orange St and Colton Ave	0	5	0	2	14	2	2	4	2	5	5	2	1.75
28	Orange St and Pearl Ave	0	18	0	0	7	0	4	7	4	0	2	5	1.75
29	Orange St and Stuart Ave	0	16	2	0	9	0	0	0	0	0	0	0	1.75
30	Orange St and Oriental Ave	0	18	-	-	9	0	0	-	0	-	-	-	1.75
31	Orange St and Redlands Blvd	0	14	0	2	7	2	2	2	2	0	5	4	1.75
32	6th St and I-10 WB RAMP	-	4	-	-	7	-	-	-	-	5	0	5	1.75
33	6th St and Pearl Ave	5	2	0	4	7	2	2	0	4	-	-	-	1.75
34	6th St and Stuart Ave	0	5	0	2	9	0	0	0	0	0	0	2	1.75
35	Redlands Blvd and Citrus Ave	5	7	2	2	17	0	0	3	2	2	2	5	1.75
36	Church St and Stuart Ave	2	7	-	-	7	2	0	-	0	-	-	-	1.75
37	University Ave and I-10 WB Ramps	11	9	0	0	4	23	-	-	-	0	0	0	1.75
38	University Ave and I-10 EB Ramps	-	16	-	-	4	-	7	-	11	-	-	-	1.75

No.	INTERSECTION	2011 PM TURNING MOVEMENT COUNTS - TOTAL PCE TRUCKS 2 AXLE = 1.5; 3 AXLE = 2; 4+ AXLE = 3												AVG PCE FACTOR PM
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	-	-	-	4	-	4	2	20	-	-	20	2	2.22
2	Waterman Ave and 9th St	2	31	4	2	27	2	4	11	2	4	9	2	2.22
3	Waterman Ave and Mill St	4	29	4	4	27	4	4	11	7	4	11	4	2.22
4	Waterman Ave and Orange Show Rd	7	24	4	4	29	4	7	16	4	4	13	2	2.22
5	Waterman Ave and Dumas St	0	36	-	-	40	0	0	-	0	-	-	-	2.22
6	Waterman Ave and Washington St	0	0	0	11	0	22	13	22	0	0	36	18	2.22
7	Tippecanoe Ave and Victoria Ave	0	31	2	2	31	0	0	0	0	2	0	0	2.22
8	Tippecanoe Ave and Hospitality Lane	16	20	2	2	29	4	9	4	11	2	2	0	2.22
9	Tippecanoe Ave and I-10 WB Ramps	18	35	0	0	31	26	0	0	0	2	0	0	2.22
10	Anderson Ave and I-10 EB Ramps	0	21	2	19	17	0	29	0	15	0	0	0	2.12
11	Anderson Ave and Academy Dr	2	30	2	2	21	4	4	2	2	2	2	2	2.12
12	California St and I-10 WB Ramps	59	113	0	0	24	61	0	0	0	14	0	18	3.05
13	California St and I-10 EB Ramps	0	70	42	9	20	0	99	0	14	0	0	0	3.14
14	California St and Walmart Driveway	-	123	3	31	85	-	-	-	-	0	-	16	3.14
15	California St and Redlands Blvd	3	41	3	35	35	13	19	53	16	13	47	50	3.14
16	Alabama St and I-10 WB Ramps	10	29	-	-	21	10	-	-	-	4	8	6	2.06
17	Alabama St and I-10 EB Ramps	-	29	8	6	21	-	10	0	12	-	-	-	2.06
18	Alabama St and Industrial Ave	2	25	2	8	21	4	2	2	0	2	2	8	2.06
19	Alabama St and Redlands Blvd	3	18	2	2	16	0	9	8	3	2	12	8	2.06
20	Tennessee St and Redlands Blvd	0	11	3	0	3	0	2	3	2	0	3	6	1.92
21	Texas St and Stuart Ave	0	6	0	0	4	0	0	0	0	0	0	0	1.92
22	Texas St and Oriental Ave	0	6	0	0	4	0	0	0	0	0	0	0	1.92
23	Eureka St and Pearl Ave	-	2	4	0	0	-	2	8	6	0	-	0	1.92
25	Eureka St and Oriental Ave	0	4	0	0	6	0	0	0	0	0	0	0	1.92
26	Eureka St and Redlands Blvd	0	2	0	2	4	0	0	8	0	0	4	0	1.92
24	Eureka St and Stuart Ave	0	4	2	0	6	0	0	0	0	0	0	0	1.92
27	Orange St and Colton Ave	0	3	2	0	3	0	2	3	2	2	2	2	1.73
28	Orange St and Pearl Ave	0	9	0	0	3	0	2	3	2	0	0	2	1.73
29	Orange St and Stuart Ave	0	7	2	0	5	0	0	0	0	2	0	0	1.73
30	Orange St and Oriental Ave	0	7	-	-	5	0	0	-	0	-	-	-	1.73
31	Orange St and Redlands Blvd	0	3	0	2	3	2	2	5	0	0	3	2	1.73
32	6th St and I-10 WB Ramp	-	3	-	-	3	-	-	-	-	2	0	2	1.73
33	6th St and Pearl Ave	2	2	2	2	2	2	2	2	2	-	-	-	1.73
34	6th St and Stuart Ave	0	3	0	0	3	0	0	0	0	0	0	0	1.73
35	Redlands Blvd and Citrus Ave	0	2	0	0	5	2	2	3	2	0	2	3	1.73
36	Church St and Stuart Ave	0	3	-	-	2	0	0	-	0	-	-	-	1.73
37	University Ave and I-10 WB Ramps	3	5	0	0	2	3	-	-	-	0	0	0	1.73
38	University Ave and I-10 EB Ramps	-	5	-	-	2	-	3	-	5	-	-	-	1.73

No.	INTERSECTION	2011 AM TURNING MOVEMENT COUNTS - TOTAL (AUTO + PCE TRUCKS)												PHF
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	-	-	-	87	-	74	60	424	-	-	344	30	0.82
2	Waterman Ave and 9th St	46	445	53	67	660	43	46	182	48	85	218	55	0.96
3	Waterman Ave and Mill St	77	491	83	79	599	65	86	291	119	111	213	63	0.96
4	Waterman Ave and Orange Show Rd	71	575	44	50	611	74	118	275	196	87	233	47	0.96
5	Waterman Ave and Dumas St	4	692	-	-	899	3	4	-	3	-	-	-	0.90
6	Waterman Ave and Washington St	2	2	1	465	9	192	538	1068	2	13	548	374	0.89
7	Tippecanoe Ave and Victoria Ave	0	505	18	20	821	2	1	0	1	62	1	31	0.86
8	Tippecanoe Ave and Hospitality Lane	183	491	22	55	543	66	64	27	66	54	122	66	0.95
9	Tippecanoe Ave and I-10 WB Ramps	302	615	-	-	444	374	-	-	-	487	10	310	0.94
10	Anderson Ave and I-10 EB Ramps	-	546	186	100	764	-	351	0	276	-	-	-	0.85
11	Anderson Ave and Academy Dr	177	442	15	26	990	374	272	139	223	83	242	40	0.91
12	California St and I-10 WB Ramps	466	683	-	-	156	186	-	-	-	396	16	333	0.90
13	California St and I-10 EB Ramps	-	641	294	54	483	-	470	1	410	-	-	-	0.95
14	California St and Walmart Driveway	-	798	18	181	664	-	-	-	-	1	-	76	0.86
15	California St and Redlands Blvd	103	385	14	297	306	79	99	200	145	44	284	309	0.82
16	Alabama St and I-10 WB Ramps	355	453	-	-	346	134	-	-	-	252	314	201	0.89
17	Alabama St and I-10 EB Ramps	-	612	124	51	561	-	238	2	389	-	-	-	0.91
18	Alabama St and Industrial Ave	20	612	25	70	754	109	51	10	29	17	17	48	0.92
19	Alabama St and Redlands Blvd	79	399	47	79	475	178	138	223	41	65	265	83	0.90
20	Tennessee St and Redlands Blvd	48	564	20	127	538	17	12	105	29	34	195	66	0.68
21	Texas St and Stuart Ave	57	278	19	27	389	84	24	4	27	15	28	12	0.95
22	Texas St and Oriental Ave	2	497	14	4	342	3	6	3	5	21	1	11	0.94
23	Eureka St and Pearl Ave	-	32	65	4	41	-	84	443	500	39	-	9	0.92
24	Eureka St and Stuart Ave	8	79	4	23	502	48	14	14	2	7	7	3	0.95
25	Eureka St and Oriental Ave	5	87	1	8	463	44	5	2	5	0	0	0	0.88
26	Eureka St and Redlands Blvd	12	85	17	58	281	85	9	152	10	11	342	16	0.90
27	Orange St and Colton Ave	13	188	33	77	550	59	51	119	64	199	237	83	0.85
28	Orange St and Pearl Ave	2	670	11	9	279	15	171	271	107	16	41	234	0.83
29	Orange St and Stuart Ave	5	637	51	3	327	6	8	6	17	34	9	26	0.92
30	Orange St and Oriental Ave	1	674	-	-	370	1	3	-	1	-	-	-	0.98
31	Orange St and Redlands Blvd	32	530	16	45	264	40	43	104	38	15	196	110	0.84
32	6th St and I-10 WB Ramp	-	149	-	-	286	-	-	-	-	183	17	190	0.77
33	6th St and Pearl Ave	197	86	30	122	265	95	66	34	171	-	-	-	0.79
34	6th St and Stuart Ave	9	241	6	76	324	12	5	7	13	15	7	60	0.89
35	Redlands Blvd and Citrus Ave	167	379	35	121	177	29	18	217	92	55	300	232	0.94
36	Church St and Stuart Ave	37	259	-	-	281	50	22	-	34	-	-	-	0.92
37	University Ave and I-10 WB Ramps	429	380	20	6	133	886	-	-	-	0	7	25	0.89
38	University Ave and I-10 EB Ramps	-	623	-	-	135	-	277	-	428	-	-	-	0.90

* TMC and Ped

** TMC and Classification

No.	INTERSECTION	2011 PM TURNING MOVEMENT COUNTS - TOTAL (AUTO + PCE TRUCKS)												PHF
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	-	-	-	100	-	144	68	554	-	-	577	35	0.97
2	Waterman Ave and 9th St	91	871	142	68	750	78	123	285	64	124	245	76	0.97
3	Waterman Ave and Mill St	130	817	96	104	765	127	135	305	172	136	301	99	0.90
4	Waterman Ave and Orange Show Rd	186	715	122	125	841	135	159	438	150	118	390	60	0.97
5	Waterman Ave and Dumas St	18	1031	-	-	1141	3	2	-	6	-	-	-	0.97
6	Waterman Ave and Washington St	4	7	4	308	7	616	392	632	5	5	1010	531	0.98
7	Tippecanoe Ave and Victoria Ave	1	899	41	39	865	0	2	0	2	46	0	23	0.92
8	Tippecanoe Ave and Hospitality Lane	452	573	58	56	810	134	236	149	339	62	72	30	0.96
9	Tippecanoe Ave and I-10 WB Ramps	476	781	-	-	1030	572	-	-	-	255	16	420	0.97
10	Anderson Ave and I-10 EB Ramps	-	743	309	381	856	-	529	12	298	-	-	-	0.93
11	Anderson Ave and Academy Dr	60	802	54	67	600	125	110	47	57	44	57	31	0.94
12	California St and I-10 WB Ramps	562	459	-	-	589	587	-	-	-	342	3	104	0.92
13	California St and I-10 EB Ramps	-	764	491	245	606	-	266	7	477	-	-	-	0.90
14	California St and Walmart Driveway	-	1124	40	302	784	-	-	-	-	2	-	152	0.89
15	California St and Redlands Blvd	41	372	36	315	313	104	169	491	140	104	445	473	0.95
16	Alabama St and I-10 WB Ramps	383	1060	-	-	799	390	-	-	-	166	311	220	0.97
17	Alabama St and I-10 EB Ramps	-	1063	291	220	756	-	385	7	487	-	-	-	0.97
18	Alabama St and Industrial Ave	50	934	84	289	806	124	103	62	38	64	57	319	0.96
19	Alabama St and Redlands Blvd	113	587	93	141	524	175	269	643	76	110	392	218	0.95
20	Tennessee St and Redlands Blvd	63	518	45	102	512	27	262	635	79	40	274	186	0.98
21	Texas St and Stuart Ave	16	457	24	16	278	12	3	10	52	20	15	18	0.95
22	Texas St and Oriental Ave	1	463	10	5	279	0	4	1	3	16	1	9	0.95
23	Eureka St and Pearl Ave	-	124	232	15	44	-	170	612	465	36	-	16	0.97
24	Eureka St and Stuart Ave	15	296	92	38	465	28	13	21	10	38	21	6	0.92
25	Eureka St and Oriental Ave	7	365	22	30	504	19	14	1	12	5	3	18	0.94
26	Eureka St and Redlands Blvd	28	224	55	122	346	38	66	666	50	45	353	53	0.86
27	Orange St and Colton Ave	63	301	95	85	452	43	155	396	159	149	235	107	0.91
28	Orange St and Pearl Ave	20	883	74	25	384	8	261	379	218	47	42	233	0.99
29	Orange St and Stuart Ave	8	739	144	50	509	10	72	77	44	128	47	71	0.97
30	Orange St and Oriental Ave	10	833	-	-	647	30	42	-	20	-	-	-	0.95
31	Orange St and Redlands Blvd	63	432	43	148	380	95	184	529	85	51	308	246	0.97
32	6th St and I-10 WB Ramp	-	317	-	-	388	-	-	-	-	198	10	167	0.97
33	6th St and Pearl Ave	190	169	120	235	247	108	128	206	176	-	-	-	0.97
34	6th St and Stuart Ave	60	465	20	36	326	35	23	17	46	18	9	55	0.85
35	Redlands Blvd and Citrus Ave	71	266	54	155	464	102	126	292	184	48	188	116	0.94
36	Church St and Stuart Ave	11	296	-	-	262	18	63	-	29	-	-	-	0.87
37	University Ave and I-10 WB Ramps	308	603	42	10	181	427	-	-	-	2	22	16	0.88
38	University Ave and I-10 EB Ramps	-	507	-	-	197	-	448	-	578	-	-	-	0.98

* TMC and Ped

** TMC and Classification

No.	INTERSECTION	2011 AM PEDESTRIAN COUNT								2011 PM PEDESTRIAN COUNT							
		NORTHBOUND		SOUTHBOUND		EASTBOUND		WESTBOUND		NORTHBOUND		SOUTHBOUND		EASTBOUND		WESTBOUND	
		L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R
1	Tippecanoe Ave and Victoria Ave																
2	Anderson Ave and Academy Dr																
3	California St and I-10 EB Ramps																
4	California St and Walmart Driveway																
5	California St and I-10 WB Ramps																
6	California St and Redlands Blvd																
7	Anderson Ave and I-10 EB Ramps																
8	Tippecanoe Ave and Hospitality Lane																
9	Tippecanoe Ave and I-10 WB Ramps																
10	Waterman Ave and Washington St																
11	Sierra Way and Mill St																
12	Waterman Ave and Mill St																
13	Waterman Ave and 9th St																
14	Waterman Ave and Dumas St																
15	Waterman Ave and Orange Show Rd																
16	Alabama St and I-10 EB Ramps																
17	Alabama St and I-10 WB Ramps																
18	Alabama St and Industrial Ave																
19	Alabama St and Redlands Blvd																
20	Eureka St and Oriental Ave	2	1	1	2	6	1	1	6	1	6	6	1	8	2	2	8
21	Orange St and Colton Ave																
22	Eureka St and Redlands Blvd	2	1	1	2	3	7	7	3	4	9	9	4	2	7	7	2
23	Redlands Blvd and Citrus Ave																
24	University Ave and I-10 WB Ramps																
25	6th St and Stuart Ave	1	0	0	1	2	1	1	2	2	2	2	2	2	4	4	2
26	Church St and Stuart Ave																
27	University Ave and I-10 EB Ramps																
28	Texas St and Oriental Ave																
29	Eureka St and Stuart Ave	0	1	1	0	1	2	2	1	0	3	3	0	9	6	6	9
30	Texas St and Stuart Ave																
31	Eureka St and Pearl Ave																
32	Orange St and Oriental Ave	2	-	-	2	0	1	1	0	16	-	-	16	1	24	24	1
33	Orange St and Redlands Blvd	3	1	1	3	1	0	0	1	26	23	23	26	16	15	15	16
34	6th St and I-10 WB Ramp																
35	Tennessee St and Redlands Blvd																
36	6th St and Pearl Ave																
37	Orange St and Stuart Ave	3	2	2	3	4	2	2	4	12	21	21	12	33	35	35	33
38	Orange St and Pearl Ave																

No.	Intersection	AM TURNING MOVEMENT COUNTS											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill Street	0	0	0	70	0	59	52	374	0	0	299	26
2	Waterman Avenue and 9th Street	42	413	49	61	611	39	43	169	45	79	203	52
3	Waterman Avenue and Mill Street	73	464	78	75	564	60	82	276	114	106	205	60
4	Waterman Avenue and Orange Show Road	65	530	40	46	564	68	109	254	182	80	216	43
5	Waterman Avenue and Dumas Street	4	636	0	0	826	3	4	0	3	0	0	0
6	Waterman Avenue and Washington Street	0	0	0	421	9	174	493	976	2	11	498	340
7	Tippecanoe Avenue and Victoria Avenue	0	466	16	18	758	2	2	0	2	58	1	30
8	Tippecanoe Avenue and Hospitality Lane	169	454	20	51	503	60	59	25	61	51	114	61
9	Tippecanoe Avenue and I-10 West Ramps	295	561	0	0	427	305	0	0	0	480	10	294
10	Anderson Avenue and I-10 East Ramps	0	540	184	100	758	0	323	0	277	0	0	0
11	Anderson Avenue and Academy Drive	169	421	15	25	954	361	259	133	213	78	227	38
12	California Street and I-10 West Ramps	435	596	0	1	155	143	0	0	0	376	15	320
13	California Street and I-10 East Ramps	1	608	277	52	481	0	401	1	395	0	0	0
14	California Street and Walmart Driveway	1	727	16	164	604	0	0	0	0	1	0	65
15	California Street and Redlands Boulevard	94	354	12	272	281	72	91	184	134	41	261	284
16	Alabama Street and I-10 West Ramps	338	430	0	0	327	127	0	0	0	240	299	190
17	Alabama Street and I-10 East Ramps	0	580	118	48	529	0	225	2	367	0	0	0
18	Alabama Street and Industrial Avenue	19	589	24	68	725	105	48	10	28	16	16	45
19	Alabama Street and Redlands Boulevard	80	397	48	74	462	175	135	224	41	66	270	84
20	Tennessee Street and Redlands Boulevard	47	556	19	126	534	17	12	103	29	34	192	63
21	Texas Street and Stuart Avenue	57	276	19	26	385	83	25	4	29	16	30	13
22	Texas Street and Oriental Avenue	2	551	16	5	399	4	34	17	28	61	3	34
23	Eureka Street and Pearl Avenue	0	33	67	5	45	0	82	436	493	43	0	10
24	Eureka Street and Stuart Avenue	8	77	4	22	492	47	14	14	2	7	7	3
25	Eureka Street and Oriental Avenue	5	84	1	8	453	43	5	2	5	0	0	0
26	Eureka Street and Redlands Boulevard	12	81	17	57	273	83	9	147	10	11	333	16
27	Orange Street and Colton Avenue	13	185	33	76	543	58	50	116	63	197	234	82
28	Orange Street and Pearl Avenue	2	657	11	9	271	15	167	265	104	16	39	228
29	Orange Street and Stuart Avenue	5	626	50	3	319	6	7	5	15	32	8	24
30	Orange Street and Oriental Avenue	1	660	0	0	360	1	0	0	0	0	0	0
31	Orange Street and Redlands Boulevard	32	519	16	43	257	38	41	100	36	15	191	106
32	6th Street and I-10 West Ramps	0	146	0	0	282	0	0	0	0	180	17	187
33	6th Street and Pearl Avenue	196	85	30	120	263	94	65	34	170	0	0	3
34	6th Street and Stuart Avenue	9	236	6	74	317	12	4	6	11	14	7	57
35	Redlands Boulevard and Citrus Avenue	161	368	33	116	164	28	17	208	88	53	293	225
36	Church Street and Stuart Avenue	37	261	0	0	282	50	24	0	37	0	0	0
37	University Street and I-10 West Ramps	424	376	20	6	131	876	0	0	1	0	7	25
38	University Street and I-10 East Ramps	0	617	0	0	134	0	274	0	423	0	0	0

No.	Intersection	AM TURNING MOVEMENT COUNTS-CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill Street	0	0	0	70	0	59	52	400	0	0	364	26
3	Waterman Avenue and Mill Street	108	468	79	75	594	90	86	289	123	106	205	60
4	Waterman Avenue and Orange Show Road	85	550	40	46	573	113	113	267	191	80	216	43
5	Waterman Avenue and Dumas Street	4	671	0	0	841	3	4	0	3	0	0	0

No.	Intersection	PM TURNING MOVEMENT COUNTS											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill Street	0	0	0	77	0	112	61	498	0	0	518	31
2	Waterman Avenue and 9th Street	90	850	139	67	731	77	120	276	62	121	237	74
3	Waterman Avenue and Mill Street	134	840	99	107	788	131	144	324	182	147	323	106
4	Waterman Avenue and Orange Show Road	184	709	121	124	833	134	157	435	150	118	390	60
5	Waterman Avenue and Dumas Street	18	1006	0	0	1114	3	1	0	2	0	0	0
6	Waterman Avenue and Washington Street	3	5	3	301	7	601	383	617	5	5	987	520
7	Tippecanoe Avenue and Victoria Avenue	1	881	40	38	847	0	1	0	1	44	0	22
8	Tippecanoe Avenue and Hospitality Lane	449	570	58	56	806	134	236	150	340	67	77	33
9	Tippecanoe Avenue and I-10 West Ramps	464	756	0	0	1007	556	0	0	0	250	16	413
10	Anderson Avenue and I-10 East Ramps	0	734	308	370	848	0	512	12	292	0	0	0
11	Anderson Avenue and Academy Drive	58	779	53	65	583	122	104	44	54	40	52	28
12	California Street and I-10 West Ramps	535	398	1	0	583	557	0	0	0	350	3	99
13	California Street and I-10 East Ramps	0	724	464	240	598	0	206	7	470	0	0	0
14	California Street and Walmart Driveway	0	1032	38	279	720	0	0	0	0	2	0	133
15	California Street and Redlands Boulevard	39	343	34	290	288	95	156	454	129	95	412	438
16	Alabama Street and I-10 West Ramps	378	1044	0	0	787	385	0	0	0	164	307	217
17	Alabama Street and I-10 East Ramps	0	1042	285	215	739	0	377	7	477	0	0	0
18	Alabama Street and Industrial Avenue	48	905	82	281	783	120	93	55	35	60	54	302
19	Alabama Street and Redlands Boulevard	110	566	90	138	508	172	260	631	74	107	378	210
20	Tennessee Street and Redlands Boulevard	66	537	46	107	534	28	269	653	80	42	288	194
21	Texas Street and Stuart Avenue	16	445	24	16	268	12	3	9	45	16	12	15
22	Texas Street and Oriental Avenue	1	520	11	6	337	0	35	9	26	54	3	30
23	Eureka Street and Pearl Avenue	0	126	235	17	50	0	170	612	465	41	0	18
24	Eureka Street and Stuart Avenue	15	295	91	38	463	28	13	22	10	39	21	6
25	Eureka Street and Oriental Avenue	7	363	22	30	501	19	14	1	12	5	3	18
26	Eureka Street and Redlands Boulevard	28	223	55	121	344	38	66	662	50	45	351	53
27	Orange Street and Colton Avenue	63	302	95	85	454	43	155	397	159	149	236	107
28	Orange Street and Pearl Avenue	20	883	74	25	387	8	261	380	218	48	43	235
29	Orange Street and Stuart Avenue	8	743	144	51	515	10	75	81	46	132	49	74
30	Orange Street and Oriental Avenue	10	846	0	0	661	31	53	0	25	0	0	0
31	Orange Street and Redlands Boulevard	64	439	44	149	385	96	185	534	86	52	312	249
32	6th Street and I-10 West Ramps	0	314	0	0	385	0	0	0	0	196	10	165
33	6th Street and Pearl Avenue	187	167	118	232	244	106	126	203	174	0	0	0
34	6th Street and Stuart Avenue	58	445	19	34	307	33	17	13	34	13	7	40
35	Redlands Boulevard and Citrus Avenue	72	268	55	156	465	102	126	292	184	49	189	116
36	Church Street and Stuart Avenue	10	267	0	0	234	16	43	0	20	0	0	0
37	University Street and I-10 West Ramps	303	594	41	10	177	418	0	0	0	1	16	11
38	University Street and I-10 East Ramps	0	512	0	0	203	0	450	1	580	0	0	0

No.	Intersection	PM TURNING MOVEMENT COUNTS-CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill Street	0	0	0	77	0	112	61	628	0	0	673	31
3	Waterman Avenue and Mill Street	215	909	99	107	863	205	213	339	228	147	323	106
4	Waterman Avenue and Orange Show Road	210	735	121	124	879	263	226	450	196	118	390	60
5	Waterman Avenue and Dumas Street	18	1065	0	0	1190	3	1	0	2	0	0	0

No.	INTERSECTION	2011 AM TURNING MOVEMENT COUNTS - AUTO											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	67	-	57	50	358	-	-	287	25
2	Waterman Ave and 9th St	40	396	47	58	586	37	41	162	43	76	195	50
3	Waterman Ave and Mill St	70	445	75	72	540	57	79	264	109	102	196	58
4	Waterman Ave and Orange Show Rd	62	508	38	44	540	65	104	243	174	77	207	41
5	Waterman Ave and Dumas St	4	609	-	-	792	3	4	-	3	-	-	-
6	Waterman Ave and Washington St	-	-	-	403	9	167	472	935	2	11	477	326
7	Tippecanoe Ave and Victoria Ave	-	447	15	17	726	2	2	-	2	56	1	29
8	Tippecanoe Ave and Hospitality Lane	162	435	19	49	482	57	57	24	58	49	109	58
9	Tippecanoe Ave and I-10 WB Ramps	283	538	-	-	409	292	-	-	-	460	10	282
10	Anderson Ave and I-10 EB Ramps	-	528	180	98	741	-	316	-	271	-	-	-
11	Anderson Ave and Academy Dr	165	412	15	24	933	353	253	130	208	76	222	37
12	California St and I-10 WB Ramps	406	556	-	1	145	133	-	-	-	351	14	298
13	California St and I-10 EB Ramps	1	580	264	50	459	-	383	1	377	-	-	-
14	California St and Walmart Driveway	1	694	15	157	576	-	-	-	-	1	-	62
15	California St and Redlands Blvd	90	338	11	260	268	69	87	176	128	39	249	271
16	Alabama St and I-10 WB Ramps	328	417	-	-	317	123	-	-	-	233	290	184
17	Alabama St and I-10 EB Ramps	-	563	115	47	513	-	218	2	356	-	-	-
18	Alabama St and Industrial Ave	18	572	23	66	704	102	47	10	27	16	16	44
19	Alabama St and Redlands Blvd	78	385	47	72	448	170	131	217	40	64	262	82
20	Tennessee St and Redlands Blvd	46	543	19	123	522	17	12	101	28	33	188	62
21	Texas St and Stuart Ave	56	270	19	25	376	81	24	4	28	16	29	13
22	Texas St and Oriental Ave	2	538	16	5	390	4	33	17	27	60	3	33
23	Eureka St and Pearl Ave	-	32	65	5	44	-	80	426	482	42	-	10
24	Eureka St and Stuart Ave	8	75	4	21	481	46	14	14	2	7	7	3
25	Eureka St and Oriental Ave	5	82	1	8	442	42	5	2	5	-	-	-
26	Eureka St and Redlands Blvd	12	79	17	56	267	81	9	144	10	11	325	16
27	Orange St and Colton Ave	13	182	33	75	536	57	49	114	62	194	231	81
28	Orange St and Pearl Ave	2	648	11	9	267	15	165	261	103	16	38	225
29	Orange St and Stuart Ave	5	617	49	3	315	6	7	5	15	32	8	24
30	Orange St and Oriental Ave	1	651	-	-	355	1	-	-	-	-	-	-
31	Orange St and Redlands Blvd	32	512	16	42	254	37	40	99	36	15	188	105
32	6th St and I-10 WB Ramp	-	144	-	-	278	-	-	-	-	178	17	184
33	6th St and Pearl Ave	193	84	30	118	259	93	64	34	168	-	-	3
34	6th St and Stuart Ave	9	233	6	73	313	12	4	6	11	14	7	56
35	Redlands Blvd and Citrus Ave	159	363	33	114	162	28	17	205	87	52	289	222
36	Church St and Stuart Ave	37	257	-	-	278	49	24	-	36	-	-	-
37	University Ave and I-10 WB Ramps	418	371	20	6	129	864	-	-	1	-	7	25
38	University Ave and I-10 EB Ramps	-	609	-	-	132	-	270	-	417	-	-	-

No.	INTERSECTION	2011 AM TURNING MOVEMENT COUNTS - AUTO - CENTRAL AVNEUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	67	-	57	50	383	-	-	349	25
3	Waterman Ave and Mill St	103	448	76	72	569	86	82	277	118	102	196	58
4	Waterman Ave and Orange Show Rd	81	527	38	44	549	108	108	256	183	77	207	41
5	Waterman Ave and Dumas St	4	643	-	-	806	3	4	-	3	-	-	-

No.	INTERSECTION	2011 PM TURNING MOVEMENT COUNTS - AUTO											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	76	-	110	60	491	-	-	511	31
2	Waterman Ave and 9th St	89	838	137	66	721	76	118	272	61	119	234	73
3	Waterman Ave and Mill St	132	828	98	105	777	129	142	319	179	145	318	105
4	Waterman Ave and Orange Show Rd	181	699	119	122	821	132	155	429	148	116	385	59
5	Waterman Ave and Dumas St	18	992	-	-	1098	3	1	-	2	-	-	-
6	Waterman Ave and Washington St	3	5	3	297	7	593	378	608	5	5	973	513
7	Tippecanoe Ave and Victoria Ave	1	869	39	37	835	-	1	-	1	43	-	22
8	Tippecanoe Ave and Hospitality Lane	443	562	57	55	795	132	233	148	335	66	76	33
9	Tippecanoe Ave and I-10 WB Ramps	457	745	-	-	993	548	-	-	-	246	16	407
10	Anderson Ave and I-10 EB Ramps	-	723	303	365	836	-	504	12	288	-	-	-
11	Anderson Ave and Academy Dr	57	768	52	64	574	120	102	43	53	39	51	28
12	California St and I-10 WB Ramps	514	383	1	-	561	535	-	-	-	336	3	95
13	California St and I-10 EB Ramps	-	702	450	233	580	-	200	7	455	-	-	-
14	California St and Walmart Driveway	-	1000	37	270	698	-	-	-	-	2	-	129
15	California St and Redlands Blvd	38	332	33	281	279	92	151	440	125	92	399	424
16	Alabama St and I-10 WB Ramps	374	1032	-	-	778	381	-	-	-	162	304	215
17	Alabama St and I-10 EB Ramps	-	1030	282	213	731	-	373	7	472	-	-	-
18	Alabama St and Industrial Ave	47	895	81	278	774	119	92	54	35	59	53	299
19	Alabama St and Redlands Blvd	109	560	89	136	502	170	257	624	73	106	374	208
20	Tennessee St and Redlands Blvd	66	534	46	106	531	28	267	649	80	42	286	193
21	Texas St and Stuart Ave	16	442	24	16	266	12	3	9	45	16	12	15
22	Texas St and Oriental Ave	1	517	11	6	335	-	35	9	26	54	3	30
23	Eureka St and Pearl Ave	-	125	234	17	50	-	169	609	462	41	-	18
24	Eureka St and Stuart Ave	15	293	90	38	460	28	13	22	10	39	21	6
25	Eureka St and Oriental Ave	7	361	22	30	498	19	14	1	12	5	3	18
26	Eureka St and Redlands Blvd	28	222	55	120	342	38	66	658	50	45	349	53
27	Orange St and Colton Ave	63	300	95	85	452	43	154	395	158	148	235	106
28	Orange St and Pearl Ave	20	879	74	25	385	8	260	378	217	48	43	234
29	Orange St and Stuart Ave	8	739	143	51	512	10	75	81	46	131	49	74
30	Orange St and Oriental Ave	10	842	-	-	658	31	53	-	25	-	-	-
31	Orange St and Redlands Blvd	64	437	44	148	383	96	184	531	86	52	310	248
32	6th St and I-10 WB Ramp	-	312	-	-	383	-	-	-	-	195	10	164
33	6th St and Pearl Ave	186	166	117	231	243	105	125	202	173	-	-	-
34	6th St and Stuart Ave	58	443	19	34	305	33	17	13	34	13	7	40
35	Redlands Blvd and Citrus Ave	72	267	55	155	463	101	125	291	183	49	188	115
36	Church St and Stuart Ave	10	266	-	-	233	16	43	-	20	-	-	-
37	University Ave and I-10 WB Ramps	301	591	41	10	176	416	-	-	-	1	16	11
38	University Ave and I-10 EB Ramps	-	509	-	-	202	-	448	1	577	-	-	-

No.	INTERSECTION	2011 PM TURNING MOVEMENT COUNTS - AUTO - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	76	-	110	60	619	-	-	664	31
3	Waterman Ave and Mill St	212	896	98	105	851	202	210	334	225	145	318	105
4	Waterman Ave and Orange Show Rd	207	725	119	122	867	259	223	444	193	116	385	59
5	Waterman Ave and Dumas St	18	1050	-	-	1173	3	1	-	2	-	-	-

No.	INTERSECTION	2011 AM TURNING MOVEMENT COUNTS - TOTAL TRUCKS												AM PEAK % TRUCK
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	3	0	2	2	16	0	0	12	1	0.0417
2	Waterman Ave and 9th St	2	17	2	3	25	2	2	7	2	3	8	2	0.0417
3	Waterman Ave and Mill St	3	19	3	3	24	3	3	12	5	4	9	2	0.0417
4	Waterman Ave and Orange Show Rd	3	22	2	2	24	3	5	11	8	3	9	2	0.0417
5	Waterman Ave and Dumas St	0	27	0	0	34	0	0	0	0	0	0	0	0.0417
6	Waterman Ave and Washington St	0	0	0	18	0	7	21	41	0	0	21	14	0.0417
7	Tippecanoe Ave and Victoria Ave	0	19	1	1	32	0	0	0	0	2	0	1	0.0417
8	Tippecanoe Ave and Hospitality Lane	7	19	1	2	21	3	2	1	3	2	5	3	0.0417
9	Tippecanoe Ave and I-10 WB Ramps	12	23	0	0	18	13	0	0	0	20	0	12	0.0417
10	Anderson Ave and I-10 EB Ramps	0	12	4	2	17	0	7	0	6	0	0	0	0.0223
11	Anderson Ave and Academy Dr	4	9	0	1	21	8	6	3	5	2	5	1	0.0223
12	California St and I-10 WB Ramps	29	40	0	0	10	10	0	0	0	25	1	22	0.0674
13	California St and I-10 EB Ramps	0	28	13	2	22	0	18	0	18	0	0	0	0.0457
14	California St and Walmart Driveway	0	33	1	7	28	0	0	0	0	0	0	3	0.0457
15	California St and Redlands Blvd	4	16	1	12	13	3	4	8	6	2	12	13	0.0457
16	Alabama St and I-10 WB Ramps	10	13	0	0	10	4	0	0	0	7	9	6	0.0295
17	Alabama St and I-10 EB Ramps	0	17	3	1	16	0	7	0	11	0	0	0	0.0295
18	Alabama St and Industrial Ave	1	17	1	2	21	3	1	0	1	0	0	1	0.0295
19	Alabama St and Redlands Blvd	2	12	1	2	14	5	4	7	1	2	8	2	0.0295
20	Tennessee St and Redlands Blvd	1	13	0	3	12	0	0	2	1	1	4	1	0.0233
21	Texas St and Stuart Ave	1	6	0	1	9	2	1	0	1	0	1	0	0.0233
22	Texas St and Oriental Ave	0	13	0	0	9	0	1	0	1	1	0	1	0.0233
23	Eureka St and Pearl Ave	0	1	2	0	1	0	2	10	11	1	0	0	0.0233
24	Eureka St and Stuart Ave	0	2	0	1	11	1	0	0	0	0	0	0	0.0233
25	Eureka St and Oriental Ave	0	2	0	0	11	1	0	0	0	0	0	0	0.0233
26	Eureka St and Redlands Blvd	0	2	0	1	6	2	0	3	0	0	8	0	0.0233
27	Orange St and Colton Ave	0	3	0	1	7	1	1	2	1	3	3	1	0.0136
28	Orange St and Pearl Ave	0	9	0	0	4	0	2	4	1	0	1	3	0.0136
29	Orange St and Stuart Ave	0	9	1	0	4	0	0	0	0	0	0	0	0.0136
30	Orange St and Oriental Ave	0	9	0	0	5	0	0	0	0	0	0	0	0.0136
31	Orange St and Redlands Blvd	0	7	0	1	3	1	1	1	0	0	3	1	0.0136
32	6th St and I-10 WB Ramp	0	2	0	0	4	0	0	0	0	2	0	3	0.0136
33	6th St and Pearl Ave	3	1	0	2	4	1	1	0	2	0	0	0	0.0136
34	6th St and Stuart Ave	0	3	0	1	4	0	0	0	0	0	0	1	0.0136
35	Redlands Blvd and Citrus Ave	2	5	0	2	2	0	0	3	1	1	4	3	0.0136
36	Church St and Stuart Ave	0	4	0	0	4	1	0	0	1	0	0	0	0.0136
37	University Ave and I-10 WB Ramps	6	5	0	0	2	12	0	0	0	0	0	0	0.0136
38	University Ave and I-10 EB Ramps	0	8	0	0	2	0	4	0	6	0	0	0	0.0136

No.	INTERSECTION	2011 AM TURNING MOVEMENT COUNTS - TOTAL TRUCKS - CENTRAL AVENUE												AM PEAK % TRUCK
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	3	0	2	2	17	0	0	15	1	0.0417
3	Waterman Ave and Mill St	5	20	3	3	25	4	4	12	5	4	9	2	0.0417
4	Waterman Ave and Orange Show Rd	4	23	2	2	24	5	5	11	8	3	9	2	0.0417
5	Waterman Ave and Dumas St	0	28	0	0	35	0	0	0	0	0	0	0	0.0417

No.	INTERSECTION	2011 PM TURNING MOVEMENT COUNTS - TOTAL TRUCKS												PM PEAK % TRUCK
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	1	0	2	1	7	0	0	7	0	0.0141
2	Waterman Ave and 9th St	1	12	2	1	10	1	2	4	1	2	3	1	0.0141
3	Waterman Ave and Mill St	2	12	1	2	11	2	2	5	3	2	5	1	0.0141
4	Waterman Ave and Orange Show Rd	3	10	2	2	12	2	2	6	2	2	5	1	0.0141
5	Waterman Ave and Dumas St	0	14	0	0	16	0	0	0	0	0	0	0	0.0141
6	Waterman Ave and Washington St	0	0	0	4	0	8	5	9	0	0	14	7	0.0141
7	Tippecanoe Ave and Victoria Ave	0	12	1	1	12	0	0	0	0	1	0	0	0.0141
8	Tippecanoe Ave and Hospitality Lane	6	8	1	1	11	2	3	2	5	1	1	0	0.0141
9	Tippecanoe Ave and I-10 WB Ramps	7	11	0	0	14	8	0	0	0	4	0	6	0.0141
10	Anderson Ave and I-10 EB Ramps	0	11	5	5	12	0	8	0	4	0	0	0	0.0147
11	Anderson Ave and Academy Dr	1	11	1	1	9	2	2	1	1	1	1	0	0.0147
12	California St and I-10 WB Ramps	21	15	0	0	22	22	0	0	0	14	0	4	0.0386
13	California St and I-10 EB Ramps	0	22	14	7	18	0	6	0	15	0	0	0	0.0309
14	California St and Walmart Driveway	0	32	1	9	22	0	0	0	0	0	0	4	0.0309
15	California St and Redlands Blvd	1	11	1	9	9	3	5	14	4	3	13	14	0.0309
16	Alabama St and I-10 WB Ramps	4	12	0	0	9	4	0	0	0	2	3	2	0.0112
17	Alabama St and I-10 EB Ramps	0	12	3	2	8	0	4	0	5	0	0	0	0.0112
18	Alabama St and Industrial Ave	1	10	1	3	9	1	1	1	0	1	1	3	0.0112
19	Alabama St and Redlands Blvd	1	6	1	2	6	2	3	7	1	1	4	2	0.0112
20	Tennessee St and Redlands Blvd	0	3	0	1	3	0	2	4	0	0	2	1	0.0057
21	Texas St and Stuart Ave	0	3	0	0	2	0	0	0	0	0	0	0	0.0057
22	Texas St and Oriental Ave	0	3	0	0	2	0	0	0	0	0	0	0	0.0057
23	Eureka St and Pearl Ave	0	1	1	0	0	0	1	3	3	0	0	0	0.0057
24	Eureka St and Stuart Ave	0	2	1	0	3	0	0	0	0	0	0	0	0.0057
25	Eureka St and Oriental Ave	0	2	0	0	3	0	0	0	0	0	0	0	0.0057
26	Eureka St and Redlands Blvd	0	1	0	1	2	0	0	4	0	0	2	0	0.0057
27	Orange St and Colton Ave	0	2	0	0	2	0	1	2	1	1	1	1	0.0050
28	Orange St and Pearl Ave	0	4	0	0	2	0	1	2	1	0	0	1	0.0050
29	Orange St and Stuart Ave	0	4	1	0	3	0	0	0	0	1	0	0	0.0050
30	Orange St and Oriental Ave	0	4	0	0	3	0	0	0	0	0	0	0	0.0050
31	Orange St and Redlands Blvd	0	2	0	1	2	0	1	3	0	0	2	1	0.0050
32	6th St and I-10 WB Ramp	0	2	0	0	2	0	0	0	0	1	0	1	0.0050
33	6th St and Pearl Ave	1	1	1	1	1	1	1	1	1	0	0	0	0.0050
34	6th St and Stuart Ave	0	2	0	0	2	0	0	0	0	0	0	0	0.0050
35	Redlands Blvd and Citrus Ave	0	1	0	1	2	1	1	1	1	0	1	1	0.0050
36	Church St and Stuart Ave	0	1	0	0	1	0	0	0	0	0	0	0	0.0050
37	University Ave and I-10 WB Ramps	2	3	0	0	1	2	0	0	0	0	0	0	0.0050
38	University Ave and I-10 EB Ramps	0	3	0	0	1	0	2	0	3	0	0	0	0.0050

No.	INTERSECTION	2011 PM TURNING MOVEMENT COUNTS - TOTAL TRUCKS - CENTRAL AVENUE												PM PEAK % TRUCK
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	1	0	2	1	9	0	0	9	0	0.0141
3	Waterman Ave and Mill St	3	13	1	2	12	3	3	5	3	2	5	1	0.0141
4	Waterman Ave and Orange Show Rd	3	10	2	2	12	4	3	6	3	2	5	1	0.0141
5	Waterman Ave and Dumas St	0	15	0	0	17	0	0	0	0	0	0	0	0.0141

No.	INTERSECTION	2011 AM TURNING MOVEMENT COUNTS - TOTAL PCE TRUCKS 2 AXLE = 1.5; 3 AXLE = 2; 4+ AXLE = 3												AVG PCE FACTOR AM
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	9	0	6	6	46	0	0	34	3	2.84
2	Waterman Ave and 9th St	6	48	6	9	71	6	6	20	6	9	23	6	2.84
3	Waterman Ave and Mill St	9	54	9	9	68	9	9	34	14	11	26	6	2.84
4	Waterman Ave and Orange Show Rd	9	63	6	6	68	9	14	31	23	9	26	6	2.84
5	Waterman Ave and Dumas St	0	77	0	0	97	0	0	0	0	0	0	0	2.84
6	Waterman Ave and Washington St	0	0	0	51	0	20	60	117	0	0	60	40	2.84
7	Tippecanoe Ave and Victoria Ave	0	54	3	3	91	0	0	0	0	6	0	3	2.84
8	Tippecanoe Ave and Hospitality Lane	20	54	3	6	60	9	6	3	9	6	14	9	2.84
9	Tippecanoe Ave and I-10 WB Ramps	34	65	0	0	51	37	0	0	0	57	0	34	2.84
10	Anderson Ave and I-10 EB Ramps	0	26	9	4	37	0	15	0	13	0	0	0	2.15
11	Anderson Ave and Academy Dr	9	19	0	2	45	17	13	6	11	4	11	2	2.15
12	California St and I-10 WB Ramps	80	111	0	0	28	28	0	0	0	69	3	61	2.76
13	California St and I-10 EB Ramps	0	76	35	5	60	0	49	0	49	0	0	0	2.73
14	California St and Walmart Driveway	0	90	3	19	76	0	0	0	0	0	0	8	2.73
15	California St and Redlands Blvd	11	44	3	33	35	8	11	22	16	5	33	35	2.73
16	Alabama St and I-10 WB Ramps	21	28	0	0	21	8	0	0	0	15	19	13	2.12
17	Alabama St and I-10 EB Ramps	0	36	6	2	34	0	15	0	23	0	0	0	2.12
18	Alabama St and Industrial Ave	2	36	2	4	44	6	2	0	2	0	0	2	2.12
19	Alabama St and Redlands Blvd	4	25	2	4	30	11	8	15	2	4	17	4	2.12
20	Tennessee St and Redlands Blvd	2	24	0	5	22	0	0	4	2	2	7	2	1.83
21	Texas St and Stuart Ave	2	11	0	2	16	4	2	0	2	0	2	0	1.83
22	Texas St and Oriental Ave	0	24	0	0	16	0	2	0	2	2	0	2	1.83
23	Eureka St and Pearl Ave	0	2	4	0	2	0	4	18	20	2	0	0	1.83
24	Eureka St and Stuart Ave	0	4	0	2	20	2	0	0	0	0	0	0	1.83
25	Eureka St and Oriental Ave	0	4	0	0	20	2	0	0	0	0	0	0	1.83
26	Eureka St and Redlands Blvd	0	4	0	2	11	4	0	5	0	0	15	0	1.83
27	Orange St and Colton Ave	0	5	0	2	12	2	2	4	2	5	5	2	1.75
28	Orange St and Pearl Ave	0	16	0	0	7	0	4	7	2	0	2	5	1.75
29	Orange St and Stuart Ave	0	16	2	0	7	0	0	0	0	0	0	0	1.75
30	Orange St and Oriental Ave	0	16	0	0	9	0	0	0	0	0	0	0	1.75
31	Orange St and Redlands Blvd	0	12	0	2	5	2	2	2	0	0	5	2	1.75
32	6th St and I-10 WB Ramp	0	4	0	0	7	0	0	0	0	4	0	5	1.75
33	6th St and Pearl Ave	5	2	0	4	7	2	2	0	4	0	0	0	1.75
34	6th St and Stuart Ave	0	5	0	2	7	0	0	0	0	0	0	2	1.75
35	Redlands Blvd and Citrus Ave	4	9	0	4	4	0	0	5	2	2	7	5	1.75
36	Church St and Stuart Ave	0	7	0	0	7	2	0	0	2	0	0	0	1.75
37	University Ave and I-10 WB Ramps	11	9	0	0	4	21	0	0	0	0	0	0	1.75
38	University Ave and I-10 EB Ramps	0	14	0	0	4	0	7	0	11	0	0	0	1.75

No.	INTERSECTION	2011 AM TURNING MOVEMENT COUNTS - TOTAL PCE TRUCKS - CENTRAL AVENUE 2 AXLE = 1.5; 3 AXLE = 2; 4+ AXLE = 3												AVG PCE FACTOR AM
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	9	0	6	6	48	0	0	43	3	2.84
3	Waterman Ave and Mill St	14	57	9	9	71	11	11	34	14	11	26	6	2.84
4	Waterman Ave and Orange Show Rd	11	65	6	6	68	14	14	31	23	9	26	6	2.84
5	Waterman Ave and Dumas St	0	80	0	0	100	0	0	0	0	0	0	0	2.84

No.	INTERSECTION	2011 PM TURNING MOVEMENT COUNTS - TOTAL PCE TRUCKS 2 AXLE = 1.5; 3 AXLE = 2; 4+ AXLE = 3												AVG PCE FACTOR PM
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	2	0	4	2	16	0	0	16	0	2.22
2	Waterman Ave and 9th St	2	27	4	2	22	2	4	9	2	4	7	2	2.22
3	Waterman Ave and Mill St	4	27	2	4	24	4	4	11	7	4	11	2	2.22
4	Waterman Ave and Orange Show Rd	7	22	4	4	27	4	4	13	4	4	11	2	2.22
5	Waterman Ave and Dumas St	0	31	0	0	36	0	0	0	0	0	0	0	2.22
6	Waterman Ave and Washington St	0	0	0	9	0	18	11	20	0	0	31	16	2.22
7	Tippecanoe Ave and Victoria Ave	0	27	2	2	27	0	0	0	0	2	0	0	2.22
8	Tippecanoe Ave and Hospitality Lane	13	18	2	2	24	4	7	4	11	2	2	0	2.22
9	Tippecanoe Ave and I-10 WB Ramps	16	24	0	0	31	18	0	0	0	9	0	13	2.22
10	Anderson Ave and I-10 EB Ramps	0	23	11	11	25	0	17	0	8	0	0	0	2.12
11	Anderson Ave and Academy Dr	2	23	2	2	19	4	4	2	2	2	2	0	2.12
12	California St and I-10 WB Ramps	64	46	0	0	67	67	0	0	0	43	0	12	3.05
13	California St and I-10 EB Ramps	0	69	44	22	57	0	19	0	47	0	0	0	3.14
14	California St and Walmart Driveway	0	101	3	28	69	0	0	0	0	0	0	13	3.14
15	California St and Redlands Blvd	3	35	3	28	28	9	16	44	13	9	41	44	3.14
16	Alabama St and I-10 WB Ramps	8	25	0	0	19	8	0	0	0	4	6	4	2.06
17	Alabama St and I-10 EB Ramps	0	25	6	4	16	0	8	0	10	0	0	0	2.06
18	Alabama St and Industrial Ave	2	21	2	6	19	2	2	2	0	2	2	6	2.06
19	Alabama St and Redlands Blvd	2	12	2	4	12	4	6	14	2	2	8	4	2.06
20	Tennessee St and Redlands Blvd	0	6	0	2	6	0	4	8	0	0	4	2	1.92
21	Texas St and Stuart Ave	0	6	0	0	4	0	0	0	0	0	0	0	1.92
22	Texas St and Oriental Ave	0	6	0	0	4	0	0	0	0	0	0	0	1.92
23	Eureka St and Pearl Ave	0	2	2	0	0	0	2	6	6	0	0	0	1.92
24	Eureka St and Stuart Ave	0	4	2	0	6	0	0	0	0	0	0	0	1.92
25	Eureka St and Oriental Ave	0	4	0	0	6	0	0	0	0	0	0	0	1.92
26	Eureka St and Redlands Blvd	0	2	0	2	4	0	0	8	0	0	4	0	1.92
27	Orange St and Colton Ave	0	3	0	0	3	0	2	3	2	2	2	2	1.73
28	Orange St and Pearl Ave	0	7	0	0	3	0	2	3	2	0	0	2	1.73
29	Orange St and Stuart Ave	0	7	2	0	5	0	0	0	0	2	0	0	1.73
30	Orange St and Oriental Ave	0	7	0	0	5	0	0	0	0	0	0	0	1.73
31	Orange St and Redlands Blvd	0	3	0	2	3	0	2	5	0	0	3	2	1.73
32	6th St and I-10 WB Ramp	0	3	0	0	3	0	0	0	0	2	0	2	1.73
33	6th St and Pearl Ave	2	2	2	2	2	2	2	2	2	0	0	0	1.73
34	6th St and Stuart Ave	0	3	0	0	3	0	0	0	0	0	0	0	1.73
35	Redlands Blvd and Citrus Ave	0	2	0	2	3	2	2	2	2	0	2	2	1.73
36	Church St and Stuart Ave	0	2	0	0	2	0	0	0	0	0	0	0	1.73
37	University Ave and I-10 WB Ramps	3	5	0	0	2	3	0	0	0	0	0	0	1.73
38	University Ave and I-10 EB Ramps	0	5	0	0	2	0	3	0	5	0	0	0	1.73

No.	INTERSECTION	2011 PM TURNING MOVEMENT COUNTS - TOTAL PCE TRUCKS - CENTRAL AVENUE 2 AXLE = 1.5; 3 AXLE = 2; 4+ AXLE = 3												AVG PCE FACTOR PM
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	2	0	4	2	20	0	0	20	0	2.22
3	Waterman Ave and Mill St	7	29	2	4	27	7	7	11	7	4	11	2	2.22
4	Waterman Ave and Orange Show Rd	7	22	4	4	27	9	7	13	7	4	11	2	2.22
5	Waterman Ave and Dumas St	0	33	0	0	38	0	0	0	0	0	0	0	2.22

No.	INTERSECTION	2011 AM TURNING MOVEMENT COUNTS - TOTAL (AUTO + PCE TRUCKS)											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	76	-	63	56	404	-	-	321	28
2	Waterman Ave and 9th St	46	444	53	67	657	43	47	182	49	85	218	56
3	Waterman Ave and Mill St	79	499	84	81	608	66	88	298	123	113	222	64
4	Waterman Ave and Orange Show Rd	71	571	44	50	608	74	118	274	197	86	233	47
5	Waterman Ave and Dumas St	4	686	-	-	889	3	4	-	3	-	-	-
6	Waterman Ave and Washington St	0	0	0	454	9	187	532	1052	2	11	537	366
7	Tippecanoe Ave and Victoria Ave	0	501	18	20	817	2	2	0	2	62	1	32
8	Tippecanoe Ave and Hospitality Lane	182	489	22	55	542	66	63	27	67	55	123	67
9	Tippecanoe Ave and I-10 WB Ramps	317	603	-	-	460	329	-	-	-	517	10	316
10	Anderson Ave and I-10 EB Ramps	-	554	189	102	778	-	331	0	284	-	-	-
11	Anderson Ave and Academy Dr	174	431	15	26	978	370	266	136	219	80	233	39
12	California St and I-10 WB Ramps	486	667	-	-	173	161	-	-	-	420	17	359
13	California St and I-10 EB Ramps	-	656	299	55	519	-	432	1	426	-	-	-
14	California St and Walmart Driveway	-	784	18	176	652	-	-	-	-	1	-	70
15	California St and Redlands Blvd	101	382	14	293	303	77	98	198	144	44	282	306
16	Alabama St and I-10 WB Ramps	349	445	-	-	338	131	-	-	-	248	309	197
17	Alabama St and I-10 EB Ramps	-	599	121	49	547	-	233	2	379	-	-	-
18	Alabama St and Industrial Ave	20	608	25	70	748	108	49	10	29	16	16	46
19	Alabama St and Redlands Blvd	82	410	49	76	478	181	139	232	42	68	279	86
20	Tennessee St and Redlands Blvd	48	567	19	128	544	17	12	105	30	35	195	64
21	Texas St and Stuart Ave	58	281	19	27	392	85	26	4	30	16	31	13
22	Texas St and Oriental Ave	2	562	16	5	406	4	35	17	29	62	3	35
23	Eureka St and Pearl Ave	-	34	69	5	46	-	84	444	502	44	-	10
24	Eureka St and Stuart Ave	8	79	4	23	501	48	14	14	2	7	7	3
25	Eureka St and Oriental Ave	5	86	1	8	462	44	5	2	5	0	0	0
26	Eureka St and Redlands Blvd	12	83	17	58	278	85	9	149	10	11	340	16
27	Orange St and Colton Ave	13	187	33	77	548	59	51	118	64	199	236	83
28	Orange St and Pearl Ave	2	664	11	9	274	15	169	268	105	16	40	230
29	Orange St and Stuart Ave	5	633	51	3	322	6	7	5	15	32	8	24
30	Orange St and Oriental Ave	1	667	-	-	364	1	0	-	0	-	-	-
31	Orange St and Redlands Blvd	32	524	16	44	259	39	42	101	36	15	193	107
32	6th St and I-10 WB Ramp	-	148	-	-	285	-	-	-	-	182	17	189
33	6th St and Pearl Ave	198	86	30	122	266	95	66	34	172	-	-	-
34	6th St and Stuart Ave	9	238	6	75	320	12	4	6	11	14	7	58
35	Redlands Blvd and Citrus Ave	163	372	33	118	166	28	17	210	89	54	296	227
36	Church St and Stuart Ave	37	264	-	-	285	51	24	-	38	-	-	-
37	University Ave and I-10 WB Ramps	429	380	20	6	133	885	-	-	-	-	7	25
38	University Ave and I-10 EB Ramps	-	623	-	-	136	-	277	-	428	-	-	-

No.	INTERSECTION	2011 AM TURNING MOVEMENT COUNTS - TOTAL (AUTO + PCE TRUCKS) - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	76	-	63	56	431	-	-	392	28
3	Waterman Ave and Mill St	117	505	85	81	640	97	93	311	132	113	222	64
4	Waterman Ave and Orange Show Rd	92	592	44	50	617	122	122	287	206	86	233	47
5	Waterman Ave and Dumas St	4	723	-	-	906	3	4	-	3	-	-	-

No.	INTERSECTION	2011 PM TURNING MOVEMENT COUNTS - TOTAL (AUTO + PCE TRUCKS)											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	78	-	114	62	507	-	-	527	31
2	Waterman Ave and 9th St	91	865	141	68	743	78	122	281	63	123	241	75
3	Waterman Ave and Mill St	136	855	100	109	801	133	146	330	186	149	329	107
4	Waterman Ave and Orange Show Rd	188	721	123	126	848	136	159	442	152	120	396	61
5	Waterman Ave and Dumas St	18	1023	-	-	1134	3	1	-	2	-	-	-
6	Waterman Ave and Washington St	3	5	3	306	7	611	389	628	5	5	1004	529
7	Tippecanoe Ave and Victoria Ave	1	896	41	39	862	0	1	0	1	45	0	22
8	Tippecanoe Ave and Hospitality Lane	456	580	59	57	819	136	240	152	346	68	78	33
9	Tippecanoe Ave and I-10 WB Ramps	473	769	-	-	1024	566	-	-	-	255	16	420
10	Anderson Ave and I-10 EB Ramps	-	746	314	376	861	-	521	12	296	-	-	-
11	Anderson Ave and Academy Dr	59	791	54	66	593	124	106	45	55	41	53	28
12	California St and I-10 WB Ramps	578	429	-	-	628	602	-	-	-	379	3	107
13	California St and I-10 EB Ramps	-	771	494	255	637	-	219	7	502	-	-	-
14	California St and Walmart Driveway	-	1101	40	298	767	-	-	-	-	2	-	142
15	California St and Redlands Blvd	41	367	36	309	307	101	167	484	138	101	440	468
16	Alabama St and I-10 WB Ramps	382	1057	-	-	797	389	-	-	-	166	310	219
17	Alabama St and I-10 EB Ramps	-	1055	288	217	747	-	381	7	482	-	-	-
18	Alabama St and Industrial Ave	49	916	83	284	793	121	94	56	35	61	55	305
19	Alabama St and Redlands Blvd	111	572	91	140	514	174	263	638	75	108	382	212
20	Tennessee St and Redlands Blvd	66	540	46	108	537	28	271	657	80	42	290	195
21	Texas St and Stuart Ave	16	448	24	16	270	12	3	9	45	16	12	15
22	Texas St and Oriental Ave	1	523	11	6	339	0	35	9	26	54	3	30
23	Eureka St and Pearl Ave	-	127	236	17	50	-	171	615	468	41	-	18
24	Eureka St and Stuart Ave	15	297	92	38	466	28	13	22	10	39	21	6
25	Eureka St and Oriental Ave	7	365	22	30	504	19	14	1	12	5	3	18
26	Eureka St and Redlands Blvd	28	224	55	122	346	38	66	666	50	45	353	53
27	Orange St and Colton Ave	63	303	95	85	455	43	156	398	160	150	237	108
28	Orange St and Pearl Ave	20	886	74	25	388	8	262	381	219	48	43	236
29	Orange St and Stuart Ave	8	746	145	51	517	10	75	81	46	133	49	74
30	Orange St and Oriental Ave	10	849	-	-	663	31	53	-	25	-	-	-
31	Orange St and Redlands Blvd	64	440	44	150	386	96	186	536	86	52	313	250
32	6th St and I-10 WB Ramp	-	315	-	-	386	-	-	-	-	197	10	166
33	6th St and Pearl Ave	188	168	119	233	245	107	127	204	175	-	-	-
34	6th St and Stuart Ave	58	446	19	34	308	33	17	13	34	13	7	40
35	Redlands Blvd and Citrus Ave	72	269	55	157	466	103	127	293	185	49	190	117
36	Church St and Stuart Ave	10	268	-	-	235	16	43	-	20	-	-	-
37	University Ave and I-10 WB Ramps	304	596	41	10	178	419	-	-	-	1	16	11
38	University Ave and I-10 EB Ramps	-	514	-	-	204	-	451	-	582	-	-	-

No.	INTERSECTION	2011 PM TURNING MOVEMENT COUNTS - TOTAL (AUTO + PCE TRUCKS) - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	78	-	114	62	639	-	-	684	31
3	Waterman Ave and Mill St	219	925	100	109	878	209	217	345	232	149	329	107
4	Waterman Ave and Orange Show Rd	214	747	123	126	894	268	230	457	200	120	396	61
5	Waterman Ave and Dumas St	18	1083	-	-	1211	3	1	-	2	-	-	-

No.	Intersection	AM TURNING MOVEMENT COUNTS											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill Street	0	0	0	86	0	73	58	419	0	0	339	30
2	Waterman Avenue and 9th Street	45	440	53	74	739	47	45	179	47	89	230	58
3	Waterman Avenue and Mill Street	88	563	95	78	591	63	85	286	118	153	295	86
4	Waterman Avenue and Orange Show Road	70	567	43	67	823	99	164	380	272	86	231	46
5	Waterman Avenue and Dumas Street	4	683	0	0	1005	4	4	0	3	0	0	0
6	Waterman Avenue and Washington Street	2	2	1	459	10	190	532	1054	2	12	540	369
7	Tippecanoe Avenue and Victoria Avenue	0	497	17	22	921	2	1	0	1	69	1	36
8	Tippecanoe Avenue and Hospitality Lane	180	485	21	61	601	72	82	35	85	56	126	67
9	Tippecanoe Avenue and I-10 West Ramps	318	606	0	0	514	367	0	0	0	538	11	330
10	Anderson Avenue and I-10 East Ramps	0	627	213	111	836	0	344	0	296	0	0	0
11	Anderson Avenue and Academy Drive	184	460	16	28	1082	410	283	146	233	87	252	42
12	California Street and I-10 West Ramps	485	664	0	2	229	212	0	0	0	437	18	372
13	California Street and I-10 East Ramps	1	649	296	76	697	0	434	1	428	0	0	0
14	California Street and Walmart Driveway	1	784	17	184	675	0	0	0	0	1	0	74
15	California Street and Redlands Boulevard	141	529	18	306	316	81	125	254	185	44	279	303
16	Alabama Street and I-10 West Ramps	405	517	0	0	379	148	0	0	0	318	396	252
17	Alabama Street and I-10 East Ramps	0	770	157	57	627	0	246	2	401	0	0	0
18	Alabama Street and Industrial Avenue	27	848	34	74	787	114	61	12	35	19	19	55
19	Alabama Street and Redlands Boulevard	85	423	51	80	499	189	182	302	56	74	301	94
20	Tennessee Street and Redlands Boulevard	50	593	20	134	570	18	13	108	30	37	205	67
21	Texas Street and Stuart Avenue	60	292	20	31	454	98	25	4	29	16	29	13
22	Texas Street and Oriental Avenue	2	522	15	5	441	4	6	3	5	21	1	12
23	Eureka Street and Pearl Avenue	0	33	68	6	60	0	88	465	525	57	0	14
24	Eureka Street and Stuart Avenue	9	83	4	24	527	50	15	15	2	8	8	3
25	Eureka Street and Oriental Avenue	6	94	1	9	487	46	5	2	5	0	0	0
26	Eureka Street and Redlands Boulevard	13	91	19	61	295	89	10	166	11	12	375	18
27	Orange Street and Colton Avenue	14	202	36	83	594	63	62	144	78	222	265	92
28	Orange Street and Pearl Avenue	2	710	12	10	296	16	181	287	113	18	44	254
29	Orange Street and Stuart Avenue	5	675	54	3	346	6	9	6	18	36	10	28
30	Orange Street and Oriental Avenue	1	714	0	0	392	1	3	0	1	0	0	0
31	Orange Street and Redlands Boulevard	35	576	18	47	280	42	45	110	40	17	219	122
32	6th Street and I-10 West Ramps	0	187	0	0	303	0	0	0	0	272	26	283
33	6th Street and Pearl Avenue	214	93	33	129	281	101	70	36	181	0	0	1
34	6th Street and Stuart Avenue	10	256	6	80	343	13	5	7	13	23	11	89
35	Redlands Boulevard and Citrus Avenue	180	412	37	130	184	31	19	232	98	54	299	230
36	Church Street and Stuart Avenue	41	293	0	0	352	62	26	0	40	0	0	0
37	University Street and I-10 West Ramps	474	420	22	6	140	939	0	0	1	0	8	27
38	University Street and I-10 East Ramps	0	675	0	0	143	0	294	0	454	0	0	0

No.	Intersection	AM TURNING MOVEMENT COUNTS - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill Street	0	0	0	86	0	73	58	530	0	0	515	30
3	Waterman Avenue and Mill Street	153	583	95	78	625	97	105	309	189	153	295	86
4	Waterman Avenue and Orange Show Road	95	592	43	67	878	162	184	403	327	86	231	46
5	Waterman Avenue and Dumas Street	4	726	0	0	1287	4	4	0	3	0	0	0

No.	Intersection	PM TURNING MOVEMENT COUNTS											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill Street	0	0	0	134	0	195	72	582	0	0	611	37
2	Waterman Avenue and 9th Street	99	936	153	73	800	84	130	299	68	135	266	83
3	Waterman Avenue and Mill Street	137	859	101	109	804	134	143	321	180	201	444	146
4	Waterman Avenue and Orange Show Road	215	830	142	132	885	143	193	535	185	151	499	77
5	Waterman Avenue and Dumas Street	21	1198	0	0	1321	4	2	0	6	0	0	0
6	Waterman Avenue and Washington Street	4	7	4	324	8	648	413	665	5	5	1061	559
7	Tippecanoe Avenue and Victoria Avenue	1	946	43	44	980	0	2	0	2	48	0	25
8	Tippecanoe Avenue and Hospitality Lane	475	603	61	62	898	149	347	221	501	92	107	45
9	Tippecanoe Avenue and I-10 West Ramps	502	818	0	0	1220	674	0	0	0	305	19	504
10	Anderson Avenue and I-10 East Ramps	0	826	346	494	1134	0	550	13	313	0	0	0
11	Anderson Avenue and Academy Drive	63	843	57	71	631	132	116	49	60	50	65	35
12	California Street and I-10 West Ramps	627	467	1	0	728	697	0	0	0	396	4	112
13	California Street and I-10 East Ramps	0	929	595	269	671	0	242	8	553	0	0	0
14	California Street and Walmart Driveway	0	1402	51	357	922	0	0	0	0	2	0	151
15	California Street and Redlands Boulevard	59	517	51	385	382	126	198	577	163	123	533	567
16	Alabama Street and I-10 West Ramps	405	1120	0	0	905	442	0	0	0	176	329	233
17	Alabama Street and I-10 East Ramps	0	1124	308	264	908	0	407	8	516	0	0	0
18	Alabama Street and Industrial Avenue	53	987	89	330	922	141	153	92	57	71	64	357
19	Alabama Street and Redlands Boulevard	127	655	104	184	678	230	298	723	85	117	414	229
20	Tennessee Street and Redlands Boulevard	72	590	51	109	548	29	333	808	99	44	297	200
21	Texas Street and Stuart Avenue	19	541	29	17	296	13	3	11	56	21	16	19
22	Texas Street and Oriental Avenue	1	555	12	5	297	0	4	1	3	17	1	10
23	Eureka Street and Pearl Avenue	0	134	250	18	53	0	181	652	495	40	0	18
24	Eureka Street and Stuart Avenue	16	318	98	41	495	30	14	23	11	41	23	6
25	Eureka Street and Oriental Avenue	8	392	24	32	537	20	15	1	13	5	3	18
26	Eureka Street and Redlands Boulevard	30	239	59	130	369	41	73	735	56	48	376	57
27	Orange Street and Colton Avenue	68	322	101	91	484	46	170	437	175	159	251	114
28	Orange Street and Pearl Avenue	21	942	79	27	412	9	298	434	249	50	45	249
29	Orange Street and Stuart Avenue	9	789	153	54	544	11	77	83	47	136	50	76
30	Orange Street and Oriental Avenue	11	890	0	0	692	32	45	0	21	0	0	0
31	Orange Street and Redlands Boulevard	68	462	46	158	406	101	196	565	91	55	329	263
32	6th Street and I-10 West Ramps	0	352	0	0	506	0	0	0	0	211	11	178
33	6th Street and Pearl Avenue	203	180	128	258	271	118	144	232	198	0	0	0
34	6th Street and Stuart Avenue	64	497	21	39	348	38	23	17	46	22	11	68
35	Redlands Boulevard and Citrus Avenue	76	284	58	166	495	108	134	311	196	48	187	115
36	Church Street and Stuart Avenue	13	356	0	0	280	19	68	0	31	0	0	0
37	University Street and I-10 West Ramps	329	644	45	11	193	457	0	0	0	2	24	17
38	University Street and I-10 East Ramps	0	549	0	0	212	0	479	1	618	0	0	0

No.	Intersection	PM TURNING MOVEMENT COUNTS - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill Street	0	0	0	134	0	195	72	744	0	0	831	37
3	Waterman Avenue and Mill Street	247	1069	101	109	1079	244	228	346	232	201	444	146
4	Waterman Avenue and Orange Show Road	260	872	142	132	937	318	279	560	237	151	499	77
5	Waterman Avenue and Dumas Street	21	1275	0	0	1425	4	2	0	6	0	0	0

No.	INTERSECTION	2018 AM TURNING MOVEMENT COUNTS - AUTO											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	82	-	70	56	402	-	-	325	29
2	Waterman Ave and 9th St	43	422	51	71	708	45	43	172	45	85	220	56
3	Waterman Ave and Mill St	84	540	91	75	566	60	81	274	113	147	283	82
4	Waterman Ave and Orange Show Rd	67	543	41	64	789	95	157	364	261	82	221	44
5	Waterman Ave and Dumas St	4	655	-	-	963	4	4	-	3	-	-	-
6	Waterman Ave and Washington St	2	2	1	440	10	182	510	1010	2	12	517	354
7	Tippecanoe Ave and Victoria Ave	-	476	16	21	883	2	1	-	1	66	1	35
8	Tippecanoe Ave and Hospitality Lane	172	465	20	58	576	69	79	34	81	54	121	64
9	Tippecanoe Ave and I-10 WB Ramps	305	581	-	-	493	352	-	-	-	516	11	316
10	Anderson Ave and I-10 EB Ramps	-	613	208	109	817	-	336	-	289	-	-	-
11	Anderson Ave and Academy Dr	180	450	16	27	1058	401	277	143	228	85	246	41
12	California St and I-10 WB Ramps	452	619	-	2	214	198	-	-	-	408	17	347
13	California St and I-10 EB Ramps	1	619	282	73	665	-	414	1	408	-	-	-
14	California St and Walmart Driveway	1	748	16	176	644	-	-	-	-	1	-	71
15	California St and Redlands Blvd	135	505	17	292	302	77	119	242	177	42	266	289
16	Alabama St and I-10 WB Ramps	393	502	-	-	368	144	-	-	-	309	384	245
17	Alabama St and I-10 EB Ramps	-	747	152	55	608	-	239	2	389	-	-	-
18	Alabama St and Industrial Ave	26	823	33	72	764	111	59	12	34	18	18	53
19	Alabama St and Redlands Blvd	82	411	49	78	484	183	177	293	54	72	292	91
20	Tennessee St and Redlands Blvd	49	579	20	131	557	18	13	105	29	36	200	65
21	Texas St and Stuart Ave	59	285	20	30	443	96	24	4	28	16	28	13
22	Texas St and Oriental Ave	2	510	15	5	431	4	6	3	5	21	1	12
23	Eureka St and Pearl Ave	-	32	66	6	59	-	86	454	513	56	-	14
24	Eureka St and Stuart Ave	9	81	4	23	515	49	15	15	2	8	8	3
25	Eureka St and Oriental Ave	6	92	1	9	476	45	5	2	5	-	-	-
26	Eureka St and Redlands Blvd	13	89	19	60	288	87	10	162	11	12	366	18
27	Orange St and Colton Ave	14	199	36	82	586	62	61	142	77	219	261	91
28	Orange St and Pearl Ave	2	700	12	10	292	16	179	283	111	18	43	251
29	Orange St and Stuart Ave	5	666	53	3	341	6	9	6	18	36	10	28
30	Orange St and Oriental Ave	1	704	-	-	387	1	3	-	1	-	-	-
31	Orange St and Redlands Blvd	35	568	18	46	276	41	44	108	39	17	216	120
32	6th St and I-10 WB Ramp	-	184	-	-	299	-	-	-	-	268	26	279
33	6th St and Pearl Ave	211	92	33	127	277	100	69	36	179	-	-	1
34	6th St and Stuart Ave	10	253	6	79	338	13	5	7	13	23	11	88
35	Redlands Blvd and Citrus Ave	178	406	36	128	181	31	19	229	97	53	295	227
36	Church St and Stuart Ave	40	289	-	-	347	61	26	-	39	-	-	-
37	University Ave and I-10 WB Ramps	468	414	22	6	138	926	-	-	1	-	8	27
38	University Ave and I-10 EB Ramps	-	666	-	-	141	-	290	-	448	-	-	-

No.	INTERSECTION	2018 AM TURNING MOVEMENT COUNTS - AUTO - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	82	-	70	56	508	-	-	494	29
3	Waterman Ave and Mill St	147	559	91	75	599	93	101	296	181	147	283	82
4	Waterman Ave and Orange Show Rd	91	567	41	64	841	155	176	386	313	82	221	44
5	Waterman Ave and Dumas St	4	696	-	-	1233	4	4	-	3	-	-	-

No.	INTERSECTION	PM TURNING MOVEMENT COUNTS - AUTO											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	132	-	192	71	574	-	-	602	36
2	Waterman Ave and 9th St	98	923	151	72	789	83	128	295	67	133	262	82
3	Waterman Ave and Mill St	135	847	100	107	793	132	141	316	177	198	438	144
4	Waterman Ave and Orange Show Rd	212	818	140	130	873	141	190	527	182	149	492	76
5	Waterman Ave and Dumas St	21	1181	-	-	1302	4	2	-	6	-	-	-
6	Waterman Ave and Washington St	4	7	4	319	8	639	407	656	5	5	1046	551
7	Tippecanoe Ave and Victoria Ave	1	933	42	43	966	-	2	-	2	47	-	25
8	Tippecanoe Ave and Hospitality Lane	468	595	60	61	885	147	342	218	494	91	105	44
9	Tippecanoe Ave and I-10 WB Ramps	495	806	-	-	1203	664	-	-	-	301	19	497
10	Anderson Ave and I-10 EB Ramps	-	814	341	487	1117	-	542	13	308	-	-	-
11	Anderson Ave and Academy Dr	62	831	56	70	622	130	114	48	59	49	64	34
12	California St and I-10 WB Ramps	603	449	1	-	700	670	-	-	-	381	4	108
13	California St and I-10 EB Ramps	-	900	577	261	650	-	235	8	536	-	-	-
14	California St and Walmart Driveway	-	1359	49	346	894	-	-	-	-	2	-	146
15	California St and Redlands Blvd	57	501	49	373	370	122	192	559	158	119	517	549
16	Alabama St and I-10 WB Ramps	400	1107	-	-	895	437	-	-	-	174	325	230
17	Alabama St and I-10 EB Ramps	-	1111	305	261	898	-	402	8	510	-	-	-
18	Alabama St and Industrial Ave	52	976	88	326	912	139	151	91	56	70	63	353
19	Alabama St and Redlands Blvd	126	648	103	182	670	227	295	715	84	116	409	226
20	Tennessee St and Redlands Blvd	72	587	51	108	545	29	331	803	98	44	295	199
21	Texas St and Stuart Ave	19	538	29	17	294	13	3	11	56	21	16	19
22	Texas St and Oriental Ave	1	552	12	5	295	-	4	1	3	17	1	10
23	Eureka St and Pearl Ave	-	133	249	18	53	-	180	648	492	40	-	18
24	Eureka St and Stuart Ave	16	316	97	41	492	30	14	23	11	41	23	6
25	Eureka St and Oriental Ave	8	390	24	32	534	20	15	1	13	5	3	18
26	Eureka St and Redlands Blvd	30	238	59	129	367	41	73	731	56	48	374	57
27	Orange St and Colton Ave	68	320	100	91	482	46	169	435	174	158	250	113
28	Orange St and Pearl Ave	21	937	79	27	410	9	297	432	248	50	45	248
29	Orange St and Stuart Ave	9	785	152	54	541	11	77	83	47	135	50	76
30	Orange St and Oriental Ave	11	886	-	-	689	32	45	-	21	-	-	-
31	Orange St and Redlands Blvd	68	460	46	157	404	100	195	562	91	55	327	262
32	6th St and I-10 WB Ramp	-	350	-	-	503	-	-	-	-	210	11	177
33	6th St and Pearl Ave	202	179	127	257	270	117	143	231	197	-	-	-
34	6th St and Stuart Ave	64	495	21	39	346	38	23	17	46	22	11	68
35	Redlands Blvd and Citrus Ave	76	283	58	165	493	107	133	309	195	48	186	114
36	Church St and Stuart Ave	13	354	-	-	279	19	68	-	31	-	-	-
37	University Ave and I-10 WB Ramps	327	641	45	11	192	455	-	-	-	2	24	17
38	University Ave and I-10 EB Ramps	-	546	-	-	211	-	477	1	615	-	-	-

No.	INTERSECTION	PM TURNING MOVEMENT COUNTS - AUTO - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	132	-	192	71	734	-	-	819	36
3	Waterman Ave and Mill St	244	1054	100	107	1064	241	225	341	229	198	438	144
4	Waterman Ave and Orange Show Rd	256	860	140	130	924	314	275	552	234	149	492	76
5	Waterman Ave and Dumas St	21	1257	-	-	1405	4	2	-	6	-	-	-

No.	INTERSECTION	2018 AM TURNING MOVEMENT COUNTS - TOTAL TRUCKS												AM PEAK % TRUCK
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	4	0	3	2	17	0	0	14	1	0.0417
2	Waterman Ave and 9th St	2	18	2	3	31	2	2	7	2	4	10	2	0.0417
3	Waterman Ave and Mill St	4	23	4	3	25	3	4	12	5	6	12	4	0.0417
4	Waterman Ave and Orange Show Rd	3	24	2	3	34	4	7	16	11	4	10	2	0.0417
5	Waterman Ave and Dumas St	0	28	0	0	42	0	0	0	0	0	0	0	0.0417
6	Waterman Ave and Washington St	0	0	0	19	0	8	22	44	0	0	23	15	0.0417
7	Tippecanoe Ave and Victoria Ave	0	21	1	1	38	0	0	0	0	3	0	1	0.0417
8	Tippecanoe Ave and Hospitality Lane	8	20	1	3	25	3	3	1	4	2	5	3	0.0417
9	Tippecanoe Ave and I-10 WB Ramps	13	25	0	0	21	15	0	0	0	22	0	14	0.0417
10	Anderson Ave and I-10 EB Ramps	0	14	5	2	19	0	8	0	7	0	0	0	0.0223
11	Anderson Ave and Academy Dr	4	10	0	1	24	9	6	3	5	2	6	1	0.0223
12	California St and I-10 WB Ramps	33	45	0	0	15	14	0	0	0	29	1	25	0.0674
13	California St and I-10 EB Ramps	0	30	14	3	32	0	20	0	20	0	0	0	0.0457
14	California St and Walmart Driveway	0	36	1	8	31	0	0	0	0	0	0	3	0.0457
15	California St and Redlands Blvd	6	24	1	14	14	4	6	12	8	2	13	14	0.0457
16	Alabama St and I-10 WB Ramps	12	15	0	0	11	4	0	0	0	9	12	7	0.0295
17	Alabama St and I-10 EB Ramps	0	23	5	2	19	0	7	0	12	0	0	0	0.0295
18	Alabama St and Industrial Ave	1	25	1	2	23	3	2	0	1	1	1	2	0.0295
19	Alabama St and Redlands Blvd	3	12	2	2	15	6	5	9	2	2	9	3	0.0295
20	Tennessee St and Redlands Blvd	1	14	0	3	13	0	0	3	1	1	5	2	0.0233
21	Texas St and Stuart Ave	1	7	0	1	11	2	1	0	1	0	1	0	0.0233
22	Texas St and Oriental Ave	0	12	0	0	10	0	0	0	0	0	0	0	0.0233
23	Eureka St and Pearl Ave	0	1	2	0	1	0	2	11	12	1	0	0	0.0233
24	Eureka St and Stuart Ave	0	2	0	1	12	1	0	0	0	0	0	0	0.0233
25	Eureka St and Oriental Ave	0	2	0	0	11	1	0	0	0	0	0	0	0.0233
26	Eureka St and Redlands Blvd	0	2	0	1	7	2	0	4	0	0	9	0	0.0233
27	Orange St and Colton Ave	0	3	0	1	8	1	1	2	1	3	4	1	0.0136
28	Orange St and Pearl Ave	0	10	0	0	4	0	2	4	2	0	1	3	0.0136
29	Orange St and Stuart Ave	0	9	1	0	5	0	0	0	0	0	0	0	0.0136
30	Orange St and Oriental Ave	0	10	0	0	5	0	0	0	0	0	0	0	0.0136
31	Orange St and Redlands Blvd	0	8	0	1	4	1	1	2	1	0	3	2	0.0136
32	6th St and I-10 WB Ramp	0	3	0	0	4	0	0	0	0	4	0	4	0.0136
33	6th St and Pearl Ave	3	1	0	2	4	1	1	0	2	0	0	0	0.0136
34	6th St and Stuart Ave	0	3	0	1	5	0	0	0	0	0	0	1	0.0136
35	Redlands Blvd and Citrus Ave	2	6	1	2	3	0	0	3	1	1	4	3	0.0136
36	Church St and Stuart Ave	1	4	0	0	5	1	0	0	1	0	0	0	0.0136
37	University Ave and I-10 WB Ramps	6	6	0	0	2	13	0	0	0	0	0	0	0.0136
38	University Ave and I-10 EB Ramps	0	9	0	0	2	0	4	0	6	0	0	0	0.0136

No.	INTERSECTION	2018 AM TURNING MOVEMENT COUNTS - TOTAL TRUCKS - CENTRAL AVENUE												AM PEAK % TRUCK
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	4	0	3	2	22	0	0	21	1	0.0417
3	Waterman Ave and Mill St	6	24	4	3	26	4	4	13	8	6	12	4	0.0417
4	Waterman Ave and Orange Show Rd	4	25	2	3	37	7	8	17	14	4	10	2	0.0417
5	Waterman Ave and Dumas St	0	30	0	0	54	0	0	0	0	0	0	0	0.0417

No.	INTERSECTION	2018 PM TURNING MOVEMENT COUNTS - TOTAL TRUCKS												PM PEAK % TRUCK
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	2	0	3	1	8	0	0	9	1	0.0141
2	Waterman Ave and 9th St	1	13	2	1	11	1	2	4	1	2	4	1	0.0141
3	Waterman Ave and Mill St	2	12	1	2	11	2	2	5	3	3	6	2	0.0141
4	Waterman Ave and Orange Show Rd	3	12	2	2	12	2	3	8	3	2	7	1	0.0141
5	Waterman Ave and Dumas St	0	17	0	0	19	0	0	0	0	0	0	0	0.0141
6	Waterman Ave and Washington St	0	0	0	5	0	9	6	9	0	0	15	8	0.0141
7	Tippecanoe Ave and Victoria Ave	0	13	1	1	14	0	0	0	0	1	0	0	0.0141
8	Tippecanoe Ave and Hospitality Lane	7	8	1	1	13	2	5	3	7	1	2	1	0.0141
9	Tippecanoe Ave and I-10 WB Ramps	7	12	0	0	17	10	0	0	0	4	0	7	0.0141
10	Anderson Ave and I-10 EB Ramps	0	12	5	7	17	0	8	0	5	0	0	0	0.0147
11	Anderson Ave and Academy Dr	1	12	1	1	9	2	2	1	1	1	1	1	0.0147
12	California St and I-10 WB Ramps	24	18	0	0	28	27	0	0	0	15	0	4	0.0386
13	California St and I-10 EB Ramps	0	29	18	8	21	0	7	0	17	0	0	0	0.0309
14	California St and Walmart Driveway	0	43	2	11	28	0	0	0	0	0	0	5	0.0309
15	California St and Redlands Blvd	2	16	2	12	12	4	6	18	5	4	16	18	0.0309
16	Alabama St and I-10 WB Ramps	5	13	0	0	10	5	0	0	0	2	4	3	0.0112
17	Alabama St and I-10 EB Ramps	0	13	3	3	10	0	5	0	6	0	0	0	0.0112
18	Alabama St and Industrial Ave	1	11	1	4	10	2	2	1	1	1	1	4	0.0112
19	Alabama St and Redlands Blvd	1	7	1	2	8	3	3	8	1	1	5	3	0.0112
20	Tennessee St and Redlands Blvd	0	3	0	1	3	0	2	5	1	0	2	1	0.0057
21	Texas St and Stuart Ave	0	3	0	0	2	0	0	0	0	0	0	0	0.0057
22	Texas St and Oriental Ave	0	3	0	0	2	0	0	0	0	0	0	0	0.0057
23	Eureka St and Pearl Ave	0	1	1	0	0	0	1	4	3	0	0	0	0.0057
24	Eureka St and Stuart Ave	0	2	1	0	3	0	0	0	0	0	0	0	0.0057
25	Eureka St and Oriental Ave	0	2	0	0	3	0	0	0	0	0	0	0	0.0057
26	Eureka St and Redlands Blvd	0	1	0	1	2	0	0	4	0	0	2	0	0.0057
27	Orange St and Colton Ave	0	2	1	0	2	0	1	2	1	1	1	1	0.0050
28	Orange St and Pearl Ave	0	5	0	0	2	0	1	2	1	0	0	1	0.0050
29	Orange St and Stuart Ave	0	4	1	0	3	0	0	0	0	1	0	0	0.0050
30	Orange St and Oriental Ave	0	4	0	0	3	0	0	0	0	0	0	0	0.0050
31	Orange St and Redlands Blvd	0	2	0	1	2	1	1	3	0	0	2	1	0.0050
32	6th St and I-10 WB Ramp	0	2	0	0	3	0	0	0	0	1	0	1	0.0050
33	6th St and Pearl Ave	1	1	1	1	1	1	1	1	1	0	0	0	0.0050
34	6th St and Stuart Ave	0	2	0	0	2	0	0	0	0	0	0	0	0.0050
35	Redlands Blvd and Citrus Ave	0	1	0	1	2	1	1	2	1	0	1	1	0.0050
36	Church St and Stuart Ave	0	2	0	0	1	0	0	0	0	0	0	0	0.0050
37	University Ave and I-10 WB Ramps	2	3	0	0	1	2	0	0	0	0	0	0	0.0050
38	University Ave and I-10 EB Ramps	0	3	0	0	1	0	2	0	3	0	0	0	0.0050

No.	INTERSECTION	2018 PM TURNING MOVEMENT COUNTS - TOTAL TRUCKS - CENTRAL AVENUE												PM PEAK % TRUCK
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	2	0	3	1	10	0	0	12	1	0.0141
3	Waterman Ave and Mill St	3	15	1	2	15	3	3	5	3	3	6	2	0.0141
4	Waterman Ave and Orange Show Rd	4	12	2	2	13	4	4	8	3	2	7	1	0.0141
5	Waterman Ave and Dumas St	0	18	0	0	20	0	0	0	0	0	0	0	0.0141

No.	INTERSECTION	2018 AM TURNING MOVEMENT COUNTS - TOTAL PCE TRUCKS 2 AXLE = 1.5; 3 AXLE = 2; 4+ AXLE = 3												AVG PCE FACTOR AM
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	11	0	9	6	48	0	0	40	3	2.84
2	Waterman Ave and 9th St	6	51	6	9	88	6	6	20	6	11	28	6	2.84
3	Waterman Ave and Mill St	11	65	11	9	71	9	11	34	14	17	34	11	2.84
4	Waterman Ave and Orange Show Rd	9	68	6	9	97	11	20	46	31	11	28	6	2.84
5	Waterman Ave and Dumas St	0	80	0	0	119	0	0	0	0	0	0	0	2.84
6	Waterman Ave and Washington St	0	0	0	54	0	23	63	125	0	0	65	43	2.84
7	Tippecanoe Ave and Victoria Ave	0	60	3	3	108	0	0	0	0	9	0	3	2.84
8	Tippecanoe Ave and Hospitality Lane	23	57	3	9	71	9	9	3	11	6	14	9	2.84
9	Tippecanoe Ave and I-10 WB Ramps	37	71	0	0	60	43	0	0	0	63	0	40	2.84
10	Anderson Ave and I-10 EB Ramps	0	30	11	4	41	0	17	0	15	0	0	0	2.15
11	Anderson Ave and Academy Dr	9	21	0	2	52	19	13	6	11	4	13	2	2.15
12	California St and I-10 WB Ramps	91	124	0	0	41	39	0	0	0	80	3	69	2.76
13	California St and I-10 EB Ramps	0	82	38	8	87	0	55	0	55	0	0	0	2.73
14	California St and Walmart Driveway	0	98	3	22	85	0	0	0	0	0	0	8	2.73
15	California St and Redlands Blvd	16	65	3	38	38	11	16	33	22	5	35	38	2.73
16	Alabama St and I-10 WB Ramps	25	32	0	0	23	8	0	0	0	19	25	15	2.12
17	Alabama St and I-10 EB Ramps	0	49	11	4	40	0	15	0	25	0	0	0	2.12
18	Alabama St and Industrial Ave	2	53	2	4	49	6	4	0	2	2	2	4	2.12
19	Alabama St and Redlands Blvd	6	25	4	4	32	13	11	19	4	4	19	6	2.12
20	Tennessee St and Redlands Blvd	2	26	0	5	24	0	0	5	2	2	9	4	1.83
21	Texas St and Stuart Ave	2	13	0	2	20	4	2	0	2	0	2	0	1.83
22	Texas St and Oriental Ave	0	22	0	0	18	0	0	0	0	0	0	0	1.83
23	Eureka St and Pearl Ave	0	2	4	0	2	0	4	20	22	2	0	0	1.83
24	Eureka St and Stuart Ave	0	4	0	2	22	2	0	0	0	0	0	0	1.83
25	Eureka St and Oriental Ave	0	4	0	0	20	2	0	0	0	0	0	0	1.83
26	Eureka St and Redlands Blvd	0	4	0	2	13	4	0	7	0	0	16	0	1.83
27	Orange St and Colton Ave	0	5	0	2	14	2	2	4	2	5	7	2	1.75
28	Orange St and Pearl Ave	0	18	0	0	7	0	4	7	4	0	2	5	1.75
29	Orange St and Stuart Ave	0	16	2	0	9	0	0	0	0	0	0	0	1.75
30	Orange St and Oriental Ave	0	18	0	0	9	0	0	0	0	0	0	0	1.75
31	Orange St and Redlands Blvd	0	14	0	2	7	2	2	4	2	0	5	4	1.75
32	6th St and I-10 WB Ramp	0	5	0	0	7	0	0	0	0	7	0	7	1.75
33	6th St and Pearl Ave	5	2	0	4	7	2	2	0	4	0	0	0	1.75
34	6th St and Stuart Ave	0	5	0	2	9	0	0	0	0	0	0	2	1.75
35	Redlands Blvd and Citrus Ave	4	11	2	4	5	0	0	5	2	2	7	5	1.75
36	Church St and Stuart Ave	2	7	0	0	9	2	0	0	2	0	0	0	1.75
37	University Ave and I-10 WB Ramps	11	11	0	0	4	23	0	0	0	0	0	0	1.75
38	University Ave and I-10 EB Ramps	0	16	0	0	4	0	7	0	11	0	0	0	1.75

No.	INTERSECTION	2018 AM TURNING MOVEMENT COUNTS - TOTAL PCE TRUCKS - CENTRAL AVENUE 2 AXLE = 1.5; 3 AXLE = 2; 4+ AXLE = 3												AVG PCE FACTOR AM
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	11	0	9	6	63	0	0	60	3	2.84
3	Waterman Ave and Mill St	17	68	11	9	74	11	11	37	23	17	34	11	2.84
4	Waterman Ave and Orange Show Rd	11	71	6	9	105	20	23	48	40	11	28	6	2.84
5	Waterman Ave and Dumas St	0	85	0	0	154	0	0	0	0	0	0	0	2.84

No.	INTERSECTION	2018 PM TURNING MOVEMENT COUNTS - TOTAL PCE TRUCKS 2 AXLE = 1.5; 3 AXLE = 2; 4+ AXLE = 3												AVG PCE FACTOR PM
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	4	0	7	2	18	0	0	20	2	2.22
2	Waterman Ave and 9th St	2	29	4	2	24	2	4	9	2	4	9	2	2.22
3	Waterman Ave and Mill St	4	27	2	4	24	4	4	11	7	7	13	4	2.22
4	Waterman Ave and Orange Show Rd	7	27	4	4	27	4	7	18	7	4	16	2	2.22
5	Waterman Ave and Dumas St	0	38	0	0	42	0	0	0	0	0	0	0	2.22
6	Waterman Ave and Washington St	0	0	0	11	0	20	13	20	0	0	33	18	2.22
7	Tippecanoe Ave and Victoria Ave	0	29	2	2	31	0	0	0	0	2	0	0	2.22
8	Tippecanoe Ave and Hospitality Lane	16	18	2	2	29	4	11	7	16	2	4	2	2.22
9	Tippecanoe Ave and I-10 WB Ramps	16	27	0	0	38	22	0	0	0	9	0	16	2.22
10	Anderson Ave and I-10 EB Ramps	0	25	11	15	36	0	17	0	11	0	0	0	2.12
11	Anderson Ave and Academy Dr	2	25	2	2	19	4	4	2	2	2	2	2	2.12
12	California St and I-10 WB Ramps	73	55	0	0	85	82	0	0	0	46	0	12	3.05
13	California St and I-10 EB Ramps	0	91	57	25	66	0	22	0	53	0	0	0	3.14
14	California St and Walmart Driveway	0	135	6	35	88	0	0	0	0	0	0	16	3.14
15	California St and Redlands Blvd	6	50	6	38	38	13	19	57	16	13	50	57	3.14
16	Alabama St and I-10 WB Ramps	10	27	0	0	21	10	0	0	0	4	8	6	2.06
17	Alabama St and I-10 EB Ramps	0	27	6	6	21	0	10	0	12	0	0	0	2.06
18	Alabama St and Industrial Ave	2	23	2	8	21	4	4	2	2	2	2	8	2.06
19	Alabama St and Redlands Blvd	2	14	2	4	16	6	6	16	2	2	10	6	2.06
20	Tennessee St and Redlands Blvd	0	6	0	2	6	0	4	10	2	0	4	2	1.92
21	Texas St and Stuart Ave	0	6	0	0	4	0	0	0	0	0	0	0	1.92
22	Texas St and Oriental Ave	0	6	0	0	4	0	0	0	0	0	0	0	1.92
23	Eureka St and Pearl Ave	0	2	2	0	0	0	2	8	6	0	0	0	1.92
24	Eureka St and Stuart Ave	0	4	2	0	6	0	0	0	0	0	0	0	1.92
25	Eureka St and Oriental Ave	0	4	0	0	6	0	0	0	0	0	0	0	1.92
26	Eureka St and Redlands Blvd	0	2	0	2	4	0	0	8	0	0	4	0	1.92
27	Orange St and Colton Ave	0	3	2	0	3	0	2	3	2	2	2	2	1.73
28	Orange St and Pearl Ave	0	9	0	0	3	0	2	3	2	0	0	2	1.73
29	Orange St and Stuart Ave	0	7	2	0	5	0	0	0	0	2	0	0	1.73
30	Orange St and Oriental Ave	0	7	0	0	5	0	0	0	0	0	0	0	1.73
31	Orange St and Redlands Blvd	0	3	0	2	3	2	2	5	0	0	3	2	1.73
32	6th St and I-10 WB Ramp	0	3	0	0	5	0	0	0	0	2	0	2	1.73
33	6th St and Pearl Ave	2	2	2	2	2	2	2	2	2	0	0	0	1.73
34	6th St and Stuart Ave	0	3	0	0	3	0	0	0	0	0	0	0	1.73
35	Redlands Blvd and Citrus Ave	0	2	0	2	3	2	2	3	2	0	2	2	1.73
36	Church St and Stuart Ave	0	3	0	0	2	0	0	0	0	0	0	0	1.73
37	University Ave and I-10 WB Ramps	3	5	0	0	2	3	0	0	0	0	0	0	1.73
38	University Ave and I-10 EB Ramps	0	5	0	0	2	0	3	0	5	0	0	0	1.73

No.	INTERSECTION	2018 PM TURNING MOVEMENT COUNTS - TOTAL PCE TRUCKS - CENTRAL AVENUE 2 AXLE = 1.5; 3 AXLE = 2; 4+ AXLE = 3												AVG PCE FACTOR PM
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	4	0	7	2	22	0	0	27	2	2.22
3	Waterman Ave and Mill St	7	33	2	4	33	7	7	11	7	7	13	4	2.22
4	Waterman Ave and Orange Show Rd	9	27	4	4	29	9	9	18	7	4	16	2	2.22
5	Waterman Ave and Dumas St	0	40	0	0	44	0	0	0	0	0	0	0	2.22

No.	INTERSECTION	2018 AM TURNING MOVEMENT COUNTS - TOTAL (AUTO + PCE TRUCKS)											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	93	-	79	62	450	-	-	365	32
2	Waterman Ave and 9th St	49	473	57	80	796	51	49	192	51	96	248	62
3	Waterman Ave and Mill St	95	605	102	84	637	69	92	308	127	164	317	93
4	Waterman Ave and Orange Show Rd	76	611	47	73	886	106	177	410	292	93	249	50
5	Waterman Ave and Dumas St	4	735	-	-	1082	4	4	-	3	-	-	-
6	Waterman Ave and Washington St	2	2	1	494	10	205	573	1135	2	12	582	397
7	Tippecanoe Ave and Victoria Ave	0	536	19	24	991	2	1	0	1	75	1	38
8	Tippecanoe Ave and Hospitality Lane	195	522	23	67	647	78	88	37	92	60	135	73
9	Tippecanoe Ave and I-10 WB Ramps	342	652	-	-	553	395	-	-	-	579	11	356
10	Anderson Ave and I-10 EB Ramps	-	643	219	113	858	-	353	0	304	-	-	-
11	Anderson Ave and Academy Dr	189	471	16	29	1110	420	290	149	239	89	259	43
12	California St and I-10 WB Ramps	543	743	-	-	255	237	-	-	-	488	20	416
13	California St and I-10 EB Ramps	-	701	320	81	752	-	469	1	463	-	-	-
14	California St and Walmart Driveway	-	846	19	198	729	-	-	-	-	1	-	79
15	California St and Redlands Blvd	151	570	20	330	340	88	135	275	199	47	301	327
16	Alabama St and I-10 WB Ramps	418	534	-	-	391	152	-	-	-	328	409	260
17	Alabama St and I-10 EB Ramps	-	796	163	59	648	-	254	2	414	-	-	-
18	Alabama St and Industrial Ave	28	876	35	76	813	117	63	12	36	20	20	57
19	Alabama St and Redlands Blvd	88	436	53	82	516	196	188	312	58	76	311	97
20	Tennessee St and Redlands Blvd	51	605	20	136	581	18	13	110	31	38	209	69
21	Texas St and Stuart Ave	61	298	20	32	463	100	26	4	30	16	30	13
22	Texas St and Oriental Ave	2	532	15	5	449	4	6	3	5	21	1	12
23	Eureka St and Pearl Ave	-	34	70	6	61	-	90	474	535	58	-	14
24	Eureka St and Stuart Ave	9	85	4	25	537	51	15	15	2	8	8	3
25	Eureka St and Oriental Ave	6	96	1	9	496	47	5	2	5	0	0	0
26	Eureka St and Redlands Blvd	13	93	19	62	301	91	10	169	11	12	382	18
27	Orange St and Colton Ave	14	204	36	84	600	64	63	146	79	224	268	93
28	Orange St and Pearl Ave	2	718	12	10	299	16	183	290	115	18	45	256
29	Orange St and Stuart Ave	5	682	55	3	350	6	9	6	18	36	10	28
30	Orange St and Oriental Ave	1	722	-	-	396	1	3	-	1	-	-	-
31	Orange St and Redlands Blvd	35	582	18	48	283	43	46	112	41	17	221	124
32	6th St and I-10 WB Ramp	-	189	-	-	306	-	-	-	-	275	26	286
33	6th St and Pearl Ave	216	94	33	131	284	102	71	36	183	-	-	-
34	6th St and Stuart Ave	10	258	6	81	347	13	5	7	13	23	11	90
35	Redlands Blvd and Citrus Ave	182	417	38	132	186	31	19	234	99	55	302	232
36	Church St and Stuart Ave	42	296	-	-	356	63	26	-	41	-	-	-
37	University Ave and I-10 WB Ramps	479	425	22	6	142	949	-	-	-	0	8	27
38	University Ave and I-10 EB Ramps	-	682	-	-	145	-	297	-	459	-	-	-

No.	INTERSECTION	2018 AM TURNING MOVEMENT COUNTS - TOTAL (AUTO + PCE TRUCKS) - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	93	-	79	62	571	-	-	554	32
3	Waterman Ave and Mill St	164	627	102	84	673	104	112	333	204	164	317	93
4	Waterman Ave and Orange Show Rd	102	638	47	73	946	175	199	434	353	93	249	50
5	Waterman Ave and Dumas St	4	781	-	-	1387	4	4	-	3	-	-	-

No.	INTERSECTION	2018 PM TURNING MOVEMENT COUNTS - TOTAL (AUTO + PCE TRUCKS)											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	136	-	199	73	592	-	-	622	38
2	Waterman Ave and 9th St	100	952	155	74	813	85	132	304	69	137	271	84
3	Waterman Ave and Mill St	139	874	102	111	817	136	145	327	184	205	451	148
4	Waterman Ave and Orange Show Rd	219	845	144	134	900	145	197	545	189	153	508	78
5	Waterman Ave and Dumas St	21	1219	-	-	1344	4	2	-	6	-	-	-
6	Waterman Ave and Washington St	4	7	4	330	8	659	420	676	5	5	1079	569
7	Tippecanoe Ave and Victoria Ave	1	962	44	45	997	0	2	0	2	49	0	25
8	Tippecanoe Ave and Hospitality Lane	484	613	62	63	914	151	353	225	510	93	109	46
9	Tippecanoe Ave and I-10 WB Ramps	511	833	-	-	1241	686	-	-	-	310	19	513
10	Anderson Ave and I-10 EB Ramps	-	839	352	502	1153	-	559	13	319	-	-	-
11	Anderson Ave and Academy Dr	64	856	58	72	641	134	118	50	61	51	66	36
12	California St and I-10 WB Ramps	676	504	-	-	785	752	-	-	-	427	4	120
13	California St and I-10 EB Ramps	-	991	634	286	716	-	257	8	589	-	-	-
14	California St and Walmart Driveway	-	1494	55	381	982	-	-	-	-	2	-	162
15	California St and Redlands Blvd	63	551	55	411	408	135	211	616	174	132	567	606
16	Alabama St and I-10 WB Ramps	410	1134	-	-	916	447	-	-	-	178	333	236
17	Alabama St and I-10 EB Ramps	-	1138	311	267	919	-	412	8	522	-	-	-
18	Alabama St and Industrial Ave	54	999	90	334	933	143	155	93	58	72	65	361
19	Alabama St and Redlands Blvd	128	662	105	186	686	233	301	731	86	118	419	232
20	Tennessee St and Redlands Blvd	72	593	51	110	551	29	335	813	100	44	299	201
21	Texas St and Stuart Ave	19	544	29	17	298	13	3	11	56	21	16	19
22	Texas St and Oriental Ave	1	558	12	5	299	0	4	1	3	17	1	10
23	Eureka St and Pearl Ave	-	135	251	18	53	-	182	656	498	40	-	18
24	Eureka St and Stuart Ave	16	320	99	41	498	30	14	23	11	41	23	6
25	Eureka St and Oriental Ave	8	394	24	32	540	20	15	1	13	5	3	18
26	Eureka St and Redlands Blvd	30	240	59	131	371	41	73	739	56	48	378	57
27	Orange St and Colton Ave	68	323	102	91	485	46	171	438	176	160	252	115
28	Orange St and Pearl Ave	21	946	79	27	413	9	299	435	250	50	45	250
29	Orange St and Stuart Ave	9	792	154	54	546	11	77	83	47	137	50	76
30	Orange St and Oriental Ave	11	893	-	-	694	32	45	-	21	-	-	-
31	Orange St and Redlands Blvd	68	463	46	159	407	102	197	567	91	55	330	264
32	6th St and I-10 WB Ramp	-	353	-	-	508	-	-	-	-	212	11	179
33	6th St and Pearl Ave	204	181	129	259	272	119	145	233	199	-	-	-
34	6th St and Stuart Ave	64	498	21	39	349	38	23	17	46	22	11	68
35	Redlands Blvd and Citrus Ave	76	285	58	167	496	109	135	312	197	48	188	116
36	Church St and Stuart Ave	13	357	-	-	281	19	68	-	31	-	-	-
37	University Ave and I-10 WB Ramps	330	646	45	11	194	458	-	-	-	2	24	17
38	University Ave and I-10 EB Ramps	-	551	-	-	213	-	480	-	620	-	-	-

No.	INTERSECTION	2018 PM TURNING MOVEMENT COUNTS - TOTAL (AUTO + PCE TRUCKS) - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	136	-	199	73	756	-	-	846	38
3	Waterman Ave and Mill St	251	1087	102	111	1097	248	232	352	236	205	451	148
4	Waterman Ave and Orange Show Rd	265	887	144	134	953	323	284	570	241	153	508	78
5	Waterman Ave and Dumas St	21	1297	-	-	1449	4	2	-	6	-	-	-

No.	Intersection	AM TURNING MOVEMENT COUNTS											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill Street	0	0	0	71	0	61	55	396	0	0	314	28
2	Waterman Avenue and 9th Street	45	441	53	74	740	47	45	180	47	90	231	59
3	Waterman Avenue and Mill Street	90	571	96	80	600	64	87	293	121	157	301	88
4	Waterman Avenue and Orange Show Road	70	566	43	67	822	99	164	380	272	85	230	46
5	Waterman Avenue and Dumas Street	4	683	0	0	1005	4	4	0	3	0	0	0
6	Waterman Avenue and Washington Street	1	1	0	456	10	189	531	1052	2	12	538	367
7	Tippecanoe Avenue and Victoria Avenue	0	486	17	22	909	2	0	0	0	61	1	32
8	Tippecanoe Avenue and Hospitality Lane	178	479	21	60	594	71	79	34	82	54	122	65
9	Tippecanoe Avenue and I-10 West Ramps	319	606	0	0	514	367	0	0	0	538	11	330
10	Anderson Avenue and I-10 East Ramps	0	626	213	111	835	0	344	0	295	0	0	0
11	Anderson Avenue and Academy Drive	183	457	16	28	1080	409	282	145	231	86	250	41
12	California Street and I-10 West Ramps	486	665	0	2	230	213	0	0	0	438	18	373
13	California Street and I-10 East Ramps	1	642	293	75	688	0	429	1	423	0	0	0
14	California Street and Walmart Driveway	1	767	17	180	661	0	0	0	0	1	0	57
15	California Street and Redlands Boulevard	135	507	17	293	303	78	118	241	175	42	266	289
16	Alabama Street and I-10 West Ramps	406	517	0	0	380	148	0	0	0	318	397	253
17	Alabama Street and I-10 East Ramps	0	776	158	57	633	0	248	2	405	0	0	0
18	Alabama Street and Industrial Avenue	27	844	34	73	784	113	59	12	33	19	19	53
19	Alabama Street and Redlands Boulevard	84	419	51	80	496	188	181	299	55	73	298	93
20	Tennessee Street and Redlands Boulevard	50	585	20	132	563	18	12	102	28	36	199	65
21	Texas Street and Stuart Avenue	60	291	20	31	454	98	25	4	28	16	29	13
22	Texas Street and Oriental Avenue	2	587	17	6	506	5	35	17	29	63	3	35
23	Eureka Street and Pearl Avenue	0	34	69	6	63	0	88	467	527	59	0	14
24	Eureka Street and Stuart Avenue	9	89	5	24	535	51	19	19	3	11	11	5
25	Eureka Street and Oriental Avenue	6	96	1	9	488	46	6	2	6	0	0	0
26	Eureka Street and Redlands Boulevard	13	92	19	61	296	89	10	168	11	12	378	18
27	Orange Street and Colton Avenue	14	198	35	82	590	63	60	141	76	220	262	92
28	Orange Street and Pearl Avenue	2	710	12	10	296	16	181	287	113	18	44	254
29	Orange Street and Stuart Avenue	5	679	54	3	351	7	10	7	21	39	10	30
30	Orange Street and Oriental Avenue	1	714	0	0	392	1	3	0	1	0	0	0
31	Orange Street and Redlands Boulevard	35	572	17	47	276	41	44	108	39	17	216	120
32	6th Street and I-10 West Ramps	0	189	0	0	305	0	0	0	0	273	26	284
33	6th Street and Pearl Avenue	218	95	33	130	284	102	71	37	184	0	0	6
34	6th Street and Stuart Avenue	9	251	6	79	339	13	4	6	10	22	10	85
35	Redlands Boulevard and Citrus Avenue	179	410	37	129	183	31	19	230	97	54	298	229
36	Church Street and Stuart Avenue	42	296	0	0	356	63	27	0	42	0	0	0
37	University Street and I-10 West Ramps	471	418	22	6	140	935	0	0	0	0	6	23
38	University Street and I-10 East Ramps	0	672	0	0	140	0	293	0	452	0	0	0

No.	Intersection	AM TURNING MOVEMENT COUNTS - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill Street	0	0	0	71	0	61	55	494	0	0	403	28
3	Waterman Avenue and Mill Street	145	590	96	80	634	98	107	316	176	157	301	88
4	Waterman Avenue and Orange Show Road	95	591	43	67	877	163	184	403	327	85	230	46
5	Waterman Avenue and Dumas Street	4	725	0	0	1285	4	4	0	3	0	0	0

No.	Intersection	PM TURNING MOVEMENT COUNTS											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill Street	0	0	0	86	0	125	59	478	0	0	501	30
2	Waterman Avenue and 9th Street	99	942	154	73	806	84	132	304	69	137	270	84
3	Waterman Avenue and Mill Street	153	957	112	123	901	150	171	383	215	234	514	169
4	Waterman Avenue and Orange Show Road	215	831	142	132	885	143	194	536	185	151	500	77
5	Waterman Avenue and Dumas Street	21	1167	0	0	1289	3	0	0	0	0	0	0
6	Waterman Avenue and Washington Street	6	10	6	326	8	652	415	669	5	5	1066	561
7	Tippecanoe Avenue and Victoria Avenue	1	955	43	44	989	0	7	0	7	54	0	28
8	Tippecanoe Avenue and Hospitality Lane	479	607	62	63	905	151	350	223	505	95	111	47
9	Tippecanoe Avenue and I-10 West Ramps	508	828	0	0	1231	680	0	0	0	311	20	514
10	Anderson Avenue and I-10 East Ramps	0	836	350	499	1144	0	559	13	318	0	0	0
11	Anderson Avenue and Academy Drive	64	849	57	71	637	133	119	51	62	52	68	36
12	California Street and I-10 West Ramps	639	476	1	0	739	707	0	0	0	413	4	116
13	California Street and I-10 East Ramps	0	939	601	273	682	0	247	8	565	0	0	0
14	California Street and Walmart Driveway	0	1389	51	353	912	0	0	0	0	2	0	138
15	California Street and Redlands Boulevard	57	504	50	378	375	123	194	567	161	121	526	559
16	Alabama Street and I-10 West Ramps	406	1123	0	0	907	443	0	0	0	177	331	234
17	Alabama Street and I-10 East Ramps	0	1135	311	268	919	0	414	8	524	0	0	0
18	Alabama Street and Industrial Avenue	53	990	89	331	924	142	155	93	58	72	64	360
19	Alabama Street and Redlands Boulevard	127	655	104	184	678	230	298	723	85	117	414	230
20	Tennessee Street and Redlands Boulevard	73	593	51	110	551	29	334	810	100	44	299	201
21	Texas Street and Stuart Avenue	19	535	28	17	290	13	3	10	50	19	14	17
22	Texas Street and Oriental Avenue	1	616	13	6	358	0	35	9	26	55	3	31
23	Eureka Street and Pearl Avenue	0	134	250	18	53	0	181	652	496	41	0	18
24	Eureka Street and Stuart Avenue	16	323	100	41	501	30	16	26	13	45	25	7
25	Eureka Street and Oriental Avenue	8	400	24	33	545	21	20	1	17	7	4	24
26	Eureka Street and Redlands Boulevard	31	247	61	132	376	42	74	744	56	49	385	58
27	Orange Street and Colton Avenue	67	321	101	91	484	46	170	436	174	159	251	114
28	Orange Street and Pearl Avenue	21	944	79	27	414	9	299	435	249	51	45	250
29	Orange Street and Stuart Avenue	9	786	153	53	540	11	76	81	46	134	50	75
30	Orange Street and Oriental Avenue	11	890	0	0	692	32	45	0	22	0	0	0
31	Orange Street and Redlands Boulevard	68	467	47	159	410	102	198	569	92	55	332	265
32	6th Street and I-10 West Ramps	0	352	0	0	506	0	0	0	0	211	11	178
33	6th Street and Pearl Avenue	203	181	128	259	272	118	144	233	199	0	0	0
34	6th Street and Stuart Avenue	62	482	21	37	334	36	18	14	37	18	9	56
35	Redlands Boulevard and Citrus Avenue	75	280	57	165	491	107	133	308	194	47	184	113
36	Church Street and Stuart Avenue	14	368	0	0	291	20	76	0	35	0	0	0
37	University Street and I-10 West Ramps	328	642	45	11	192	454	0	0	0	2	21	15
38	University Street and I-10 East Ramps	0	548	0	0	210	0	479	1	617	0	0	0

No.	Intersection	PM TURNING MOVEMENT COUNTS - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill Street	0	0	0	86	0	125	59	640	0	0	721	30
3	Waterman Avenue and Mill Street	263	1042	112	123	1011	260	256	408	267	234	514	169
4	Waterman Avenue and Orange Show Road	260	876	142	132	937	318	279	561	237	151	500	77
5	Waterman Avenue and Dumas Street	21	1268	0	0	1322	3	10	0	0	0	0	0

No.	INTERSECTION	2018 AM TURNING MOVEMENT COUNTS - AUTO											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	68	-	58	53	380	-	-	301	27
2	Waterman Ave and 9th St	43	423	51	71	709	45	43	173	45	86	221	57
3	Waterman Ave and Mill St	86	547	92	77	575	61	83	281	116	150	288	84
4	Waterman Ave and Orange Show Rd	67	542	41	64	788	95	157	364	261	81	220	44
5	Waterman Ave and Dumas St	4	655	-	-	963	4	4	-	3	-	-	-
6	Waterman Ave and Washington St	1	1	0	437	10	181	509	1008	2	12	516	352
7	Tippecanoe Ave and Victoria Ave	-	466	16	21	871	2	-	-	-	58	1	31
8	Tippecanoe Ave and Hospitality Lane	171	459	20	57	569	68	76	33	79	52	117	62
9	Tippecanoe Ave and I-10 WB Ramps	306	581	-	-	493	352	-	-	-	516	11	316
10	Anderson Ave and I-10 EB Ramps	-	612	208	109	816	-	336	-	288	-	-	-
11	Anderson Ave and Academy Dr	179	447	16	27	1056	400	276	142	226	84	244	40
12	California St and I-10 WB Ramps	453	620	-	2	215	199	-	-	-	408	17	348
13	California St and I-10 EB Ramps	1	613	280	72	657	-	409	1	404	-	-	-
14	California St and Walmart Driveway	1	732	16	172	631	-	-	-	-	1	-	54
15	California St and Redlands Blvd	129	484	16	280	289	74	113	230	167	40	254	276
16	Alabama St and I-10 WB Ramps	394	502	-	-	369	144	-	-	-	309	385	246
17	Alabama St and I-10 EB Ramps	-	753	153	55	614	-	241	2	393	-	-	-
18	Alabama St and Industrial Ave	26	819	33	71	761	110	57	12	32	18	18	51
19	Alabama St and Redlands Blvd	82	407	50	78	481	182	176	290	53	71	289	90
20	Tennessee St and Redlands Blvd	49	571	20	129	550	18	12	100	27	35	194	63
21	Texas St and Stuart Ave	59	284	20	30	443	96	24	4	27	16	28	13
22	Texas St and Oriental Ave	2	573	17	6	494	5	34	17	28	62	3	34
23	Eureka St and Pearl Ave	-	33	67	6	62	-	86	456	515	58	-	14
24	Eureka St and Stuart Ave	9	87	5	23	523	50	19	19	3	11	11	5
25	Eureka St and Oriental Ave	6	94	1	9	477	45	6	2	6	-	-	-
26	Eureka St and Redlands Blvd	13	90	19	60	289	87	10	164	11	12	369	18
27	Orange St and Colton Ave	14	195	35	81	582	62	59	139	75	217	258	91
28	Orange St and Pearl Ave	2	700	12	10	292	16	179	283	111	18	43	251
29	Orange St and Stuart Ave	5	670	53	3	346	7	10	7	21	38	10	30
30	Orange St and Oriental Ave	1	704	-	-	387	1	3	-	1	-	-	-
31	Orange St and Redlands Blvd	35	564	17	46	272	40	43	107	38	17	213	118
32	6th St and I-10 WB Ramp	-	186	-	-	301	-	-	-	-	269	26	280
33	6th St and Pearl Ave	215	94	33	128	280	101	70	36	181	-	-	6
34	6th St and Stuart Ave	9	248	6	78	334	13	4	6	10	22	10	84
35	Redlands Blvd and Citrus Ave	177	404	36	127	181	31	19	227	96	53	294	226
36	Church St and Stuart Ave	41	292	-	-	351	62	27	-	41	-	-	-
37	University Ave and I-10 WB Ramps	465	412	22	6	138	922	-	-	-	-	6	23
38	University Ave and I-10 EB Ramps	-	663	-	-	138	-	289	-	446	-	-	-

No.	INTERSECTION	2018 AM TURNING MOVEMENT COUNTS - AUTO - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	68	-	58	53	473	-	-	386	27
3	Waterman Ave and Mill St	139	565	92	77	608	94	103	303	169	150	288	84
4	Waterman Ave and Orange Show Rd	91	566	41	64	840	156	176	386	313	81	220	44
5	Waterman Ave and Dumas St	4	695	-	-	1231	4	4	-	3	-	-	-

No.	INTERSECTION	2018 PM TURNING MOVEMENT COUNTS - AUTO											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	85	-	123	58	471	-	-	494	30
2	Waterman Ave and 9th St	98	929	152	72	795	83	130	300	68	135	266	83
3	Waterman Ave and Mill St	151	944	110	121	888	148	169	378	212	231	507	167
4	Waterman Ave and Orange Show Rd	212	819	140	130	873	141	191	528	182	149	493	76
5	Waterman Ave and Dumas St	21	1151	-	-	1271	3	-	-	-	-	-	-
6	Waterman Ave and Washington St	6	10	6	321	8	643	409	660	5	5	1051	553
7	Tippecanoe Ave and Victoria Ave	1	942	42	43	975	-	7	-	7	53	-	28
8	Tippecanoe Ave and Hospitality Lane	472	598	61	62	892	149	345	220	498	94	109	46
9	Tippecanoe Ave and I-10 WB Ramps	501	816	-	-	1214	670	-	-	-	307	20	507
10	Anderson Ave and I-10 EB Ramps	-	824	345	492	1127	-	551	13	313	-	-	-
11	Anderson Ave and Academy Dr	63	837	56	70	628	131	117	50	61	51	67	35
12	California St and I-10 WB Ramps	614	458	1	-	710	680	-	-	-	397	4	112
13	California St and I-10 EB Ramps	-	910	582	265	661	-	239	8	548	-	-	-
14	California St and Walmart Driveway	-	1346	49	342	884	-	-	-	-	2	-	134
15	California St and Redlands Blvd	55	488	48	366	363	119	188	549	156	117	510	542
16	Alabama St and I-10 WB Ramps	401	1110	-	-	897	438	-	-	-	175	327	231
17	Alabama St and I-10 EB Ramps	-	1122	308	265	909	-	409	8	518	-	-	-
18	Alabama St and Industrial Ave	52	979	88	327	914	140	153	92	57	71	63	356
19	Alabama St and Redlands Blvd	126	648	103	182	670	227	295	715	84	116	409	227
20	Tennessee St and Redlands Blvd	73	590	51	109	548	29	332	805	99	44	297	200
21	Texas St and Stuart Ave	19	532	28	17	288	13	3	10	50	19	14	17
22	Texas St and Oriental Ave	1	612	13	6	356	-	35	9	26	55	3	31
23	Eureka St and Pearl Ave	-	133	249	18	53	-	180	648	493	41	-	18
24	Eureka St and Stuart Ave	16	321	99	41	498	30	16	26	13	45	25	7
25	Eureka St and Oriental Ave	8	398	24	33	542	21	20	1	17	7	4	24
26	Eureka St and Redlands Blvd	31	246	61	131	374	42	74	740	56	49	383	58
27	Orange St and Colton Ave	67	319	100	91	482	46	169	434	173	158	250	113
28	Orange St and Pearl Ave	21	939	79	27	412	9	298	433	248	51	45	249
29	Orange St and Stuart Ave	9	782	152	53	537	11	76	81	46	133	50	75
30	Orange St and Oriental Ave	11	886	-	-	689	32	45	-	22	-	-	-
31	Orange St and Redlands Blvd	68	465	47	158	408	101	197	566	92	55	330	264
32	6th St and I-10 WB Ramp	-	350	-	-	503	-	-	-	-	210	11	177
33	6th St and Pearl Ave	202	180	127	258	271	117	143	232	198	-	-	-
34	6th St and Stuart Ave	62	480	21	37	332	36	18	14	37	18	9	56
35	Redlands Blvd and Citrus Ave	75	279	57	164	489	106	132	306	193	47	183	112
36	Church St and Stuart Ave	14	366	-	-	290	20	76	-	35	-	-	-
37	University Ave and I-10 WB Ramps	326	639	45	11	191	452	-	-	-	2	21	15
38	University Ave and I-10 EB Ramps	-	545	-	-	209	-	477	1	614	-	-	-

No.	INTERSECTION	2018 PM TURNING MOVEMENT COUNTS - AUTO - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	85	-	123	58	631	-	-	711	30
3	Waterman Ave and Mill St	259	1027	110	121	997	256	252	402	263	231	507	167
4	Waterman Ave and Orange Show Rd	256	864	140	130	924	314	275	553	234	149	493	76
5	Waterman Ave and Dumas St	21	1250	-	-	1303	3	10	-	-	-	-	-

No.	INTERSECTION	2018 AM TURNING MOVEMENT COUNTS - TOTAL TRUCKS												AM PEAK % TRUCK
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	3	0	3	2	16	0	0	13	1	0.0417
2	Waterman Ave and 9th St	2	18	2	3	31	2	2	7	2	4	10	2	0.0417
3	Waterman Ave and Mill St	4	24	4	3	25	3	4	12	5	7	13	4	0.0417
4	Waterman Ave and Orange Show Rd	3	24	2	3	34	4	7	16	11	4	10	2	0.0417
5	Waterman Ave and Dumas St	0	28	0	0	42	0	0	0	0	0	0	0	0.0417
6	Waterman Ave and Washington St	0	0	0	19	0	8	22	44	0	0	22	15	0.0417
7	Tippecanoe Ave and Victoria Ave	0	20	1	1	38	0	0	0	0	3	0	1	0.0417
8	Tippecanoe Ave and Hospitality Lane	7	20	1	3	25	3	3	1	3	2	5	3	0.0417
9	Tippecanoe Ave and I-10 WB Ramps	13	25	0	0	21	15	0	0	0	22	0	14	0.0417
10	Anderson Ave and I-10 EB Ramps	0	14	5	2	19	0	8	0	7	0	0	0	0.0223
11	Anderson Ave and Academy Dr	4	10	0	1	24	9	6	3	5	2	6	1	0.0223
12	California St and I-10 WB Ramps	33	45	0	0	15	14	0	0	0	30	1	25	0.0674
13	California St and I-10 EB Ramps	0	29	13	3	31	0	20	0	19	0	0	0	0.0457
14	California St and Walmart Driveway	0	35	1	8	30	0	0	0	0	0	0	3	0.0457
15	California St and Redlands Blvd	6	23	1	13	14	4	5	11	8	2	12	13	0.0457
16	Alabama St and I-10 WB Ramps	12	15	0	0	11	4	0	0	0	9	12	7	0.0295
17	Alabama St and I-10 EB Ramps	0	23	5	2	19	0	7	0	12	0	0	0	0.0295
18	Alabama St and Industrial Ave	1	25	1	2	23	3	2	0	1	1	1	2	0.0295
19	Alabama St and Redlands Blvd	2	12	1	2	15	6	5	9	2	2	9	3	0.0295
20	Tennessee St and Redlands Blvd	1	14	0	3	13	0	0	2	1	1	5	2	0.0233
21	Texas St and Stuart Ave	1	7	0	1	11	2	1	0	1	0	1	0	0.0233
22	Texas St and Oriental Ave	0	14	0	0	12	0	1	0	1	1	0	1	0.0233
23	Eureka St and Pearl Ave	0	1	2	0	1	0	2	11	12	1	0	0	0.0233
24	Eureka St and Stuart Ave	0	2	0	1	12	1	0	0	0	0	0	0	0.0233
25	Eureka St and Oriental Ave	0	2	0	0	11	1	0	0	0	0	0	0	0.0233
26	Eureka St and Redlands Blvd	0	2	0	1	7	2	0	4	0	0	9	0	0.0233
27	Orange St and Colton Ave	0	3	0	1	8	1	1	2	1	3	4	1	0.0136
28	Orange St and Pearl Ave	0	10	0	0	4	0	2	4	2	0	1	3	0.0136
29	Orange St and Stuart Ave	0	9	1	0	5	0	0	0	0	1	0	0	0.0136
30	Orange St and Oriental Ave	0	10	0	0	5	0	0	0	0	0	0	0	0.0136
31	Orange St and Redlands Blvd	0	8	0	1	4	1	1	1	1	0	3	2	0.0136
32	6th St and I-10 WB Ramp	0	3	0	0	4	0	0	0	0	4	0	4	0.0136
33	6th St and Pearl Ave	3	1	0	2	4	1	1	1	3	0	0	0	0.0136
34	6th St and Stuart Ave	0	3	0	1	5	0	0	0	0	0	0	1	0.0136
35	Redlands Blvd and Citrus Ave	2	6	1	2	2	0	0	3	1	1	4	3	0.0136
36	Church St and Stuart Ave	1	4	0	0	5	1	0	0	1	0	0	0	0.0136
37	University Ave and I-10 WB Ramps	6	6	0	0	2	13	0	0	0	0	0	0	0.0136
38	University Ave and I-10 EB Ramps	0	9	0	0	2	0	4	0	6	0	0	0	0.0136

No.	INTERSECTION	2018 AM TURNING MOVEMENT COUNTS - TOTAL TRUCKS - CENTRAL AVENUE												AM PEAK % TRUCK
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	3	0	3	2	21	0	0	17	1	0.0417
3	Waterman Ave and Mill St	6	25	4	3	26	4	4	13	7	7	13	4	0.0417
4	Waterman Ave and Orange Show Rd	4	25	2	3	37	7	8	17	14	4	10	2	0.0417
5	Waterman Ave and Dumas St	0	30	0	0	54	0	0	0	0	0	0	0	0.0417

No.	INTERSECTION	2018 PM TURNING MOVEMENT COUNTS - TOTAL TRUCKS												PM PEAK % TRUCK
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	1	0	2	1	7	0	0	7	0	0.0141
2	Waterman Ave and 9th St	1	13	2	1	11	1	2	4	1	2	4	1	0.0141
3	Waterman Ave and Mill St	2	13	2	2	13	2	2	5	3	3	7	2	0.0141
4	Waterman Ave and Orange Show Rd	3	12	2	2	12	2	3	8	3	2	7	1	0.0141
5	Waterman Ave and Dumas St	0	16	0	0	18	0	0	0	0	0	0	0	0.0141
6	Waterman Ave and Washington St	0	0	0	5	0	9	6	9	0	0	15	8	0.0141
7	Tippecanoe Ave and Victoria Ave	0	13	1	1	14	0	0	0	0	1	0	0	0.0141
8	Tippecanoe Ave and Hospitality Lane	7	9	1	1	13	2	5	3	7	1	2	1	0.0141
9	Tippecanoe Ave and I-10 WB Ramps	7	12	0	0	17	10	0	0	0	4	0	7	0.0141
10	Anderson Ave and I-10 EB Ramps	0	12	5	7	17	0	8	0	5	0	0	0	0.0147
11	Anderson Ave and Academy Dr	1	12	1	1	9	2	2	1	1	1	1	1	0.0147
12	California St and I-10 WB Ramps	25	18	0	0	29	27	0	0	0	16	0	4	0.0386
13	California St and I-10 EB Ramps	0	29	19	8	21	0	8	0	17	0	0	0	0.0309
14	California St and Walmart Driveway	0	43	2	11	28	0	0	0	0	0	0	4	0.0309
15	California St and Redlands Blvd	2	16	2	12	12	4	6	18	5	4	16	17	0.0309
16	Alabama St and I-10 WB Ramps	5	13	0	0	10	5	0	0	0	2	4	3	0.0112
17	Alabama St and I-10 EB Ramps	0	13	3	3	10	0	5	0	6	0	0	0	0.0112
18	Alabama St and Industrial Ave	1	11	1	4	10	2	2	1	1	1	1	4	0.0112
19	Alabama St and Redlands Blvd	1	7	1	2	8	3	3	8	1	1	5	3	0.0112
20	Tennessee St and Redlands Blvd	0	3	0	1	3	0	2	5	1	0	2	1	0.0057
21	Texas St and Stuart Ave	0	3	0	0	2	0	0	0	0	0	0	0	0.0057
22	Texas St and Oriental Ave	0	4	0	0	2	0	0	0	0	0	0	0	0.0057
23	Eureka St and Pearl Ave	0	1	1	0	0	0	1	4	3	0	0	0	0.0057
24	Eureka St and Stuart Ave	0	2	1	0	3	0	0	0	0	0	0	0	0.0057
25	Eureka St and Oriental Ave	0	2	0	0	3	0	0	0	0	0	0	0	0.0057
26	Eureka St and Redlands Blvd	0	1	0	1	2	0	0	4	0	0	2	0	0.0057
27	Orange St and Colton Ave	0	2	1	0	2	0	1	2	1	1	1	1	0.0050
28	Orange St and Pearl Ave	0	5	0	0	2	0	1	2	1	0	0	1	0.0050
29	Orange St and Stuart Ave	0	4	1	0	3	0	0	0	0	1	0	0	0.0050
30	Orange St and Oriental Ave	0	4	0	0	3	0	0	0	0	0	0	0	0.0050
31	Orange St and Redlands Blvd	0	2	0	1	2	1	1	3	0	0	2	1	0.0050
32	6th St and I-10 WB Ramp	0	2	0	0	3	0	0	0	0	1	0	1	0.0050
33	6th St and Pearl Ave	1	1	1	1	1	1	1	1	1	0	0	0	0.0050
34	6th St and Stuart Ave	0	2	0	0	2	0	0	0	0	0	0	0	0.0050
35	Redlands Blvd and Citrus Ave	0	1	0	1	2	1	1	2	1	0	1	1	0.0050
36	Church St and Stuart Ave	0	2	0	0	1	0	0	0	0	0	0	0	0.0050
37	University Ave and I-10 WB Ramps	2	3	0	0	1	2	0	0	0	0	0	0	0.0050
38	University Ave and I-10 EB Ramps	0	3	0	0	1	0	2	0	3	0	0	0	0.0050

No.	INTERSECTION	2018 PM TURNING MOVEMENT COUNTS - TOTAL TRUCKS - CENTRAL AVENUE												PM PEAK % TRUCK
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	1	0	2	1	9	0	0	10	0	0.0141
3	Waterman Ave and Mill St	4	15	2	2	14	4	4	6	4	3	7	2	0.0141
4	Waterman Ave and Orange Show Rd	4	12	2	2	13	4	4	8	3	2	7	1	0.0141
5	Waterman Ave and Dumas St	0	18	0	0	19	0	0	0	0	0	0	0	0.0141

No.	INTERSECTION	2018 AM TURNING MOVEMENT COUNTS - TOTAL PCE TRUCKS 2 AXLE = 1.5; 3 AXLE = 2; 4+ AXLE = 3												AVG PCE FACTOR AM
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	9	0	9	6	46	0	0	37	3	2.84
2	Waterman Ave and 9th St	6	51	6	9	88	6	6	20	6	11	28	6	2.84
3	Waterman Ave and Mill St	11	68	11	9	71	9	11	34	14	20	37	11	2.84
4	Waterman Ave and Orange Show Rd	9	68	6	9	97	11	20	46	31	11	28	6	2.84
5	Waterman Ave and Dumas St	0	80	0	0	119	0	0	0	0	0	0	0	2.84
6	Waterman Ave and Washington St	0	0	0	54	0	23	63	125	0	0	63	43	2.84
7	Tippecanoe Ave and Victoria Ave	0	57	3	3	108	0	0	0	0	9	0	3	2.84
8	Tippecanoe Ave and Hospitality Lane	20	57	3	9	71	9	9	3	9	6	14	9	2.84
9	Tippecanoe Ave and I-10 WB Ramps	37	71	0	0	60	43	0	0	0	63	0	40	2.84
10	Anderson Ave and I-10 EB Ramps	0	30	11	4	41	0	17	0	15	0	0	0	2.15
11	Anderson Ave and Academy Dr	9	21	0	2	52	19	13	6	11	4	13	2	2.15
12	California St and I-10 WB Ramps	91	124	0	0	41	39	0	0	0	83	3	69	2.76
13	California St and I-10 EB Ramps	0	79	35	8	85	0	55	0	52	0	0	0	2.73
14	California St and Walmart Driveway	0	96	3	22	82	0	0	0	0	0	0	8	2.73
15	California St and Redlands Blvd	16	63	3	35	38	11	14	30	22	5	33	35	2.73
16	Alabama St and I-10 WB Ramps	25	32	0	0	23	8	0	0	0	19	25	15	2.12
17	Alabama St and I-10 EB Ramps	0	49	11	4	40	0	15	0	25	0	0	0	2.12
18	Alabama St and Industrial Ave	2	53	2	4	49	6	4	0	2	2	2	4	2.12
19	Alabama St and Redlands Blvd	4	25	2	4	32	13	11	19	4	4	19	6	2.12
20	Tennessee St and Redlands Blvd	2	26	0	5	24	0	0	4	2	2	9	4	1.83
21	Texas St and Stuart Ave	2	13	0	2	20	4	2	0	2	0	2	0	1.83
22	Texas St and Oriental Ave	0	26	0	0	22	0	2	0	2	2	0	2	1.83
23	Eureka St and Pearl Ave	0	2	4	0	2	0	4	20	22	2	0	0	1.83
24	Eureka St and Stuart Ave	0	4	0	2	22	2	0	0	0	0	0	0	1.83
25	Eureka St and Oriental Ave	0	4	0	0	20	2	0	0	0	0	0	0	1.83
26	Eureka St and Redlands Blvd	0	4	0	2	13	4	0	7	0	0	16	0	1.83
27	Orange St and Colton Ave	0	5	0	2	14	2	2	4	2	5	7	2	1.75
28	Orange St and Pearl Ave	0	18	0	0	7	0	4	7	4	0	2	5	1.75
29	Orange St and Stuart Ave	0	16	2	0	9	0	0	0	0	2	0	0	1.75
30	Orange St and Oriental Ave	0	18	0	0	9	0	0	0	0	0	0	0	1.75
31	Orange St and Redlands Blvd	0	14	0	2	7	2	2	2	2	0	5	4	1.75
32	6th St and I-10 WB Ramp	0	5	0	0	7	0	0	0	0	7	0	7	1.75
33	6th St and Pearl Ave	5	2	0	4	7	2	2	2	5	0	0	0	1.75
34	6th St and Stuart Ave	0	5	0	2	9	0	0	0	0	0	0	2	1.75
35	Redlands Blvd and Citrus Ave	4	11	2	4	4	0	0	5	2	2	7	5	1.75
36	Church St and Stuart Ave	2	7	0	0	9	2	0	0	2	0	0	0	1.75
37	University Ave and I-10 WB Ramps	11	11	0	0	4	23	0	0	0	0	0	0	1.75
38	University Ave and I-10 EB Ramps	0	16	0	0	4	0	7	0	11	0	0	0	1.75

No.	INTERSECTION	2018 AM TURNING MOVEMENT COUNTS - TOTAL PCE TRUCKS - CENTRAL AVENUE 2 AXLE = 1.5; 3 AXLE = 2; 4+ AXLE = 3												AVG PCE FACTOR AM
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	9	0	9	6	60	0	0	48	3	2.84
3	Waterman Ave and Mill St	17	71	11	9	74	11	11	37	20	20	37	11	2.84
4	Waterman Ave and Orange Show Rd	11	71	6	9	105	20	23	48	40	11	28	6	2.84
5	Waterman Ave and Dumas St	0	85	0	0	154	0	0	0	0	0	0	0	2.84

No.	INTERSECTION	2018 PM TURNING MOVEMENT COUNTS - TOTAL PCE TRUCKS 2 AXLE = 1.5; 3 AXLE = 2; 4+ AXLE = 3												AVG PCE FACTOR PM
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	2	0	4	2	16	0	0	16	0	2.22
2	Waterman Ave and 9th St	2	29	4	2	24	2	4	9	2	4	9	2	2.22
3	Waterman Ave and Mill St	4	29	4	4	29	4	4	11	7	7	16	4	2.22
4	Waterman Ave and Orange Show Rd	7	27	4	4	27	4	7	18	7	4	16	2	2.22
5	Waterman Ave and Dumas St	0	36	0	0	40	0	0	0	0	0	0	0	2.22
6	Waterman Ave and Washington St	0	0	0	11	0	20	13	20	0	0	33	18	2.22
7	Tippecanoe Ave and Victoria Ave	0	29	2	2	31	0	0	0	0	2	0	0	2.22
8	Tippecanoe Ave and Hospitality Lane	16	20	2	2	29	4	11	7	16	2	4	2	2.22
9	Tippecanoe Ave and I-10 WB Ramps	16	27	0	0	38	22	0	0	0	9	0	16	2.22
10	Anderson Ave and I-10 EB Ramps	0	25	11	15	36	0	17	0	11	0	0	0	2.12
11	Anderson Ave and Academy Dr	2	25	2	2	19	4	4	2	2	2	2	2	2.12
12	California St and I-10 WB Ramps	76	55	0	0	88	82	0	0	0	49	0	12	3.05
13	California St and I-10 EB Ramps	0	91	60	25	66	0	25	0	53	0	0	0	3.14
14	California St and Walmart Driveway	0	135	6	35	88	0	0	0	0	0	0	13	3.14
15	California St and Redlands Blvd	6	50	6	38	38	13	19	57	16	13	50	53	3.14
16	Alabama St and I-10 WB Ramps	10	27	0	0	21	10	0	0	0	4	8	6	2.06
17	Alabama St and I-10 EB Ramps	0	27	6	6	21	0	10	0	12	0	0	0	2.06
18	Alabama St and Industrial Ave	2	23	2	8	21	4	4	2	2	2	2	8	2.06
19	Alabama St and Redlands Blvd	2	14	2	4	16	6	6	16	2	2	10	6	2.06
20	Tennessee St and Redlands Blvd	0	6	0	2	6	0	4	10	2	0	4	2	1.92
21	Texas St and Stuart Ave	0	6	0	0	4	0	0	0	0	0	0	0	1.92
22	Texas St and Oriental Ave	0	8	0	0	4	0	0	0	0	0	0	0	1.92
23	Eureka St and Pearl Ave	0	2	2	0	0	0	2	8	6	0	0	0	1.92
24	Eureka St and Stuart Ave	0	4	2	0	6	0	0	0	0	0	0	0	1.92
25	Eureka St and Oriental Ave	0	4	0	0	6	0	0	0	0	0	0	0	1.92
26	Eureka St and Redlands Blvd	0	2	0	2	4	0	0	8	0	0	4	0	1.92
27	Orange St and Colton Ave	0	3	2	0	3	0	2	3	2	2	2	2	1.73
28	Orange St and Pearl Ave	0	9	0	0	3	0	2	3	2	0	0	2	1.73
29	Orange St and Stuart Ave	0	7	2	0	5	0	0	0	0	2	0	0	1.73
30	Orange St and Oriental Ave	0	7	0	0	5	0	0	0	0	0	0	0	1.73
31	Orange St and Redlands Blvd	0	3	0	2	3	2	2	5	0	0	3	2	1.73
32	6th St and I-10 WB Ramp	0	3	0	0	5	0	0	0	0	2	0	2	1.73
33	6th St and Pearl Ave	2	2	2	2	2	2	2	2	2	0	0	0	1.73
34	6th St and Stuart Ave	0	3	0	0	3	0	0	0	0	0	0	0	1.73
35	Redlands Blvd and Citrus Ave	0	2	0	2	3	2	2	3	2	0	2	2	1.73
36	Church St and Stuart Ave	0	3	0	0	2	0	0	0	0	0	0	0	1.73
37	University Ave and I-10 WB Ramps	3	5	0	0	2	3	0	0	0	0	0	0	1.73
38	University Ave and I-10 EB Ramps	0	5	0	0	2	0	3	0	5	0	0	0	1.73

No.	INTERSECTION	2018 PM TURNING MOVEMENT COUNTS - TOTAL PCE TRUCKS - CENTRAL AVENUE 2 AXLE = 1.5; 3 AXLE = 2; 4+ AXLE = 3												AVG PCE FACTOR PM
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	2	0	4	2	20	0	0	22	0	2.22
3	Waterman Ave and Mill St	9	33	4	4	31	9	9	13	9	7	16	4	2.22
4	Waterman Ave and Orange Show Rd	9	27	4	4	29	9	9	18	7	4	16	2	2.22
5	Waterman Ave and Dumas St	0	40	0	0	42	0	0	0	0	0	0	0	2.22

No.	INTERSECTION	2018 AM TURNING MOVEMENT COUNTS - TOTAL (AUTO + PCE TRUCKS)											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	77	-	67	59	426	-	-	338	30
2	Waterman Ave and 9th St	49	474	57	80	797	51	49	193	51	97	249	63
3	Waterman Ave and Mill St	97	615	103	86	646	70	94	315	130	170	325	95
4	Waterman Ave and Orange Show Rd	76	610	47	73	885	106	177	410	292	92	248	50
5	Waterman Ave and Dumas St	4	735	-	-	1082	4	4	-	3	-	-	-
6	Waterman Ave and Washington St	1	1	0	491	10	204	572	1133	2	12	579	395
7	Tippecanoe Ave and Victoria Ave	0	523	19	24	979	2	0	0	0	67	1	34
8	Tippecanoe Ave and Hospitality Lane	191	516	23	66	640	77	85	36	88	58	131	71
9	Tippecanoe Ave and I-10 WB Ramps	343	652	-	-	553	395	-	-	-	579	11	356
10	Anderson Ave and I-10 EB Ramps	-	642	219	113	857	-	353	0	303	-	-	-
11	Anderson Ave and Academy Dr	188	468	16	29	1108	419	289	148	237	88	257	42
12	California St and I-10 WB Ramps	544	744	-	-	256	238	-	-	-	491	20	417
13	California St and I-10 EB Ramps	-	692	315	80	742	-	464	1	456	-	-	-
14	California St and Walmart Driveway	-	828	19	194	713	-	-	-	-	1	-	62
15	California St and Redlands Blvd	145	547	19	315	327	85	127	260	189	45	287	311
16	Alabama St and I-10 WB Ramps	419	534	-	-	392	152	-	-	-	328	410	261
17	Alabama St and I-10 EB Ramps	-	802	164	59	654	-	256	2	418	-	-	-
18	Alabama St and Industrial Ave	28	872	35	75	810	116	61	12	34	20	20	55
19	Alabama St and Redlands Blvd	86	432	52	82	513	195	187	309	57	75	308	96
20	Tennessee St and Redlands Blvd	51	597	20	134	574	18	12	104	29	37	203	67
21	Texas St and Stuart Ave	61	297	20	32	463	100	26	4	29	16	30	13
22	Texas St and Oriental Ave	2	599	17	6	516	5	36	17	30	64	3	36
23	Eureka St and Pearl Ave	-	35	71	6	64	-	90	476	537	60	-	14
24	Eureka St and Stuart Ave	9	91	5	25	545	52	19	19	3	11	11	5
25	Eureka St and Oriental Ave	6	98	1	9	497	47	6	2	6	0	0	0
26	Eureka St and Redlands Blvd	13	94	19	62	302	91	10	171	11	12	385	18
27	Orange St and Colton Ave	14	200	35	83	596	64	61	143	77	222	265	93
28	Orange St and Pearl Ave	2	718	12	10	299	16	183	290	115	18	45	256
29	Orange St and Stuart Ave	5	686	55	3	355	7	10	7	21	40	10	30
30	Orange St and Oriental Ave	1	722	-	-	396	1	3	-	1	-	-	-
31	Orange St and Redlands Blvd	35	578	17	48	279	42	45	109	40	17	218	122
32	6th St and I-10 WB Ramp	-	191	-	-	308	-	-	-	-	276	26	287
33	6th St and Pearl Ave	220	96	33	132	287	103	72	38	186	-	-	-
34	6th St and Stuart Ave	9	253	6	80	343	13	4	6	10	22	10	86
35	Redlands Blvd and Citrus Ave	181	415	38	131	185	31	19	232	98	55	301	231
36	Church St and Stuart Ave	43	299	-	-	360	64	27	-	43	-	-	-
37	University Ave and I-10 WB Ramps	476	423	22	6	142	945	-	-	-	0	6	23
38	University Ave and I-10 EB Ramps	-	679	-	-	142	-	296	-	457	-	-	-

No.	INTERSECTION	2018 AM TURNING MOVEMENT COUNTS - TOTAL (AUTO + PCE TRUCKS) - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	77	-	67	59	533	-	-	434	30
3	Waterman Ave and Mill St	156	636	103	86	682	105	114	340	189	170	325	95
4	Waterman Ave and Orange Show Rd	102	637	47	73	945	176	199	434	353	92	248	50
5	Waterman Ave and Dumas St	4	780	-	-	1385	4	4	-	3	-	-	-

No.	INTERSECTION	2018 PM TURNING MOVEMENT COUNTS - TOTAL (AUTO + PCE TRUCKS)											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	87	-	127	60	487	-	-	510	30
2	Waterman Ave and 9th St	100	958	156	74	819	85	134	309	70	139	275	85
3	Waterman Ave and Mill St	155	973	114	125	917	152	173	389	219	238	523	171
4	Waterman Ave and Orange Show Rd	219	846	144	134	900	145	198	546	189	153	509	78
5	Waterman Ave and Dumas St	21	1187	-	-	1311	3	0	-	0	-	-	-
6	Waterman Ave and Washington St	6	10	6	332	8	663	422	680	5	5	1084	571
7	Tippecanoe Ave and Victoria Ave	1	971	44	45	1006	0	7	0	7	55	0	28
8	Tippecanoe Ave and Hospitality Lane	488	618	63	64	921	153	356	227	514	96	113	48
9	Tippecanoe Ave and I-10 WB Ramps	517	843	-	-	1252	692	-	-	-	316	20	523
10	Anderson Ave and I-10 EB Ramps	-	849	356	507	1163	-	568	13	324	-	-	-
11	Anderson Ave and Academy Dr	65	862	58	72	647	135	121	52	63	53	69	37
12	California St and I-10 WB Ramps	690	513	-	-	798	762	-	-	-	446	4	124
13	California St and I-10 EB Ramps	-	1001	642	290	727	-	264	8	601	-	-	-
14	California St and Walmart Driveway	-	1481	55	377	972	-	-	-	-	2	-	147
15	California St and Redlands Blvd	61	538	54	404	401	132	207	606	172	130	560	595
16	Alabama St and I-10 WB Ramps	411	1137	-	-	918	448	-	-	-	179	335	237
17	Alabama St and I-10 EB Ramps	-	1149	314	271	930	-	419	8	530	-	-	-
18	Alabama St and Industrial Ave	54	1002	90	335	935	144	157	94	59	73	65	364
19	Alabama St and Redlands Blvd	128	662	105	186	686	233	301	731	86	118	419	233
20	Tennessee St and Redlands Blvd	73	596	51	111	554	29	336	815	101	44	301	202
21	Texas St and Stuart Ave	19	538	28	17	292	13	3	10	50	19	14	17
22	Texas St and Oriental Ave	1	620	13	6	360	0	35	9	26	55	3	31
23	Eureka St and Pearl Ave	-	135	251	18	53	-	182	656	499	41	-	18
24	Eureka St and Stuart Ave	16	325	101	41	504	30	16	26	13	45	25	7
25	Eureka St and Oriental Ave	8	402	24	33	548	21	20	1	17	7	4	24
26	Eureka St and Redlands Blvd	31	248	61	133	378	42	74	748	56	49	387	58
27	Orange St and Colton Ave	67	322	102	91	485	46	171	437	175	160	252	115
28	Orange St and Pearl Ave	21	948	79	27	415	9	300	436	250	51	45	251
29	Orange St and Stuart Ave	9	789	154	53	542	11	76	81	46	135	50	75
30	Orange St and Oriental Ave	11	893	-	-	694	32	45	-	22	-	-	-
31	Orange St and Redlands Blvd	68	468	47	160	411	103	199	571	92	55	333	266
32	6th St and I-10 WB Ramp	-	353	-	-	508	-	-	-	-	212	11	179
33	6th St and Pearl Ave	204	182	129	260	273	119	145	234	200	-	-	-
34	6th St and Stuart Ave	62	483	21	37	335	36	18	14	37	18	9	56
35	Redlands Blvd and Citrus Ave	75	281	57	166	492	108	134	309	195	47	185	114
36	Church St and Stuart Ave	14	369	-	-	292	20	76	-	35	-	-	-
37	University Ave and I-10 WB Ramps	329	644	45	11	193	455	-	-	-	2	21	15
38	University Ave and I-10 EB Ramps	-	550	-	-	211	-	480	-	619	-	-	-

No.	INTERSECTION	2018 PM TURNING MOVEMENT COUNTS - TOTAL (AUTO + PCE TRUCKS) - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	87	-	127	60	651	-	-	733	30
3	Waterman Ave and Mill St	268	1060	114	125	1028	265	261	415	272	238	523	171
4	Waterman Ave and Orange Show Rd	265	891	144	134	953	323	284	571	241	153	509	78
5	Waterman Ave and Dumas St	21	1290	-	-	1345	3	10	-	0	-	-	-

No.	Intersection	AM TURNING MOVEMENT COUNTS											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill Street	0	0	0	217	0	184	67	484	0	0	381	34
2	Waterman Avenue and 9th Street	48	469	56	82	817	52	101	402	106	169	435	110
3	Waterman Avenue and Mill Street	99	631	106	85	643	69	96	325	134	294	565	164
4	Waterman Avenue and Orange Show Road	125	1021	77	70	862	104	207	480	343	229	617	123
5	Waterman Avenue and Dumas Street	8	1239	0	0	1213	4	5	0	3	0	0	0
6	Waterman Avenue and Washington Street	2	2	1	536	11	222	645	1279	3	18	841	574
7	Tippecanoe Avenue and Victoria Avenue	0	1259	43	27	1136	3	1	0	1	64	1	33
8	Tippecanoe Avenue and Hospitality Lane	484	1303	58	75	735	88	137	59	142	87	196	104
9	Tippecanoe Avenue and I-10 West Ramps	535	1018	0	0	956	683	0	0	0	554	11	340
10	Anderson Avenue and I-10 East Ramps	0	634	216	114	864	0	719	0	618	0	0	0
11	Anderson Avenue and Academy Drive	197	491	17	29	1101	416	536	276	440	93	269	45
12	California Street and I-10 West Ramps	783	1072	0	2	361	335	0	0	0	1075	43	917
13	California Street and I-10 East Ramps	2	1059	483	150	1375	0	779	2	767	0	0	0
14	California Street and Walmart Driveway	2	1305	29	352	1295	0	0	0	0	1	0	79
15	California Street and Redlands Boulevard	271	1015	35	636	657	169	151	308	224	70	442	481
16	Alabama Street and I-10 West Ramps	501	639	0	0	382	149	0	0	0	521	650	414
17	Alabama Street and I-10 East Ramps	0	675	137	58	634	0	357	3	583	0	0	0
18	Alabama Street and Industrial Avenue	24	742	30	78	831	120	68	14	39	28	28	79
19	Alabama Street and Redlands Boulevard	92	458	55	84	519	197	150	248	46	98	402	126
20	Tennessee Street and Redlands Boulevard	57	666	23	143	609	19	14	116	32	53	296	96
21	Texas Street and Stuart Avenue	64	311	22	30	436	94	26	5	30	43	78	35
22	Texas Street and Oriental Avenue	2	557	16	5	383	3	6	3	5	24	1	13
23	Eureka Street and Pearl Avenue	0	35	72	5	46	0	107	569	642	110	0	26
24	Eureka Street and Stuart Avenue	9	88	5	25	563	54	16	16	2	12	12	5
25	Eureka Street and Oriental Avenue	6	97	1	9	519	49	6	2	6	0	0	0
26	Eureka Street and Redlands Boulevard	14	95	19	65	315	95	10	170	11	19	589	28
27	Orange Street and Colton Avenue	15	213	38	87	624	67	144	337	182	278	332	116
28	Orange Street and Pearl Avenue	2	757	13	10	316	17	318	504	198	18	46	265
29	Orange Street and Stuart Avenue	6	721	57	6	690	13	9	7	19	39	10	30
30	Orange Street and Oriental Avenue	1	762	0	0	722	2	3	0	1	0	0	0
31	Orange Street and Redlands Boulevard	37	600	18	100	594	89	48	118	42	23	301	167
32	6th Street and I-10 West Ramps	0	168	0	0	327	0	0	0	0	522	49	542
33	6th Street and Pearl Avenue	223	97	34	156	340	122	122	64	317	0	0	1
34	6th Street and Stuart Avenue	10	273	7	135	576	22	5	7	13	19	9	75
35	Redlands Boulevard and Citrus Avenue	188	430	39	143	202	34	29	345	145	54	299	230
36	Church Street and Stuart Avenue	43	308	0	0	318	56	25	0	39	0	0	0
37	University Street and I-10 West Ramps	556	493	26	7	150	1002	0	0	1	0	8	29
38	University Street and I-10 East Ramps	0	826	0	0	180	0	313	0	484	0	0	0

No.	Intersection	AM TURNING MOVEMENT COUNTS - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill Street	0	0	0	217	0	184	67	604	0	0	606	34
3	Waterman Avenue and Mill Street	239	905	106	85	822	164	126	360	189	294	565	164
4	Waterman Avenue and Orange Show Road	220	1116	77	70	917	244	237	515	398	229	617	123
5	Waterman Avenue and Dumas Street	8	1408	0	0	1540	4	5	0	3	0	0	0

No.	Intersection	PM TURNING MOVEMENT COUNTS											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill Street	0	0	0	156	0	226	88	714	0	0	892	54
2	Waterman Avenue and 9th Street	116	1101	181	84	926	97	209	483	109	180	354	111
3	Waterman Avenue and Mill Street	157	980	115	123	904	151	177	397	223	283	623	205
4	Waterman Avenue and Orange Show Road	312	1203	206	164	1101	178	271	749	259	304	1004	155
5	Waterman Avenue and Dumas Street	31	1761	0	0	1787	5	6	0	17	0	0	0
6	Waterman Avenue and Washington Street	4	7	4	375	9	749	641	1032	8	7	1315	692
7	Tippecanoe Avenue and Victoria Avenue	2	1498	68	71	1593	0	2	0	2	55	0	28
8	Tippecanoe Avenue and Hospitality Lane	769	975	99	99	1426	237	590	375	850	176	205	87
9	Tippecanoe Avenue and I-10 West Ramps	729	1189	0	0	2379	1314	0	0	0	291	18	481
10	Anderson Avenue and I-10 East Ramps	0	1100	461	761	1746	0	957	22	545	0	0	0
11	Anderson Avenue and Academy Drive	68	899	61	88	783	164	311	133	161	93	121	65
12	California Street and I-10 West Ramps	1035	771	2	0	1261	1206	0	0	0	868	8	245
13	California Street and I-10 East Ramps	0	1554	995	558	1393	0	293	10	670	0	0	0
14	California Street and Walmart Driveway	0	2497	91	470	1213	0	0	0	0	2	0	161
15	California Street and Redlands Boulevard	112	992	98	514	510	168	365	1064	302	155	675	717
16	Alabama Street and I-10 West Ramps	432	1196	0	0	1271	621	0	0	0	237	443	313
17	Alabama Street and I-10 East Ramps	0	1199	328	384	1319	0	585	11	741	0	0	0
18	Alabama Street and Industrial Avenue	56	1054	95	460	1283	197	294	176	110	72	64	360
19	Alabama Street and Redlands Boulevard	128	660	105	274	1013	343	402	974	114	125	442	245
20	Tennessee Street and Redlands Boulevard	76	620	53	117	585	31	522	1269	156	46	311	209
21	Texas Street and Stuart Avenue	20	577	31	18	316	14	3	11	59	57	43	51
22	Texas Street and Oriental Avenue	1	601	13	7	362	0	4	1	3	18	1	10
23	Eureka Street and Pearl Avenue	0	141	263	23	67	0	251	902	686	104	0	46
24	Eureka Street and Stuart Avenue	17	336	104	43	529	32	25	41	19	43	24	7
25	Eureka Street and Oriental Avenue	8	415	25	34	573	22	16	1	14	5	3	18
26	Eureka Street and Redlands Boulevard	32	255	63	138	394	43	87	877	66	51	402	61
27	Orange Street and Colton Avenue	135	644	202	98	518	49	235	604	241	169	268	121
28	Orange Street and Pearl Avenue	23	1006	85	41	626	13	582	847	486	54	48	265
29	Orange Street and Stuart Avenue	9	842	164	130	1319	26	118	126	72	145	54	81
30	Orange Street and Oriental Avenue	11	950	0	0	1547	72	48	0	23	0	0	0
31	Orange Street and Redlands Boulevard	72	493	49	351	905	224	209	603	97	58	351	280
32	6th Street and I-10 West Ramps	0	362	0	0	805	0	0	0	0	346	18	291
33	6th Street and Pearl Avenue	216	192	136	466	490	213	186	300	256	0	0	0
34	6th Street and Stuart Avenue	69	531	23	41	372	40	23	17	46	21	10	63
35	Redlands Boulevard and Citrus Avenue	81	303	62	177	529	116	150	347	219	48	187	115
36	Church Street and Stuart Avenue	13	338	0	0	381	26	72	0	33	0	0	0
37	University Street and I-10 West Ramps	417	817	57	11	206	487	0	0	0	2	25	18
38	University Street and I-10 East Ramps	0	623	0	0	264	0	626	1	807	0	0	0

No.	Intersection	PM TURNING MOVEMENT COUNTS - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill Street	0	0	0	156	0	226	88	944	0	0	1212	54
3	Waterman Avenue and Mill Street	362	1373	115	123	1099	281	277	432	391	283	623	205
4	Waterman Avenue and Orange Show Road	427	1318	206	164	1196	383	371	784	354	304	1004	155
5	Waterman Avenue and Dumas Street	31	1945	0	0	1849	5	6	0	17	0	0	0

No.	INTERSECTION	2038 AM TURNING MOVEMENT COUNTS - AUTO											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	208	-	176	64	464	-	-	365	33
2	Waterman Ave and 9th St	46	449	54	79	783	50	97	385	102	162	417	105
3	Waterman Ave and Mill St	95	605	102	81	616	66	92	311	128	282	541	157
4	Waterman Ave and Orange Show Rd	120	978	74	67	826	100	198	460	329	219	591	118
5	Waterman Ave and Dumas St	8	1187	-	-	1162	4	5	-	3	-	-	-
6	Waterman Ave and Washington St	2	2	1	514	11	213	618	1226	3	17	806	550
7	Tippecanoe Ave and Victoria Ave	-	1207	41	26	1089	3	1	-	1	61	1	32
8	Tippecanoe Ave and Hospitality Lane	464	1249	56	72	704	84	131	57	136	83	188	100
9	Tippecanoe Ave and I-10 WB Ramps	513	976	-	-	916	655	-	-	-	531	11	326
10	Anderson Ave and I-10 EB Ramps	-	620	211	111	845	-	703	-	604	-	-	-
11	Anderson Ave and Academy Dr	193	480	17	28	1076	407	524	270	430	91	263	44
12	California St and I-10 WB Ramps	730	1000	-	2	337	312	-	-	-	1003	40	855
13	California St and I-10 EB Ramps	2	1011	461	143	1312	-	743	2	732	-	-	-
14	California St and Walmart Driveway	2	1245	28	336	1236	-	-	-	-	1	-	75
15	California St and Redlands Blvd	259	969	33	607	627	161	144	294	214	67	422	459
16	Alabama St and I-10 WB Ramps	486	620	-	-	371	145	-	-	-	506	631	402
17	Alabama St and I-10 EB Ramps	-	655	133	56	615	-	346	3	566	-	-	-
18	Alabama St and Industrial Ave	23	720	29	76	806	116	66	14	38	27	27	77
19	Alabama St and Redlands Blvd	89	445	53	82	504	191	146	241	45	95	390	122
20	Tennessee St and Redlands Blvd	56	650	22	140	595	19	14	113	31	52	289	94
21	Texas St and Stuart Ave	63	304	21	29	426	92	25	5	29	42	76	34
22	Texas St and Oriental Ave	2	544	16	5	374	3	6	3	5	23	1	13
23	Eureka St and Pearl Ave	-	34	70	5	45	-	104	556	627	107	-	25
24	Eureka St and Stuart Ave	9	86	5	24	550	53	16	16	2	12	12	5
25	Eureka St and Oriental Ave	6	95	1	9	507	48	6	2	6	-	-	-
26	Eureka St and Redlands Blvd	14	93	19	63	308	93	10	166	11	19	575	27
27	Orange St and Colton Ave	15	210	37	86	616	66	142	332	180	274	327	114
28	Orange St and Pearl Ave	2	747	13	10	312	17	314	497	195	18	45	261
29	Orange St and Stuart Ave	6	711	56	6	681	13	9	7	19	38	10	30
30	Orange St and Oriental Ave	1	752	-	-	712	2	3	-	1	-	-	-
31	Orange St and Redlands Blvd	37	592	18	99	586	88	47	116	41	23	297	165
32	6th St and I-10 WB Ramp	-	166	-	-	323	-	-	-	-	515	48	535
33	6th St and Pearl Ave	220	96	34	154	335	120	120	63	313	-	-	1
34	6th St and Stuart Ave	10	269	7	133	568	22	5	7	13	19	9	74
35	Redlands Blvd and Citrus Ave	185	424	38	141	199	34	29	340	143	53	295	227
36	Church St and Stuart Ave	42	304	-	-	314	55	25	-	38	-	-	-
37	University Ave and I-10 WB Ramps	548	486	26	7	148	988	-	-	1	-	8	29
38	University Ave and I-10 EB Ramps	-	815	-	-	178	-	309	-	477	-	-	-

No.	INTERSECTION	2038 AM TURNING MOVEMENT COUNTS - AUTO - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	208	-	176	64	579	-	-	581	33
3	Waterman Ave and Mill St	229	867	102	81	788	157	121	345	181	282	541	157
4	Waterman Ave and Orange Show Rd	211	1069	74	67	879	234	227	494	381	219	591	118
5	Waterman Ave and Dumas St	8	1349	-	-	1476	4	5	-	3	-	-	-

No.	INTERSECTION	2038 PM TURNING MOVEMENT COUNTS - AUTO											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	154	-	223	87	704	-	-	879	53
2	Waterman Ave and 9th St	114	1085	178	83	913	96	206	476	107	177	349	109
3	Waterman Ave and Mill St	155	966	113	121	891	149	175	391	220	279	614	202
4	Waterman Ave and Orange Show Rd	308	1186	203	162	1085	175	267	738	255	300	990	153
5	Waterman Ave and Dumas St	31	1736	-	-	1762	5	6	-	17	-	-	-
6	Waterman Ave and Washington St	4	7	4	370	9	738	632	1017	8	7	1296	682
7	Tippecanoe Ave and Victoria Ave	2	1477	67	70	1571	-	2	-	2	54	-	28
8	Tippecanoe Ave and Hospitality Lane	758	961	98	98	1406	234	582	370	838	174	202	86
9	Tippecanoe Ave and I-10 WB Ramps	719	1172	-	-	2345	1295	-	-	-	287	18	474
10	Anderson Ave and I-10 EB Ramps	-	1084	454	750	1720	-	943	22	537	-	-	-
11	Anderson Ave and Academy Dr	67	886	60	87	771	162	306	131	159	92	119	64
12	California St and I-10 WB Ramps	995	741	2	-	1212	1159	-	-	-	835	8	236
13	California St and I-10 EB Ramps	-	1506	964	541	1350	-	284	10	649	-	-	-
14	California St and Walmart Driveway	-	2420	88	455	1176	-	-	-	-	2	-	156
15	California St and Redlands Blvd	109	961	95	498	494	163	354	1031	293	150	654	695
16	Alabama St and I-10 WB Ramps	427	1183	-	-	1257	614	-	-	-	234	438	309
17	Alabama St and I-10 EB Ramps	-	1186	324	380	1304	-	578	11	733	-	-	-
18	Alabama St and Industrial Ave	55	1042	94	455	1269	195	291	174	109	71	63	356
19	Alabama St and Redlands Blvd	127	653	104	271	1002	339	397	963	113	124	437	242
20	Tennessee St and Redlands Blvd	76	616	53	116	582	31	519	1262	155	46	309	208
21	Texas St and Stuart Ave	20	574	31	18	314	14	3	11	59	57	43	51
22	Texas St and Oriental Ave	1	598	13	7	360	-	4	1	3	18	1	10
23	Eureka St and Pearl Ave	-	140	262	23	67	-	250	897	682	103	-	46
24	Eureka St and Stuart Ave	17	334	103	43	526	32	25	41	19	43	24	7
25	Eureka St and Oriental Ave	8	413	25	34	570	22	16	1	14	5	3	18
26	Eureka St and Redlands Blvd	32	254	63	137	392	43	87	872	66	51	400	61
27	Orange St and Colton Ave	134	641	201	98	515	49	234	601	240	168	267	120
28	Orange St and Pearl Ave	23	1001	85	41	623	13	579	843	484	54	48	264
29	Orange St and Stuart Ave	9	838	163	129	1312	26	117	125	72	144	54	81
30	Orange St and Oriental Ave	11	945	-	-	1539	72	48	-	23	-	-	-
31	Orange St and Redlands Blvd	72	491	49	349	900	223	208	600	97	58	349	279
32	6th St and I-10 WB Ramp	-	360	-	-	801	-	-	-	-	344	18	290
33	6th St and Pearl Ave	215	191	135	464	488	212	185	298	255	-	-	-
34	6th St and Stuart Ave	69	528	23	41	370	40	23	17	46	21	10	63
35	Redlands Blvd and Citrus Ave	81	301	62	176	526	115	149	345	218	48	186	114
36	Church St and Stuart Ave	13	336	-	-	379	26	72	-	33	-	-	-
37	University Ave and I-10 WB Ramps	415	813	57	11	205	485	-	-	-	2	25	18
38	University Ave and I-10 EB Ramps	-	620	-	-	263	-	623	1	803	-	-	-

No.	INTERSECTION	2038 PM TURNING MOVEMENT COUNTS - AUTO - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	154	-	223	87	931	-	-	1195	53
3	Waterman Ave and Mill St	357	1354	113	121	1084	277	273	426	385	279	614	202
4	Waterman Ave and Orange Show Rd	421	1299	203	162	1179	378	366	773	349	300	990	153
5	Waterman Ave and Dumas St	31	1918	-	-	1823	5	6	-	17	-	-	-

No.	INTERSECTION	2038 AM TURNING MOVEMENT COUNTS - TOTAL TRUCKS												AM PEAK % TRUCK
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	9	0	8	3	20	0	0	16	1	0.0417
2	Waterman Ave and 9th St	2	20	2	3	34	2	4	17	4	7	18	5	0.0417
3	Waterman Ave and Mill St	4	26	4	4	27	3	4	14	6	12	24	7	0.0417
4	Waterman Ave and Orange Show Rd	5	43	3	3	36	4	9	20	14	10	26	5	0.0417
5	Waterman Ave and Dumas St	0	52	0	0	51	0	0	0	0	0	0	0	0.0417
6	Waterman Ave and Washington St	0	0	0	22	0	9	27	53	0	1	35	24	0.0417
7	Tippecanoe Ave and Victoria Ave	0	52	2	1	47	0	0	0	0	3	0	1	0.0417
8	Tippecanoe Ave and Hospitality Lane	20	54	2	3	31	4	6	2	6	4	8	4	0.0417
9	Tippecanoe Ave and I-10 WB Ramps	22	42	0	0	40	28	0	0	0	23	0	14	0.0417
10	Anderson Ave and I-10 EB Ramps	0	14	5	3	19	0	16	0	14	0	0	0	0.0223
11	Anderson Ave and Academy Dr	4	11	0	1	25	9	12	6	10	2	6	1	0.0223
12	California St and I-10 WB Ramps	53	72	0	0	24	23	0	0	0	72	3	62	0.0674
13	California St and I-10 EB Ramps	0	48	22	7	63	0	36	0	35	0	0	0	0.0457
14	California St and Walmart Driveway	0	60	1	16	59	0	0	0	0	0	0	4	0.0457
15	California St and Redlands Blvd	12	46	2	29	30	8	7	14	10	3	20	22	0.0457
16	Alabama St and I-10 WB Ramps	15	19	0	0	11	4	0	0	0	15	19	12	0.0295
17	Alabama St and I-10 EB Ramps	0	20	4	2	19	0	11	0	17	0	0	0	0.0295
18	Alabama St and Industrial Ave	1	22	1	2	25	4	2	0	1	1	1	2	0.0295
19	Alabama St and Redlands Blvd	3	13	2	2	15	6	4	7	1	3	12	4	0.0295
20	Tennessee St and Redlands Blvd	1	16	1	3	14	0	0	3	1	1	7	2	0.0233
21	Texas St and Stuart Ave	1	7	1	1	10	2	1	0	1	1	2	1	0.0233
22	Texas St and Oriental Ave	0	13	0	0	9	0	0	0	0	1	0	0	0.0233
23	Eureka St and Pearl Ave	0	1	2	0	1	0	3	13	15	3	0	1	0.0233
24	Eureka St and Stuart Ave	0	2	0	1	13	1	0	0	0	0	0	0	0.0233
25	Eureka St and Oriental Ave	0	2	0	0	12	1	0	0	0	0	0	0	0.0233
26	Eureka St and Redlands Blvd	0	2	0	2	7	2	0	4	0	0	14	1	0.0233
27	Orange St and Colton Ave	0	3	1	1	8	1	2	5	2	4	5	2	0.0136
28	Orange St and Pearl Ave	0	10	0	0	4	0	4	7	3	0	1	4	0.0136
29	Orange St and Stuart Ave	0	10	1	0	9	0	0	0	0	1	0	0	0.0136
30	Orange St and Oriental Ave	0	10	0	0	10	0	0	0	0	0	0	0	0.0136
31	Orange St and Redlands Blvd	0	8	0	1	8	1	1	2	1	0	4	2	0.0136
32	6th St and I-10 WB Ramp	0	2	0	0	4	0	0	0	0	7	1	7	0.0136
33	6th St and Pearl Ave	3	1	0	2	5	2	2	1	4	0	0	0	0.0136
34	6th St and Stuart Ave	0	4	0	2	8	0	0	0	0	0	0	1	0.0136
35	Redlands Blvd and Citrus Ave	3	6	1	2	3	0	0	5	2	1	4	3	0.0136
36	Church St and Stuart Ave	1	4	0	0	4	1	0	0	1	0	0	0	0.0136
37	University Ave and I-10 WB Ramps	8	7	0	0	2	14	0	0	0	0	0	0	0.0136
38	University Ave and I-10 EB Ramps	0	11	0	0	2	0	4	0	7	0	0	0	0.0136

No.	INTERSECTION	2038 AM TURNING MOVEMENT COUNTS - TOTAL TRUCKS - CENTRAL AVENUE												AM PEAK % TRUCK
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	9	0	8	3	25	0	0	25	1	0.0417
3	Waterman Ave and Mill St	10	38	4	4	34	7	5	15	8	12	24	7	0.0417
4	Waterman Ave and Orange Show Rd	9	47	3	3	38	10	10	21	17	10	26	5	0.0417
5	Waterman Ave and Dumas St	0	59	0	0	64	0	0	0	0	0	0	0	0.0417

No.	INTERSECTION	2038 PM TURNING MOVEMENT COUNTS - TOTAL TRUCKS												PM PEAK % TRUCK
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	2	0	3	1	10	0	0	13	1	0.0141
2	Waterman Ave and 9th St	2	16	3	1	13	1	3	7	2	3	5	2	0.0141
3	Waterman Ave and Mill St	2	14	2	2	13	2	2	6	3	4	9	3	0.0141
4	Waterman Ave and Orange Show Rd	4	17	3	2	16	3	4	11	4	4	14	2	0.0141
5	Waterman Ave and Dumas St	0	25	0	0	25	0	0	0	0	0	0	0	0.0141
6	Waterman Ave and Washington St	0	0	0	5	0	11	9	15	0	0	19	10	0.0141
7	Tippecanoe Ave and Victoria Ave	0	21	1	1	22	0	0	0	0	1	0	0	0.0141
8	Tippecanoe Ave and Hospitality Lane	11	14	1	1	20	3	8	5	12	2	3	1	0.0141
9	Tippecanoe Ave and I-10 WB Ramps	10	17	0	0	34	19	0	0	0	4	0	7	0.0141
10	Anderson Ave and I-10 EB Ramps	0	16	7	11	26	0	14	0	8	0	0	0	0.0147
11	Anderson Ave and Academy Dr	1	13	1	1	12	2	5	2	2	1	2	1	0.0147
12	California St and I-10 WB Ramps	40	30	0	0	49	47	0	0	0	33	0	9	0.0386
13	California St and I-10 EB Ramps	0	48	31	17	43	0	9	0	21	0	0	0	0.0309
14	California St and Walmart Driveway	0	77	3	15	37	0	0	0	0	0	0	5	0.0309
15	California St and Redlands Blvd	3	31	3	16	16	5	11	33	9	5	21	22	0.0309
16	Alabama St and I-10 WB Ramps	5	13	0	0	14	7	0	0	0	3	5	4	0.0112
17	Alabama St and I-10 EB Ramps	0	13	4	4	15	0	7	0	8	0	0	0	0.0112
18	Alabama St and Industrial Ave	1	12	1	5	14	2	3	2	1	1	1	4	0.0112
19	Alabama St and Redlands Blvd	1	7	1	3	11	4	5	11	1	1	5	3	0.0112
20	Tennessee St and Redlands Blvd	0	4	0	1	3	0	3	7	1	0	2	1	0.0057
21	Texas St and Stuart Ave	0	3	0	0	2	0	0	0	0	0	0	0	0.0057
22	Texas St and Oriental Ave	0	3	0	0	2	0	0	0	0	0	0	0	0.0057
23	Eureka St and Pearl Ave	0	1	1	0	0	0	1	5	4	1	0	0	0.0057
24	Eureka St and Stuart Ave	0	2	1	0	3	0	0	0	0	0	0	0	0.0057
25	Eureka St and Oriental Ave	0	2	0	0	3	0	0	0	0	0	0	0	0.0057
26	Eureka St and Redlands Blvd	0	1	0	1	2	0	0	5	0	0	2	0	0.0057
27	Orange St and Colton Ave	1	3	1	0	3	0	1	3	1	1	1	1	0.0050
28	Orange St and Pearl Ave	0	5	0	0	3	0	3	4	2	0	0	1	0.0050
29	Orange St and Stuart Ave	0	4	1	1	7	0	1	1	0	1	0	0	0.0050
30	Orange St and Oriental Ave	0	5	0	0	8	0	0	0	0	0	0	0	0.0050
31	Orange St and Redlands Blvd	0	2	0	2	5	1	1	3	0	0	2	1	0.0050
32	6th St and I-10 WB Ramp	0	2	0	0	4	0	0	0	0	2	0	1	0.0050
33	6th St and Pearl Ave	1	1	1	2	2	1	1	2	1	0	0	0	0.0050
34	6th St and Stuart Ave	0	3	0	0	2	0	0	0	0	0	0	0	0.0050
35	Redlands Blvd and Citrus Ave	0	2	0	1	3	1	1	2	1	0	1	1	0.0050
36	Church St and Stuart Ave	0	2	0	0	2	0	0	0	0	0	0	0	0.0050
37	University Ave and I-10 WB Ramps	2	4	0	0	1	2	0	0	0	0	0	0	0.0050
38	University Ave and I-10 EB Ramps	0	3	0	0	1	0	3	0	4	0	0	0	0.0050

No.	INTERSECTION	2038 PM TURNING MOVEMENT COUNTS - TOTAL TRUCKS - CENTRAL AVENUE												PM PEAK % TRUCK
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	2	0	3	1	13	0	0	17	1	0.0141
3	Waterman Ave and Mill St	5	19	2	2	15	4	4	6	6	4	9	3	0.0141
4	Waterman Ave and Orange Show Rd	6	19	3	2	17	5	5	11	5	4	14	2	0.0141
5	Waterman Ave and Dumas St	0	27	0	0	26	0	0	0	0	0	0	0	0.0141

No.	INTERSECTION	2038 AM TURNING MOVEMENT COUNTS - TOTAL PCE TRUCKS 2 AXLE = 1.5; 3 AXLE = 2; 4+ AXLE = 3											AVG PCE FACTOR AM	
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T		R
1	Sierra Way and Mill St	0	0	0	26	0	23	9	57	0	0	46	3	2.84
2	Waterman Ave and 9th St	6	57	6	9	97	6	11	48	11	20	51	14	2.84
3	Waterman Ave and Mill St	11	74	11	11	77	9	11	40	17	34	68	20	2.84
4	Waterman Ave and Orange Show Rd	14	122	9	9	102	11	26	57	40	28	74	14	2.84
5	Waterman Ave and Dumas St	0	148	0	0	145	0	0	0	0	0	0	0	2.84
6	Waterman Ave and Washington St	0	0	0	63	0	26	77	151	0	3	100	68	2.84
7	Tippecanoe Ave and Victoria Ave	0	148	6	3	134	0	0	0	0	9	0	3	2.84
8	Tippecanoe Ave and Hospitality Lane	57	154	6	9	88	11	17	6	17	11	23	11	2.84
9	Tippecanoe Ave and I-10 WB Ramps	63	119	0	0	114	80	0	0	0	65	0	40	2.84
10	Anderson Ave and I-10 EB Ramps	0	30	11	6	41	0	34	0	30	0	0	0	2.15
11	Anderson Ave and Academy Dr	9	24	0	2	54	19	26	13	21	4	13	2	2.15
12	California St and I-10 WB Ramps	146	199	0	0	66	64	0	0	0	199	8	171	2.76
13	California St and I-10 EB Ramps	0	131	60	19	172	0	98	0	96	0	0	0	2.73
14	California St and Walmart Driveway	0	164	3	44	161	0	0	0	0	0	0	11	2.73
15	California St and Redlands Blvd	33	126	5	79	82	22	19	38	27	8	55	60	2.73
16	Alabama St and I-10 WB Ramps	32	40	0	0	23	8	0	0	0	32	40	25	2.12
17	Alabama St and I-10 EB Ramps	0	42	8	4	40	0	23	0	36	0	0	0	2.12
18	Alabama St and Industrial Ave	2	47	2	4	53	8	4	0	2	2	2	4	2.12
19	Alabama St and Redlands Blvd	6	28	4	4	32	13	8	15	2	6	25	8	2.12
20	Tennessee St and Redlands Blvd	2	29	2	5	26	0	0	5	2	2	13	4	1.83
21	Texas St and Stuart Ave	2	13	2	2	18	4	2	0	2	2	4	2	1.83
22	Texas St and Oriental Ave	0	24	0	0	16	0	0	0	0	2	0	0	1.83
23	Eureka St and Pearl Ave	0	2	4	0	2	0	5	24	27	5	0	2	1.83
24	Eureka St and Stuart Ave	0	4	0	2	24	2	0	0	0	0	0	0	1.83
25	Eureka St and Oriental Ave	0	4	0	0	22	2	0	0	0	0	0	0	1.83
26	Eureka St and Redlands Blvd	0	4	0	4	13	4	0	7	0	0	26	2	1.83
27	Orange St and Colton Ave	0	5	2	2	14	2	4	9	4	7	9	4	1.75
28	Orange St and Pearl Ave	0	18	0	0	7	0	7	12	5	0	2	7	1.75
29	Orange St and Stuart Ave	0	18	2	0	16	0	0	0	0	2	0	0	1.75
30	Orange St and Oriental Ave	0	18	0	0	18	0	0	0	0	0	0	0	1.75
31	Orange St and Redlands Blvd	0	14	0	2	14	2	2	4	2	0	7	4	1.75
32	6th St and I-10 WB Ramp	0	4	0	0	7	0	0	0	0	12	2	12	1.75
33	6th St and Pearl Ave	5	2	0	4	9	4	4	2	7	0	0	0	1.75
34	6th St and Stuart Ave	0	7	0	4	14	0	0	0	0	0	0	2	1.75
35	Redlands Blvd and Citrus Ave	5	11	2	4	5	0	0	9	4	2	7	5	1.75
36	Church St and Stuart Ave	2	7	0	0	7	2	0	0	2	0	0	0	1.75
37	University Ave and I-10 WB Ramps	14	12	0	0	4	25	0	0	0	0	0	0	1.75
38	University Ave and I-10 EB Ramps	0	19	0	0	4	0	7	0	12	0	0	0	1.75

No.	INTERSECTION	2038 AM TURNING MOVEMENT COUNTS - TOTAL PCE TRUCKS - CENTRAL AVENUE 2 AXLE = 1.5; 3 AXLE = 2; 4+ AXLE = 3											AVG PCE FACTOR AM	
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T		R
1	Sierra Way and Mill St	0	0	0	26	0	23	9	71	0	0	71	3	2.84
3	Waterman Ave and Mill St	28	108	11	11	97	20	14	43	23	34	68	20	2.84
4	Waterman Ave and Orange Show Rd	26	134	9	9	108	28	28	60	48	28	74	14	2.84
5	Waterman Ave and Dumas St	0	168	0	0	182	0	0	0	0	0	0	0	2.84

No.	INTERSECTION	2038 PM TURNING MOVEMENT COUNTS - TOTAL PCE TRUCKS 2 AXLE = 1.5; 3 AXLE = 2; 4+ AXLE = 3												AVG PCE FACTOR PM
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	4	0	7	2	22	0	0	29	2	2.22
2	Waterman Ave and 9th St	4	36	7	2	29	2	7	16	4	7	11	4	2.22
3	Waterman Ave and Mill St	4	31	4	4	29	4	4	13	7	9	20	7	2.22
4	Waterman Ave and Orange Show Rd	9	38	7	4	36	7	9	24	9	9	31	4	2.22
5	Waterman Ave and Dumas St	0	55	0	0	55	0	0	0	0	0	0	0	2.22
6	Waterman Ave and Washington St	0	0	0	11	0	24	20	33	0	0	42	22	2.22
7	Tippecanoe Ave and Victoria Ave	0	47	2	2	49	0	0	0	0	2	0	0	2.22
8	Tippecanoe Ave and Hospitality Lane	24	31	2	2	44	7	18	11	27	4	7	2	2.22
9	Tippecanoe Ave and I-10 WB Ramps	22	38	0	0	75	42	0	0	0	9	0	16	2.22
10	Anderson Ave and I-10 EB Ramps	0	34	15	23	55	0	30	0	17	0	0	0	2.12
11	Anderson Ave and Academy Dr	2	28	2	2	25	4	11	4	4	2	4	2	2.12
12	California St and I-10 WB Ramps	122	92	0	0	150	143	0	0	0	101	0	27	3.05
13	California St and I-10 EB Ramps	0	151	97	53	135	0	28	0	66	0	0	0	3.14
14	California St and Walmart Driveway	0	242	9	47	116	0	0	0	0	0	0	16	3.14
15	California St and Redlands Blvd	9	97	9	50	50	16	35	104	28	16	66	69	3.14
16	Alabama St and I-10 WB Ramps	10	27	0	0	29	14	0	0	0	6	10	8	2.06
17	Alabama St and I-10 EB Ramps	0	27	8	8	31	0	14	0	16	0	0	0	2.06
18	Alabama St and Industrial Ave	2	25	2	10	29	4	6	4	2	2	2	8	2.06
19	Alabama St and Redlands Blvd	2	14	2	6	23	8	10	23	2	2	10	6	2.06
20	Tennessee St and Redlands Blvd	0	8	0	2	6	0	6	13	2	0	4	2	1.92
21	Texas St and Stuart Ave	0	6	0	0	4	0	0	0	0	0	0	0	1.92
22	Texas St and Oriental Ave	0	6	0	0	4	0	0	0	0	0	0	0	1.92
23	Eureka St and Pearl Ave	0	2	2	0	0	0	2	10	8	2	0	0	1.92
24	Eureka St and Stuart Ave	0	4	2	0	6	0	0	0	0	0	0	0	1.92
25	Eureka St and Oriental Ave	0	4	0	0	6	0	0	0	0	0	0	0	1.92
26	Eureka St and Redlands Blvd	0	2	0	2	4	0	0	10	0	0	4	0	1.92
27	Orange St and Colton Ave	2	5	2	0	5	0	2	5	2	2	2	2	1.73
28	Orange St and Pearl Ave	0	9	0	0	5	0	5	7	3	0	0	2	1.73
29	Orange St and Stuart Ave	0	7	2	2	12	0	2	2	0	2	0	0	1.73
30	Orange St and Oriental Ave	0	9	0	0	14	0	0	0	0	0	0	0	1.73
31	Orange St and Redlands Blvd	0	3	0	3	9	2	2	5	0	0	3	2	1.73
32	6th St and I-10 WB Ramp	0	3	0	0	7	0	0	0	0	3	0	2	1.73
33	6th St and Pearl Ave	2	2	2	3	3	2	2	3	2	0	0	0	1.73
34	6th St and Stuart Ave	0	5	0	0	3	0	0	0	0	0	0	0	1.73
35	Redlands Blvd and Citrus Ave	0	3	0	2	5	2	2	3	2	0	2	2	1.73
36	Church St and Stuart Ave	0	3	0	0	3	0	0	0	0	0	0	0	1.73
37	University Ave and I-10 WB Ramps	3	7	0	0	2	3	0	0	0	0	0	0	1.73
38	University Ave and I-10 EB Ramps	0	5	0	0	2	0	5	0	7	0	0	0	1.73

No.	INTERSECTION	2038 PM TURNING MOVEMENT COUNTS - TOTAL PCE TRUCKS - CENTRAL AVENUE 2 AXLE = 1.5; 3 AXLE = 2; 4+ AXLE = 3												AVG PCE FACTOR PM
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	4	0	7	2	29	0	0	38	2	2.22
3	Waterman Ave and Mill St	11	42	4	4	33	9	9	13	13	9	20	7	2.22
4	Waterman Ave and Orange Show Rd	13	42	7	4	38	11	11	24	11	9	31	4	2.22
5	Waterman Ave and Dumas St	0	60	0	0	58	0	0	0	0	0	0	0	2.22

No.	INTERSECTION	2038 AM TURNING MOVEMENT COUNTS - TOTAL (AUTO + PCE TRUCKS)											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	234	-	199	73	521	-	-	411	36
2	Waterman Ave and 9th St	52	506	60	88	880	56	108	433	113	182	468	119
3	Waterman Ave and Mill St	106	679	113	92	693	75	103	351	145	316	609	177
4	Waterman Ave and Orange Show Rd	134	1100	83	76	928	111	224	517	369	247	665	132
5	Waterman Ave and Dumas St	8	1335	-	-	1307	4	5	-	3	-	-	-
6	Waterman Ave and Washington St	2	2	1	577	11	239	695	1377	3	20	906	618
7	Tippecanoe Ave and Victoria Ave	0	1355	47	29	1223	3	1	0	1	70	1	35
8	Tippecanoe Ave and Hospitality Lane	521	1403	62	81	792	95	148	63	153	94	211	111
9	Tippecanoe Ave and I-10 WB Ramps	576	1095	-	-	1030	735	-	-	-	596	11	366
10	Anderson Ave and I-10 EB Ramps	-	650	222	117	886	-	737	0	634	-	-	-
11	Anderson Ave and Academy Dr	202	504	17	30	1130	426	550	283	451	95	276	46
12	California St and I-10 WB Ramps	876	1199	-	-	403	376	-	-	-	1202	48	1026
13	California St and I-10 EB Ramps	-	1142	521	162	1484	-	841	2	828	-	-	-
14	California St and Walmart Driveway	-	1409	31	380	1397	-	-	-	-	1	-	86
15	California St and Redlands Blvd	292	1095	38	686	709	183	163	332	241	75	477	519
16	Alabama St and I-10 WB Ramps	518	660	-	-	394	153	-	-	-	538	671	427
17	Alabama St and I-10 EB Ramps	-	697	141	60	655	-	369	3	602	-	-	-
18	Alabama St and Industrial Ave	25	767	31	80	859	124	70	14	40	29	29	81
19	Alabama St and Redlands Blvd	95	473	57	86	536	204	154	256	47	101	415	130
20	Tennessee St and Redlands Blvd	58	679	24	145	621	19	14	118	33	54	302	98
21	Texas St and Stuart Ave	65	317	23	31	444	96	27	5	31	44	80	36
22	Texas St and Oriental Ave	2	568	16	5	390	3	6	3	5	25	1	13
23	Eureka St and Pearl Ave	-	36	74	5	47	-	109	580	654	112	-	27
24	Eureka St and Stuart Ave	9	90	5	26	574	55	16	16	2	12	12	5
25	Eureka St and Oriental Ave	6	99	1	9	529	50	6	2	6	0	0	0
26	Eureka St and Redlands Blvd	14	97	19	67	321	97	10	173	11	19	601	29
27	Orange St and Colton Ave	15	215	39	88	630	68	146	341	184	281	336	118
28	Orange St and Pearl Ave	2	765	13	10	319	17	321	509	200	18	47	268
29	Orange St and Stuart Ave	6	729	58	6	697	13	9	7	19	40	10	30
30	Orange St and Oriental Ave	1	770	-	-	730	2	3	-	1	-	-	-
31	Orange St and Redlands Blvd	37	606	18	101	600	90	49	120	43	23	304	169
32	6th St and I-10 WB Ramp	-	170	-	-	330	-	-	-	-	527	50	547
33	6th St and Pearl Ave	225	98	34	158	344	124	124	65	320	-	-	-
34	6th St and Stuart Ave	10	276	7	137	582	22	5	7	13	19	9	76
35	Redlands Blvd and Citrus Ave	190	435	40	145	204	34	29	349	147	55	302	232
36	Church St and Stuart Ave	44	311	-	-	321	57	25	-	40	-	-	-
37	University Ave and I-10 WB Ramps	562	498	26	7	152	1013	-	-	-	0	8	29
38	University Ave and I-10 EB Ramps	-	834	-	-	182	-	316	-	489	-	-	-

No.	INTERSECTION	2038 AM TURNING MOVEMENT COUNTS - TOTAL (AUTO + PCE TRUCKS) - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	234	-	199	73	650	-	-	652	36
3	Waterman Ave and Mill St	257	975	113	92	885	177	135	388	204	316	609	177
4	Waterman Ave and Orange Show Rd	237	1203	83	76	987	262	255	554	429	247	665	132
5	Waterman Ave and Dumas St	8	1517	-	-	1658	4	5	-	3	-	-	-

No.	INTERSECTION	2038 PM TURNING MOVEMENT COUNTS - TOTAL (AUTO + PCE TRUCKS)											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	158	-	230	89	726	-	-	908	55
2	Waterman Ave and 9th St	118	1121	185	85	942	98	213	492	111	184	360	113
3	Waterman Ave and Mill St	159	997	117	125	920	153	179	404	227	288	634	209
4	Waterman Ave and Orange Show Rd	317	1224	210	166	1121	182	276	762	264	309	1021	157
5	Waterman Ave and Dumas St	31	1791	-	-	1817	5	6	-	17	-	-	-
6	Waterman Ave and Washington St	4	7	4	381	9	762	652	1050	8	7	1338	704
7	Tippecanoe Ave and Victoria Ave	2	1524	69	72	1620	0	2	0	2	56	0	28
8	Tippecanoe Ave and Hospitality Lane	782	992	100	100	1450	241	600	381	865	178	209	88
9	Tippecanoe Ave and I-10 WB Ramps	741	1210	-	-	2420	1337	-	-	-	296	18	490
10	Anderson Ave and I-10 EB Ramps	-	1118	469	773	1775	-	973	22	554	-	-	-
11	Anderson Ave and Academy Dr	69	914	62	89	796	166	317	135	163	94	123	66
12	California St and I-10 WB Ramps	1117	833	-	-	1362	1302	-	-	-	936	8	263
13	California St and I-10 EB Ramps	-	1657	1061	594	1485	-	312	10	715	-	-	-
14	California St and Walmart Driveway	-	2662	97	502	1292	-	-	-	-	2	-	172
15	California St and Redlands Blvd	118	1058	104	548	544	179	389	1135	321	166	720	764
16	Alabama St and I-10 WB Ramps	437	1210	-	-	1286	628	-	-	-	240	448	317
17	Alabama St and I-10 EB Ramps	-	1213	332	388	1335	-	592	11	749	-	-	-
18	Alabama St and Industrial Ave	57	1067	96	465	1298	199	297	178	111	73	65	364
19	Alabama St and Redlands Blvd	129	667	106	277	1025	347	407	986	115	126	447	248
20	Tennessee St and Redlands Blvd	76	624	53	118	588	31	525	1275	157	46	313	210
21	Texas St and Stuart Ave	20	580	31	18	318	14	3	11	59	57	43	51
22	Texas St and Oriental Ave	1	604	13	7	364	0	4	1	3	18	1	10
23	Eureka St and Pearl Ave	-	142	264	23	67	-	252	907	690	105	-	46
24	Eureka St and Stuart Ave	17	338	105	43	532	32	25	41	19	43	24	7
25	Eureka St and Oriental Ave	8	417	25	34	576	22	16	1	14	5	3	18
26	Eureka St and Redlands Blvd	32	256	63	139	396	43	87	882	66	51	404	61
27	Orange St and Colton Ave	136	646	203	98	520	49	236	606	242	170	269	122
28	Orange St and Pearl Ave	23	1010	85	41	628	13	584	850	487	54	48	266
29	Orange St and Stuart Ave	9	845	165	131	1324	26	119	127	72	146	54	81
30	Orange St and Oriental Ave	11	954	-	-	1553	72	48	-	23	-	-	-
31	Orange St and Redlands Blvd	72	494	49	352	909	225	210	605	97	58	352	281
32	6th St and I-10 WB Ramp	-	363	-	-	808	-	-	-	-	347	18	292
33	6th St and Pearl Ave	217	193	137	467	491	214	187	301	257	-	-	-
34	6th St and Stuart Ave	69	533	23	41	373	40	23	17	46	21	10	63
35	Redlands Blvd and Citrus Ave	81	304	62	178	531	117	151	348	220	48	188	116
36	Church St and Stuart Ave	13	339	-	-	382	26	72	-	33	-	-	-
37	University Ave and I-10 WB Ramps	418	820	57	11	207	488	-	-	-	2	25	18
38	University Ave and I-10 EB Ramps	-	625	-	-	265	-	628	-	810	-	-	-

No.	INTERSECTION	2038 PM TURNING MOVEMENT COUNTS - TOTAL (AUTO + PCE TRUCKS) - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	158	-	230	89	960	-	-	1233	55
3	Waterman Ave and Mill St	368	1396	117	125	1117	286	282	439	398	288	634	209
4	Waterman Ave and Orange Show Rd	434	1341	210	166	1217	389	377	797	360	309	1021	157
5	Waterman Ave and Dumas St	31	1978	-	-	1881	5	6	-	17	-	-	-

No.	Intersection	AM TURNING MOVEMENT COUNTS											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill Street	0	0	0	175	0	148	57	415	0	0	310	27
2	Waterman Avenue and 9th Street	48	466	56	82	814	52	101	400	105	168	433	110
3	Waterman Avenue and Mill Street	108	684	115	93	700	75	108	367	151	314	604	176
4	Waterman Avenue and Orange Show Road	126	1028	78	71	870	105	208	484	346	231	622	124
5	Waterman Avenue and Dumas Street	8	1223	0	0	1197	4	0	0	0	0	0	0
6	Waterman Avenue and Washington Street	0	0	0	525	11	217	640	1269	3	18	831	567
7	Tippecanoe Avenue and Victoria Avenue	0	1250	43	27	1127	3	0	0	0	58	1	30
8	Tippecanoe Avenue and Hospitality Lane	482	1298	57	74	729	87	134	58	138	85	192	102
9	Tippecanoe Avenue and I-10 West Ramps	542	1032	0	0	969	692	0	0	0	567	12	348
10	Anderson Avenue and I-10 East Ramps	0	643	219	116	874	0	725	0	624	0	0	0
11	Anderson Avenue and Academy Drive	197	491	17	29	1101	417	536	276	441	93	269	45
12	California Street and I-10 West Ramps	789	1081	0	2	370	343	0	0	0	1084	44	924
13	California Street and I-10 East Ramps	2	1034	472	146	1343	0	761	2	749	0	0	0
14	California Street and Walmart Driveway	2	1269	28	344	1267	0	0	0	0	1	0	43
15	California Street and Redlands Boulevard	264	988	34	620	641	165	143	292	212	67	426	464
16	Alabama Street and I-10 West Ramps	501	639	0	0	383	149	0	0	0	522	650	414
17	Alabama Street and I-10 East Ramps	0	685	139	58	644	0	362	3	591	0	0	0
18	Alabama Street and Industrial Avenue	24	751	31	78	838	121	73	15	42	29	29	85
19	Alabama Street and Redlands Boulevard	94	465	56	85	526	199	153	254	47	100	409	128
20	Tennessee Street and Redlands Boulevard	57	672	23	144	614	20	14	120	33	54	300	98
21	Texas Street and Stuart Avenue	64	312	22	30	437	94	27	5	30	44	78	35
22	Texas Street and Oriental Avenue	3	621	18	5	448	4	34	17	29	65	3	36
23	Eureka Street and Pearl Avenue	0	36	72	5	46	0	108	569	642	110	0	26
24	Eureka Street and Stuart Avenue	10	94	5	25	569	54	19	19	3	15	15	6
25	Eureka Street and Oriental Avenue	6	99	1	9	521	49	6	3	6	0	0	0
26	Eureka Street and Redlands Boulevard	14	96	20	65	315	95	10	171	11	19	590	28
27	Orange Street and Colton Avenue	15	211	37	87	623	66	144	336	181	277	331	115
28	Orange Street and Pearl Avenue	2	756	13	10	315	17	318	504	197	18	46	264
29	Orange Street and Stuart Avenue	6	713	57	6	682	13	7	5	15	35	9	27
30	Orange Street and Oriental Avenue	1	748	0	0	707	2	0	0	0	0	0	0
31	Orange Street and Redlands Boulevard	36	587	18	99	584	87	45	110	40	23	293	163
32	6th Street and I-10 West Ramps	0	178	0	0	336	0	0	0	0	526	49	547
33	6th Street and Pearl Avenue	234	102	36	160	349	125	126	66	328	0	0	18
34	6th Street and Stuart Avenue	10	272	7	135	574	22	5	6	12	19	9	74
35	Redlands Boulevard and Citrus Avenue	185	423	38	139	196	34	28	338	142	53	293	226
36	Church Street and Stuart Avenue	43	303	0	0	313	55	23	0	36	0	0	0
37	University Street and I-10 West Ramps	552	489	26	7	149	995	0	0	0	0	6	22
38	University Street and I-10 East Ramps	0	822	0	0	176	0	312	0	482	0	0	0

No.	Intersection	AM TURNING MOVEMENT COUNTS - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill Street	0	0	0	175	0	148	57	535	0	0	535	27
3	Waterman Avenue and Mill Street	248	887	115	93	785	160	138	402	206	314	604	176
4	Waterman Avenue and Orange Show Road	221	1123	78	71	925	235	238	519	401	231	622	124
5	Waterman Avenue and Dumas Street	8	1422	0	0	1553	4	0	0	0	0	0	0

No.	Intersection	PM TURNING MOVEMENT COUNTS											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill Street	0	0	0	126	0	182	80	648	0	0	823	49
2	Waterman Avenue and 9th Street	116	1100	180	84	925	97	209	483	109	180	353	110
3	Waterman Avenue and Mill Street	170	1063	125	134	985	164	200	450	253	310	682	224
4	Waterman Avenue and Orange Show Road	311	1198	205	163	1096	177	269	745	257	303	999	154
5	Waterman Avenue and Dumas Street	29	1633	0	0	1657	4	0	0	0	0	0	0
6	Waterman Avenue and Washington Street	6	10	6	377	9	753	643	1036	8	7	1319	694
7	Tippecanoe Avenue and Victoria Avenue	2	1471	67	70	1567	0	0	0	0	37	0	19
8	Tippecanoe Avenue and Hospitality Lane	756	959	97	97	1400	233	579	369	835	164	191	81
9	Tippecanoe Avenue and I-10 West Ramps	723	1178	0	0	2369	1308	0	0	0	284	18	470
10	Anderson Avenue and I-10 East Ramps	0	1104	463	763	1751	0	961	22	547	0	0	0
11	Anderson Avenue and Academy Drive	68	912	61	89	794	166	319	136	165	98	127	68
12	California Street and I-10 West Ramps	1040	774	2	0	1265	1210	0	0	0	874	8	246
13	California Street and I-10 East Ramps	0	1553	995	557	1392	0	292	10	669	0	0	0
14	California Street and Walmart Driveway	0	2481	91	465	1202	0	0	0	0	2	0	145
15	California Street and Redlands Boulevard	111	983	97	509	506	166	362	1057	300	154	670	712
16	Alabama Street and I-10 West Ramps	433	1198	0	0	1273	622	0	0	0	237	444	314
17	Alabama Street and I-10 East Ramps	0	1201	329	385	1321	0	587	11	742	0	0	0
18	Alabama Street and Industrial Avenue	57	1076	97	466	1299	199	307	183	114	76	67	378
19	Alabama Street and Redlands Boulevard	131	675	108	278	1026	347	407	987	116	128	452	251
20	Tennessee Street and Redlands Boulevard	76	623	53	117	588	31	523	1271	156	46	313	211
21	Texas Street and Stuart Avenue	20	577	30	18	316	14	3	11	59	57	42	51
22	Texas Street and Oriental Avenue	1	676	15	8	437	0	42	11	32	65	4	37
23	Eureka Street and Pearl Avenue	0	142	265	24	69	0	251	904	687	106	0	47
24	Eureka Street and Stuart Avenue	18	345	107	44	539	33	29	46	22	50	28	8
25	Eureka Street and Oriental Avenue	8	424	26	35	581	22	21	1	18	7	4	24
26	Eureka Street and Redlands Boulevard	33	261	64	140	399	44	88	884	67	52	408	62
27	Orange Street and Colton Avenue	135	645	202	98	519	50	236	604	242	170	268	122
28	Orange Street and Pearl Avenue	23	1012	85	41	632	13	584	850	488	55	49	270
29	Orange Street and Stuart Avenue	9	852	166	131	1329	26	122	131	75	152	56	85
30	Orange Street and Oriental Avenue	12	961	0	0	1558	72	56	0	27	0	0	0
31	Orange Street and Redlands Boulevard	72	494	49	351	905	224	210	603	97	58	352	281
32	6th Street and I-10 West Ramps	0	360	0	0	803	0	0	0	0	345	18	291
33	6th Street and Pearl Avenue	211	187	133	461	484	211	182	294	251	0	0	0
34	6th Street and Stuart Avenue	66	509	22	39	351	38	16	12	33	15	8	46
35	Redlands Boulevard and Citrus Avenue	81	303	62	177	528	115	150	347	219	48	187	115
36	Church Street and Stuart Avenue	12	311	0	0	355	24	53	0	24	0	0	0
37	University Street and I-10 West Ramps	415	812	57	11	204	482	0	0	0	2	21	15
38	University Street and I-10 East Ramps	0	621	0	0	263	0	626	1	806	0	0	0

No.	Intersection	PM TURNING MOVEMENT COUNTS - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill Street	0	0	0	126	0	182	80	878	0	0	1143	49
3	Waterman Avenue and Mill Street	360	1365	125	134	1115	294	300	485	348	310	682	224
4	Waterman Avenue and Orange Show Road	426	1313	205	163	1191	382	369	780	352	303	999	154
5	Waterman Avenue and Dumas Street	29	1935	0	0	1842	4	9	0	5	0	0	0

No.	INTERSECTION	2038 AM TURNING MOVEMENT COUNTS - AUTO											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	168	-	142	55	398	-	-	297	26
2	Waterman Ave and 9th St	46	447	54	79	780	50	97	383	101	161	415	105
3	Waterman Ave and Mill St	104	655	110	89	671	72	103	352	145	301	579	169
4	Waterman Ave and Orange Show Rd	121	985	75	68	834	101	199	464	332	221	596	119
5	Waterman Ave and Dumas St	8	1172	-	-	1147	4	-	-	-	-	-	-
6	Waterman Ave and Washington St	-	-	-	503	11	208	613	1216	3	17	796	543
7	Tippecanoe Ave and Victoria Ave	-	1198	41	26	1080	3	-	-	-	56	1	29
8	Tippecanoe Ave and Hospitality Lane	462	1244	55	71	699	83	128	56	132	81	184	98
9	Tippecanoe Ave and I-10 WB Ramps	519	989	-	-	929	663	-	-	-	543	12	333
10	Anderson Ave and I-10 EB Ramps	-	629	214	113	855	-	709	-	610	-	-	-
11	Anderson Ave and Academy Dr	193	480	17	28	1076	408	524	270	431	91	263	44
12	California St and I-10 WB Ramps	736	1008	-	2	345	320	-	-	-	1011	41	862
13	California St and I-10 EB Ramps	2	987	450	139	1282	-	726	2	715	-	-	-
14	California St and Walmart Driveway	2	1211	27	328	1209	-	-	-	-	1	-	41
15	California St and Redlands Blvd	252	943	32	592	612	157	136	279	202	64	407	443
16	Alabama St and I-10 WB Ramps	486	620	-	-	372	145	-	-	-	507	631	402
17	Alabama St and I-10 EB Ramps	-	665	135	56	625	-	351	3	574	-	-	-
18	Alabama St and Industrial Ave	23	729	30	76	813	117	71	15	41	28	28	83
19	Alabama St and Redlands Blvd	91	451	54	83	510	193	148	247	46	97	397	124
20	Tennessee St and Redlands Blvd	56	656	22	141	600	20	14	117	32	53	293	96
21	Texas St and Stuart Ave	63	305	21	29	427	92	26	5	29	43	76	34
22	Texas St and Oriental Ave	3	607	18	5	438	4	33	17	28	63	3	35
23	Eureka St and Pearl Ave	-	35	70	5	45	-	105	556	627	107	-	25
24	Eureka St and Stuart Ave	10	92	5	24	556	53	19	19	3	15	15	6
25	Eureka St and Oriental Ave	6	97	1	9	509	48	6	3	6	-	-	-
26	Eureka St and Redlands Blvd	14	94	20	63	308	93	10	167	11	19	576	27
27	Orange St and Colton Ave	15	208	36	86	615	65	142	331	179	273	327	113
28	Orange St and Pearl Ave	2	746	13	10	311	17	314	497	194	18	45	260
29	Orange St and Stuart Ave	6	703	56	6	673	13	7	5	15	35	9	27
30	Orange St and Oriental Ave	1	738	-	-	697	2	-	-	-	-	-	-
31	Orange St and Redlands Blvd	36	579	18	98	576	86	44	108	39	23	289	161
32	6th St and I-10 WB Ramp	-	176	-	-	331	-	-	-	-	519	48	540
33	6th St and Pearl Ave	231	101	36	158	344	123	124	65	324	-	-	18
34	6th St and Stuart Ave	10	268	7	133	566	22	5	6	12	19	9	73
35	Redlands Blvd and Citrus Ave	182	417	37	137	193	34	28	333	140	52	289	223
36	Church St and Stuart Ave	42	299	-	-	309	54	23	-	36	-	-	-
37	University Ave and I-10 WB Ramps	544	482	26	7	147	981	-	-	-	-	6	22
38	University Ave and I-10 EB Ramps	-	811	-	-	174	-	308	-	475	-	-	-

No.	INTERSECTION	2038 AM TURNING MOVEMENT COUNTS - AUTO - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	168	-	142	55	513	-	-	513	26
3	Waterman Ave and Mill St	238	850	110	89	752	153	132	385	197	301	579	169
4	Waterman Ave and Orange Show Rd	212	1076	75	68	886	225	228	497	384	221	596	119
5	Waterman Ave and Dumas St	8	1363	-	-	1488	4	-	-	-	-	-	-

No.	INTERSECTION	2038 PM TURNING MOVEMENT COUNTS - AUTO											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	124	-	179	79	639	-	-	811	48
2	Waterman Ave and 9th St	114	1084	177	83	912	96	206	476	107	177	348	108
3	Waterman Ave and Mill St	168	1048	123	132	971	162	197	444	249	306	672	221
4	Waterman Ave and Orange Show Rd	307	1181	202	161	1081	175	265	734	253	299	985	152
5	Waterman Ave and Dumas St	29	1610	-	-	1634	4	-	-	-	-	-	-
6	Waterman Ave and Washington St	6	10	6	372	9	742	634	1021	8	7	1300	684
7	Tippecanoe Ave and Victoria Ave	2	1450	66	69	1545	-	-	-	-	36	-	19
8	Tippecanoe Ave and Hospitality Lane	745	945	96	96	1380	230	571	364	823	162	188	80
9	Tippecanoe Ave and I-10 WB Ramps	713	1161	-	-	2336	1290	-	-	-	280	18	463
10	Anderson Ave and I-10 EB Ramps	-	1088	456	752	1725	-	947	22	539	-	-	-
11	Anderson Ave and Academy Dr	67	899	60	88	782	164	314	134	163	97	125	67
12	California St and I-10 WB Ramps	1000	744	2	-	1216	1163	-	-	-	840	8	236
13	California St and I-10 EB Ramps	-	1505	964	540	1349	-	283	10	648	-	-	-
14	California St and Walmart Driveway	-	2404	88	451	1165	-	-	-	-	2	-	141
15	California St and Redlands Blvd	108	953	94	493	490	161	351	1024	291	149	649	690
16	Alabama St and I-10 WB Ramps	428	1185	-	-	1259	615	-	-	-	234	439	310
17	Alabama St and I-10 EB Ramps	-	1188	325	381	1306	-	580	11	734	-	-	-
18	Alabama St and Industrial Ave	56	1064	96	461	1284	197	304	181	113	75	66	374
19	Alabama St and Redlands Blvd	130	667	107	275	1015	343	402	976	115	127	447	248
20	Tennessee St and Redlands Blvd	76	619	53	116	585	31	520	1264	155	46	311	210
21	Texas St and Stuart Ave	20	574	30	18	314	14	3	11	59	57	42	51
22	Texas St and Oriental Ave	1	672	15	8	435	-	42	11	32	65	4	37
23	Eureka St and Pearl Ave	-	141	263	24	69	-	250	899	683	105	-	47
24	Eureka St and Stuart Ave	18	343	106	44	536	33	29	46	22	50	28	8
25	Eureka St and Oriental Ave	8	422	26	35	578	22	21	1	18	7	4	24
26	Eureka St and Redlands Blvd	33	260	64	139	397	44	87	879	67	52	406	62
27	Orange St and Colton Ave	134	642	201	98	516	50	235	601	241	169	267	121
28	Orange St and Pearl Ave	23	1007	85	41	629	13	581	846	486	55	49	269
29	Orange St and Stuart Ave	9	848	165	130	1322	26	121	130	75	151	56	85
30	Orange St and Oriental Ave	12	956	-	-	1550	72	56	-	27	-	-	-
31	Orange St and Redlands Blvd	72	492	49	349	900	223	209	600	97	58	350	280
32	6th St and I-10 WB Ramp	-	358	-	-	799	-	-	-	-	343	18	290
33	6th St and Pearl Ave	210	186	132	459	482	210	181	293	250	-	-	-
34	6th St and Stuart Ave	66	506	22	39	349	38	16	12	33	15	8	46
35	Redlands Blvd and Citrus Ave	81	301	62	176	525	114	149	345	218	48	186	114
36	Church St and Stuart Ave	12	309	-	-	353	24	53	-	24	-	-	-
37	University Ave and I-10 WB Ramps	413	808	57	11	203	480	-	-	-	2	21	15
38	University Ave and I-10 EB Ramps	-	618	-	-	262	-	623	1	802	-	-	-

No.	INTERSECTION	2038 PM TURNING MOVEMENT COUNTS - AUTO - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	124	-	179	79	866	-	-	1127	48
3	Waterman Ave and Mill St	355	1346	123	132	1099	290	296	478	343	306	672	221
4	Waterman Ave and Orange Show Rd	420	1294	202	161	1174	377	364	769	347	299	985	152
5	Waterman Ave and Dumas St	29	1908	-	-	1816	4	9	-	5	-	-	-

No.	INTERSECTION	2038 AM TURNING MOVEMENT COUNTS - TOTAL TRUCKS												AM PEAK % TRUCK
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	7	0	6	2	17	0	0	13	1	0.0417
2	Waterman Ave and 9th St	2	19	2	3	34	2	4	17	4	7	18	5	0.0417
3	Waterman Ave and Mill St	4	29	5	4	29	3	5	15	6	13	25	7	0.0417
4	Waterman Ave and Orange Show Rd	5	43	3	3	36	4	9	20	14	10	26	5	0.0417
5	Waterman Ave and Dumas St	0	51	0	0	50	0	0	0	0	0	0	0	0.0417
6	Waterman Ave and Washington St	0	0	0	22	0	9	27	53	0	1	35	24	0.0417
7	Tippecanoe Ave and Victoria Ave	0	52	2	1	47	0	0	0	0	2	0	1	0.0417
8	Tippecanoe Ave and Hospitality Lane	20	54	2	3	30	4	6	2	6	4	8	4	0.0417
9	Tippecanoe Ave and I-10 WB Ramps	23	43	0	0	40	29	0	0	0	24	0	15	0.0417
10	Anderson Ave and I-10 EB Ramps	0	14	5	3	19	0	16	0	14	0	0	0	0.0223
11	Anderson Ave and Academy Dr	4	11	0	1	25	9	12	6	10	2	6	1	0.0223
12	California St and I-10 WB Ramps	53	73	0	0	25	23	0	0	0	73	3	62	0.0674
13	California St and I-10 EB Ramps	0	47	22	7	61	0	35	0	34	0	0	0	0.0457
14	California St and Walmart Driveway	0	58	1	16	58	0	0	0	0	0	0	2	0.0457
15	California St and Redlands Blvd	12	45	2	28	29	8	7	13	10	3	19	21	0.0457
16	Alabama St and I-10 WB Ramps	15	19	0	0	11	4	0	0	0	15	19	12	0.0295
17	Alabama St and I-10 EB Ramps	0	20	4	2	19	0	11	0	17	0	0	0	0.0295
18	Alabama St and Industrial Ave	1	22	1	2	25	4	2	0	1	1	1	2	0.0295
19	Alabama St and Redlands Blvd	3	14	2	2	16	6	5	7	1	3	12	4	0.0295
20	Tennessee St and Redlands Blvd	1	16	1	3	14	0	0	3	1	1	7	2	0.0233
21	Texas St and Stuart Ave	1	7	1	1	10	2	1	0	1	1	2	1	0.0233
22	Texas St and Oriental Ave	0	14	0	0	10	0	1	0	1	2	0	1	0.0233
23	Eureka St and Pearl Ave	0	1	2	0	1	0	3	13	15	3	0	1	0.0233
24	Eureka St and Stuart Ave	0	2	0	1	13	1	0	0	0	0	0	0	0.0233
25	Eureka St and Oriental Ave	0	2	0	0	12	1	0	0	0	0	0	0	0.0233
26	Eureka St and Redlands Blvd	0	2	0	2	7	2	0	4	0	0	14	1	0.0233
27	Orange St and Colton Ave	0	3	1	1	8	1	2	5	2	4	4	2	0.0136
28	Orange St and Pearl Ave	0	10	0	0	4	0	4	7	3	0	1	4	0.0136
29	Orange St and Stuart Ave	0	10	1	0	9	0	0	0	0	0	0	0	0.0136
30	Orange St and Oriental Ave	0	10	0	0	10	0	0	0	0	0	0	0	0.0136
31	Orange St and Redlands Blvd	0	8	0	1	8	1	1	2	1	0	4	2	0.0136
32	6th St and I-10 WB Ramp	0	2	0	0	5	0	0	0	0	7	1	7	0.0136
33	6th St and Pearl Ave	3	1	0	2	5	2	2	1	4	0	0	0	0.0136
34	6th St and Stuart Ave	0	4	0	2	8	0	0	0	0	0	0	1	0.0136
35	Redlands Blvd and Citrus Ave	3	6	1	2	3	0	0	5	2	1	4	3	0.0136
36	Church St and Stuart Ave	1	4	0	0	4	1	0	0	0	0	0	0	0.0136
37	University Ave and I-10 WB Ramps	8	7	0	0	2	14	0	0	0	0	0	0	0.0136
38	University Ave and I-10 EB Ramps	0	11	0	0	2	0	4	0	7	0	0	0	0.0136

No.	INTERSECTION	2038 AM TURNING MOVEMENT COUNTS - TOTAL TRUCKS - CENTRAL AVENUE												AM PEAK % TRUCK
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	7	0	6	2	22	0	0	22	1	0.0417
4	Waterman Ave and Orange Show Rd	10	37	5	4	33	7	6	17	9	13	25	7	0.0417
5	Waterman Ave and Dumas St	9	47	3	3	39	10	10	22	17	10	26	5	0.0417
6	Waterman Ave and Washington St	0	59	0	0	65	0	0	0	0	0	0	0	0.0417

No.	INTERSECTION	2038 PM TURNING MOVEMENT COUNTS - TOTAL TRUCKS												PM PEAK % TRUCK
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	2	0	3	1	9	0	0	12	1	0.0141
2	Waterman Ave and 9th St	2	16	3	1	13	1	3	7	2	3	5	2	0.0141
3	Waterman Ave and Mill St	2	15	2	2	14	2	3	6	4	4	10	3	0.0141
4	Waterman Ave and Orange Show Rd	4	17	3	2	15	2	4	11	4	4	14	2	0.0141
5	Waterman Ave and Dumas St	0	23	0	0	23	0	0	0	0	0	0	0	0.0141
6	Waterman Ave and Washington St	0	0	0	5	0	11	9	15	0	0	19	10	0.0141
7	Tippecanoe Ave and Victoria Ave	0	21	1	1	22	0	0	0	0	1	0	0	0.0141
8	Tippecanoe Ave and Hospitality Lane	11	14	1	1	20	3	8	5	12	2	3	1	0.0141
9	Tippecanoe Ave and I-10 WB Ramps	10	17	0	0	33	18	0	0	0	4	0	7	0.0141
10	Anderson Ave and I-10 EB Ramps	0	16	7	11	26	0	14	0	8	0	0	0	0.0147
11	Anderson Ave and Academy Dr	1	13	1	1	12	2	5	2	2	1	2	1	0.0147
12	California St and I-10 WB Ramps	40	30	0	0	49	47	0	0	0	34	0	10	0.0386
13	California St and I-10 EB Ramps	0	48	31	17	43	0	9	0	21	0	0	0	0.0309
14	California St and Walmart Driveway	0	77	3	14	37	0	0	0	0	0	0	4	0.0309
15	California St and Redlands Blvd	3	30	3	16	16	5	11	33	9	5	21	22	0.0309
16	Alabama St and I-10 WB Ramps	5	13	0	0	14	7	0	0	0	3	5	4	0.0112
17	Alabama St and I-10 EB Ramps	0	13	4	4	15	0	7	0	8	0	0	0	0.0112
18	Alabama St and Industrial Ave	1	12	1	5	15	2	3	2	1	1	1	4	0.0112
19	Alabama St and Redlands Blvd	1	8	1	3	11	4	5	11	1	1	5	3	0.0112
20	Tennessee St and Redlands Blvd	0	4	0	1	3	0	3	7	1	0	2	1	0.0057
21	Texas St and Stuart Ave	0	3	0	0	2	0	0	0	0	0	0	0	0.0057
22	Texas St and Oriental Ave	0	4	0	0	2	0	0	0	0	0	0	0	0.0057
23	Eureka St and Pearl Ave	0	1	2	0	0	0	1	5	4	1	0	0	0.0057
24	Eureka St and Stuart Ave	0	2	1	0	3	0	0	0	0	0	0	0	0.0057
25	Eureka St and Oriental Ave	0	2	0	0	3	0	0	0	0	0	0	0	0.0057
26	Eureka St and Redlands Blvd	0	1	0	1	2	0	1	5	0	0	2	0	0.0057
27	Orange St and Colton Ave	1	3	1	0	3	0	1	3	1	1	1	1	0.0050
28	Orange St and Pearl Ave	0	5	0	0	3	0	3	4	2	0	0	1	0.0050
29	Orange St and Stuart Ave	0	4	1	1	7	0	1	1	0	1	0	0	0.0050
30	Orange St and Oriental Ave	0	5	0	0	8	0	0	0	0	0	0	0	0.0050
31	Orange St and Redlands Blvd	0	2	0	2	5	1	1	3	0	0	2	1	0.0050
32	6th St and I-10 WB Ramp	0	2	0	0	4	0	0	0	0	2	0	1	0.0050
33	6th St and Pearl Ave	1	1	1	2	2	1	1	1	1	0	0	0	0.0050
34	6th St and Stuart Ave	0	3	0	0	2	0	0	0	0	0	0	0	0.0050
35	Redlands Blvd and Citrus Ave	0	2	0	1	3	1	1	2	1	0	1	1	0.0050
36	Church St and Stuart Ave	0	2	0	0	2	0	0	0	0	0	0	0	0.0050
37	University Ave and I-10 WB Ramps	2	4	0	0	1	2	0	0	0	0	0	0	0.0050
38	University Ave and I-10 EB Ramps	0	3	0	0	1	0	3	0	4	0	0	0	0.0050

No.	INTERSECTION	2038 PM TURNING MOVEMENT COUNTS - TOTAL TRUCKS - CENTRAL AVENUE												PM PEAK % TRUCK
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	2	0	3	1	12	0	0	16	1	0.0141
4	Waterman Ave and Orange Show Rd	5	19	2	2	16	4	4	7	5	4	10	3	0.0141
5	Waterman Ave and Dumas St	6	19	3	2	17	5	5	11	5	4	14	2	0.0141
6	Waterman Ave and Washington St	0	27	0	0	26	0	0	0	0	0	0	0	0.0141

No.	INTERSECTION	2038 AM TURNING MOVEMENT COUNTS - TOTAL PCE TRUCKS 2 AXLE = 1.5; 3 AXLE = 2; 4+ AXLE = 3												AVG PCE FACTOR AM
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	20	0	17	6	48	0	0	37	3	2.84
2	Waterman Ave and 9th St	6	54	6	9	97	6	11	48	11	20	51	14	2.84
3	Waterman Ave and Mill St	11	82	14	11	82	9	14	43	17	37	71	20	2.84
4	Waterman Ave and Orange Show Rd	14	122	9	9	102	11	26	57	40	28	74	14	2.84
5	Waterman Ave and Dumas St	0	145	0	0	142	0	0	0	0	0	0	0	2.84
6	Waterman Ave and Washington St	0	0	0	63	0	26	77	151	0	3	100	68	2.84
7	Tippecanoe Ave and Victoria Ave	0	148	6	3	134	0	0	0	0	6	0	3	2.84
8	Tippecanoe Ave and Hospitality Lane	57	154	6	9	85	11	17	6	17	11	23	11	2.84
9	Tippecanoe Ave and I-10 WB Ramps	65	122	0	0	114	82	0	0	0	68	0	43	2.84
10	Anderson Ave and I-10 EB Ramps	0	30	11	6	41	0	34	0	30	0	0	0	2.15
11	Anderson Ave and Academy Dr	9	24	0	2	54	19	26	13	21	4	13	2	2.15
12	California St and I-10 WB Ramps	146	202	0	0	69	64	0	0	0	202	8	171	2.76
13	California St and I-10 EB Ramps	0	128	60	19	166	0	96	0	93	0	0	0	2.73
14	California St and Walmart Driveway	0	158	3	44	158	0	0	0	0	0	0	5	2.73
15	California St and Redlands Blvd	33	123	5	76	79	22	19	35	27	8	52	57	2.73
16	Alabama St and I-10 WB Ramps	32	40	0	0	23	8	0	0	0	32	40	25	2.12
17	Alabama St and I-10 EB Ramps	0	42	8	4	40	0	23	0	36	0	0	0	2.12
18	Alabama St and Industrial Ave	2	47	2	4	53	8	4	0	2	2	2	4	2.12
19	Alabama St and Redlands Blvd	6	30	4	4	34	13	11	15	2	6	25	8	2.12
20	Tennessee St and Redlands Blvd	2	29	2	5	26	0	0	5	2	2	13	4	1.83
21	Texas St and Stuart Ave	2	13	2	2	18	4	2	0	2	2	4	2	1.83
22	Texas St and Oriental Ave	0	26	0	0	18	0	2	0	2	4	0	2	1.83
23	Eureka St and Pearl Ave	0	2	4	0	2	0	5	24	27	5	0	2	1.83
24	Eureka St and Stuart Ave	0	4	0	2	24	2	0	0	0	0	0	0	1.83
25	Eureka St and Oriental Ave	0	4	0	0	22	2	0	0	0	0	0	0	1.83
26	Eureka St and Redlands Blvd	0	4	0	4	13	4	0	7	0	0	26	2	1.83
27	Orange St and Colton Ave	0	5	2	2	14	2	4	9	4	7	7	4	1.75
28	Orange St and Pearl Ave	0	18	0	0	7	0	7	12	5	0	2	7	1.75
29	Orange St and Stuart Ave	0	18	2	0	16	0	0	0	0	0	0	0	1.75
30	Orange St and Oriental Ave	0	18	0	0	18	0	0	0	0	0	0	0	1.75
31	Orange St and Redlands Blvd	0	14	0	2	14	2	2	4	2	0	7	4	1.75
32	6th St and I-10 WB Ramp	0	4	0	0	9	0	0	0	0	12	2	12	1.75
33	6th St and Pearl Ave	5	2	0	4	9	4	4	2	7	0	0	0	1.75
34	6th St and Stuart Ave	0	7	0	4	14	0	0	0	0	0	0	2	1.75
35	Redlands Blvd and Citrus Ave	5	11	2	4	5	0	0	9	4	2	7	5	1.75
36	Church St and Stuart Ave	2	7	0	0	7	2	0	0	0	0	0	0	1.75
37	University Ave and I-10 WB Ramps	14	12	0	0	4	25	0	0	0	0	0	0	1.75
38	University Ave and I-10 EB Ramps	0	19	0	0	4	0	7	0	12	0	0	0	1.75

No.	INTERSECTION	2038 AM TURNING MOVEMENT COUNTS - TOTAL PCE TRUCKS - CENTRAL AVENUE 2 AXLE = 1.5; 3 AXLE = 2; 4+ AXLE = 3												AVG PCE FACTOR AM
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	20	0	17	6	63	0	0	63	3	2.84
3	Waterman Ave and Mill St	28	105	14	11	94	20	17	48	26	37	71	20	2.84
4	Waterman Ave and Orange Show Rd	26	134	9	9	111	28	28	63	48	28	74	14	2.84
5	Waterman Ave and Dumas St	0	168	0	0	185	0	0	0	0	0	0	0	2.84

No.	INTERSECTION	2038 PM TURNING MOVEMENT COUNTS - TOTAL PCE TRUCKS 2 AXLE = 1.5; 3 AXLE = 2; 4+ AXLE = 3												AVG PCE FACTOR PM
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	4	0	7	2	20	0	0	27	2	2.22
2	Waterman Ave and 9th St	4	36	7	2	29	2	7	16	4	7	11	4	2.22
3	Waterman Ave and Mill St	4	33	4	4	31	4	7	13	9	9	22	7	2.22
4	Waterman Ave and Orange Show Rd	9	38	7	4	33	4	9	24	9	9	31	4	2.22
5	Waterman Ave and Dumas St	0	51	0	0	51	0	0	0	0	0	0	0	2.22
6	Waterman Ave and Washington St	0	0	0	11	0	24	20	33	0	0	42	22	2.22
7	Tippecanoe Ave and Victoria Ave	0	47	2	2	49	0	0	0	0	2	0	0	2.22
8	Tippecanoe Ave and Hospitality Lane	24	31	2	2	44	7	18	11	27	4	7	2	2.22
9	Tippecanoe Ave and I-10 WB Ramps	22	38	0	0	73	40	0	0	0	9	0	16	2.22
10	Anderson Ave and I-10 EB Ramps	0	34	15	23	55	0	30	0	17	0	0	0	2.12
11	Anderson Ave and Academy Dr	2	28	2	2	25	4	11	4	4	2	4	2	2.12
12	California St and I-10 WB Ramps	122	92	0	0	150	143	0	0	0	104	0	31	3.05
13	California St and I-10 EB Ramps	0	151	97	53	135	0	28	0	66	0	0	0	3.14
14	California St and Walmart Driveway	0	242	9	44	116	0	0	0	0	0	0	13	3.14
15	California St and Redlands Blvd	9	94	9	50	50	16	35	104	28	16	66	69	3.14
16	Alabama St and I-10 WB Ramps	10	27	0	0	29	14	0	0	0	6	10	8	2.06
17	Alabama St and I-10 EB Ramps	0	27	8	8	31	0	14	0	16	0	0	0	2.06
18	Alabama St and Industrial Ave	2	25	2	10	31	4	6	4	2	2	2	8	2.06
19	Alabama St and Redlands Blvd	2	16	2	6	23	8	10	23	2	2	10	6	2.06
20	Tennessee St and Redlands Blvd	0	8	0	2	6	0	6	13	2	0	4	2	1.92
21	Texas St and Stuart Ave	0	6	0	0	4	0	0	0	0	0	0	0	1.92
22	Texas St and Oriental Ave	0	8	0	0	4	0	0	0	0	0	0	0	1.92
23	Eureka St and Pearl Ave	0	2	4	0	0	0	2	10	8	2	0	0	1.92
24	Eureka St and Stuart Ave	0	4	2	0	6	0	0	0	0	0	0	0	1.92
25	Eureka St and Oriental Ave	0	4	0	0	6	0	0	0	0	0	0	0	1.92
26	Eureka St and Redlands Blvd	0	2	0	2	4	0	2	10	0	0	4	0	1.92
27	Orange St and Colton Ave	2	5	2	0	5	0	2	5	2	2	2	2	1.73
28	Orange St and Pearl Ave	0	9	0	0	5	0	5	7	3	0	0	2	1.73
29	Orange St and Stuart Ave	0	7	2	2	12	0	2	2	0	2	0	0	1.73
30	Orange St and Oriental Ave	0	9	0	0	14	0	0	0	0	0	0	0	1.73
31	Orange St and Redlands Blvd	0	3	0	3	9	2	2	5	0	0	3	2	1.73
32	6th St and I-10 WB Ramp	0	3	0	0	7	0	0	0	0	3	0	2	1.73
33	6th St and Pearl Ave	2	2	2	3	3	2	2	2	2	0	0	0	1.73
34	6th St and Stuart Ave	0	5	0	0	3	0	0	0	0	0	0	0	1.73
35	Redlands Blvd and Citrus Ave	0	3	0	2	5	2	2	3	2	0	2	2	1.73
36	Church St and Stuart Ave	0	3	0	0	3	0	0	0	0	0	0	0	1.73
37	University Ave and I-10 WB Ramps	3	7	0	0	2	3	0	0	0	0	0	0	1.73
38	University Ave and I-10 EB Ramps	0	5	0	0	2	0	5	0	7	0	0	0	1.73

No.	INTERSECTION	2038 PM TURNING MOVEMENT COUNTS - TOTAL PCE TRUCKS - CENTRAL AVENUE 2 AXLE = 1.5; 3 AXLE = 2; 4+ AXLE = 3												AVG PCE FACTOR PM
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
		L	T	R	L	T	R	L	T	R	L	T	R	
1	Sierra Way and Mill St	0	0	0	4	0	7	2	27	0	0	36	2	2.22
3	Waterman Ave and Mill St	11	42	4	4	36	9	9	16	11	9	22	7	2.22
4	Waterman Ave and Orange Show Rd	13	42	7	4	38	11	11	24	11	9	31	4	2.22
5	Waterman Ave and Dumas St	0	60	0	0	58	0	0	0	0	0	0	0	2.22

No.	INTERSECTION	2038 AM TURNING MOVEMENT COUNTS - TOTAL (AUTO + PCE TRUCKS)											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	188	-	159	61	446	-	-	334	29
2	Waterman Ave and 9th St	52	501	60	88	877	56	108	431	112	181	466	119
3	Waterman Ave and Mill St	115	737	124	100	753	81	117	395	162	338	650	189
4	Waterman Ave and Orange Show Rd	135	1107	84	77	936	112	225	521	372	249	670	133
5	Waterman Ave and Dumas St	8	1317	-	-	1289	4	0	-	0	-	-	-
6	Waterman Ave and Washington St	0	0	0	566	11	234	690	1367	3	20	896	611
7	Tippecanoe Ave and Victoria Ave	0	1346	47	29	1214	3	0	0	0	62	1	32
8	Tippecanoe Ave and Hospitality Lane	519	1398	61	80	784	94	145	62	149	92	207	109
9	Tippecanoe Ave and I-10 WB Ramps	584	1111	-	-	1043	745	-	-	-	611	12	376
10	Anderson Ave and I-10 EB Ramps	-	659	225	119	896	-	743	0	640	-	-	-
11	Anderson Ave and Academy Dr	202	504	17	30	1130	427	550	283	452	95	276	46
12	California St and I-10 WB Ramps	882	1210	-	-	414	384	-	-	-	1213	49	1033
13	California St and I-10 EB Ramps	-	1115	510	158	1448	-	822	2	808	-	-	-
14	California St and Walmart Driveway	-	1369	30	372	1367	-	-	-	-	1	-	46
15	California St and Redlands Blvd	285	1066	37	668	691	179	155	314	229	72	459	500
16	Alabama St and I-10 WB Ramps	518	660	-	-	395	153	-	-	-	539	671	427
17	Alabama St and I-10 EB Ramps	-	707	143	60	665	-	374	3	610	-	-	-
18	Alabama St and Industrial Ave	25	776	32	80	866	125	75	15	43	30	30	87
19	Alabama St and Redlands Blvd	97	481	58	87	544	206	159	262	48	103	422	132
20	Tennessee St and Redlands Blvd	58	685	24	146	626	20	14	122	34	55	306	100
21	Texas St and Stuart Ave	65	318	23	31	445	96	28	5	31	45	80	36
22	Texas St and Oriental Ave	3	633	18	5	456	4	35	17	30	67	3	37
23	Eureka St and Pearl Ave	-	37	74	5	47	-	110	580	654	112	-	27
24	Eureka St and Stuart Ave	10	96	5	26	580	55	19	19	3	15	15	6
25	Eureka St and Oriental Ave	6	101	1	9	531	50	6	3	6	0	0	0
26	Eureka St and Redlands Blvd	14	98	20	67	321	97	10	174	11	19	602	29
27	Orange St and Colton Ave	15	213	38	88	629	67	146	340	183	280	334	117
28	Orange St and Pearl Ave	2	764	13	10	318	17	321	509	199	18	47	267
29	Orange St and Stuart Ave	6	721	58	6	689	13	7	5	15	35	9	27
30	Orange St and Oriental Ave	1	756	-	-	715	2	0	-	0	-	-	-
31	Orange St and Redlands Blvd	36	593	18	100	590	88	46	112	41	23	296	165
32	6th St and I-10 WB Ramp	-	180	-	-	340	-	-	-	-	531	50	552
33	6th St and Pearl Ave	236	103	36	162	353	127	128	67	331	-	-	-
34	6th St and Stuart Ave	10	275	7	137	580	22	5	6	12	19	9	75
35	Redlands Blvd and Citrus Ave	187	428	39	141	198	34	28	342	144	54	296	228
36	Church St and Stuart Ave	44	306	-	-	316	56	23	-	36	-	-	-
37	University Ave and I-10 WB Ramps	558	494	26	7	151	1006	-	-	-	0	6	22
38	University Ave and I-10 EB Ramps	-	830	-	-	178	-	315	-	487	-	-	-

No.	INTERSECTION	2038 AM TURNING MOVEMENT COUNTS - TOTAL (AUTO + PCE TRUCKS) - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	188	-	159	61	576	-	-	576	29
3	Waterman Ave and Mill St	266	955	124	100	846	173	149	433	223	338	650	189
4	Waterman Ave and Orange Show Rd	238	1210	84	77	997	253	256	560	432	249	670	133
5	Waterman Ave and Dumas St	8	1531	-	-	1673	4	0	-	0	-	-	-

No.	INTERSECTION	2038 PM TURNING MOVEMENT COUNTS - TOTAL (AUTO + PCE TRUCKS)											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	128	-	186	81	659	-	-	838	50
2	Waterman Ave and 9th St	118	1120	184	85	941	98	213	492	111	184	359	112
3	Waterman Ave and Mill St	172	1081	127	136	1002	166	204	457	258	315	694	228
4	Waterman Ave and Orange Show Rd	316	1219	209	165	1114	179	274	758	262	308	1016	156
5	Waterman Ave and Dumas St	29	1661	-	-	1685	4	0	-	0	-	-	-
6	Waterman Ave and Washington St	6	10	6	383	9	766	654	1054	8	7	1342	706
7	Tippecanoe Ave and Victoria Ave	2	1497	68	71	1594	0	0	0	0	38	0	19
8	Tippecanoe Ave and Hospitality Lane	769	976	98	98	1424	237	589	375	850	166	195	82
9	Tippecanoe Ave and I-10 WB Ramps	735	1199	-	-	2409	1330	-	-	-	289	18	479
10	Anderson Ave and I-10 EB Ramps	-	1122	471	775	1780	-	977	22	556	-	-	-
11	Anderson Ave and Academy Dr	69	927	62	90	807	168	325	138	167	99	129	69
12	California St and I-10 WB Ramps	1122	836	-	-	1366	1306	-	-	-	944	8	267
13	California St and I-10 EB Ramps	-	1656	1061	593	1484	-	311	10	714	-	-	-
14	California St and Walmart Driveway	-	2646	97	495	1281	-	-	-	-	2	-	154
15	California St and Redlands Blvd	117	1047	103	543	540	177	386	1128	319	165	715	759
16	Alabama St and I-10 WB Ramps	438	1212	-	-	1288	629	-	-	-	240	449	318
17	Alabama St and I-10 EB Ramps	-	1215	333	389	1337	-	594	11	750	-	-	-
18	Alabama St and Industrial Ave	58	1089	98	471	1315	201	310	185	115	77	68	382
19	Alabama St and Redlands Blvd	132	683	109	281	1038	351	412	999	117	129	457	254
20	Tennessee St and Redlands Blvd	76	627	53	118	591	31	526	1277	157	46	315	212
21	Texas St and Stuart Ave	20	580	30	18	318	14	3	11	59	57	42	51
22	Texas St and Oriental Ave	1	680	15	8	439	0	42	11	32	65	4	37
23	Eureka St and Pearl Ave	-	143	267	24	69	-	252	909	691	107	-	47
24	Eureka St and Stuart Ave	18	347	108	44	542	33	29	46	22	50	28	8
25	Eureka St and Oriental Ave	8	426	26	35	584	22	21	1	18	7	4	24
26	Eureka St and Redlands Blvd	33	262	64	141	401	44	89	889	67	52	410	62
27	Orange St and Colton Ave	136	647	203	98	521	50	237	606	243	171	269	123
28	Orange St and Pearl Ave	23	1016	85	41	634	13	586	853	489	55	49	271
29	Orange St and Stuart Ave	9	855	167	132	1334	26	123	132	75	153	56	85
30	Orange St and Oriental Ave	12	965	-	-	1564	72	56	-	27	-	-	-
31	Orange St and Redlands Blvd	72	495	49	352	909	225	211	605	97	58	353	282
32	6th St and I-10 WB Ramp	-	361	-	-	806	-	-	-	-	346	18	292
33	6th St and Pearl Ave	212	188	134	462	485	212	183	295	252	-	-	-
34	6th St and Stuart Ave	66	511	22	39	352	38	16	12	33	15	8	46
35	Redlands Blvd and Citrus Ave	81	304	62	178	530	116	151	348	220	48	188	116
36	Church St and Stuart Ave	12	312	-	-	356	24	53	-	24	-	-	-
37	University Ave and I-10 WB Ramps	416	815	57	11	205	483	-	-	-	2	21	15
38	University Ave and I-10 EB Ramps	-	623	-	-	264	-	628	-	809	-	-	-

No.	INTERSECTION	2038 PM TURNING MOVEMENT COUNTS - TOTAL (AUTO + PCE TRUCKS) - CENTRAL AVENUE											
		NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
		L	T	R	L	T	R	L	T	R	L	T	R
1	Sierra Way and Mill St	-	-	-	128	-	186	81	893	-	-	1163	50
3	Waterman Ave and Mill St	366	1388	127	136	1135	299	305	494	354	315	694	228
4	Waterman Ave and Orange Show Rd	433	1336	209	165	1212	388	375	793	358	308	1016	156
5	Waterman Ave and Dumas St	29	1968	-	-	1874	4	9	-	5	-	-	-

Peak Hour Intersection PCE Turning Movement Traffic Estimate

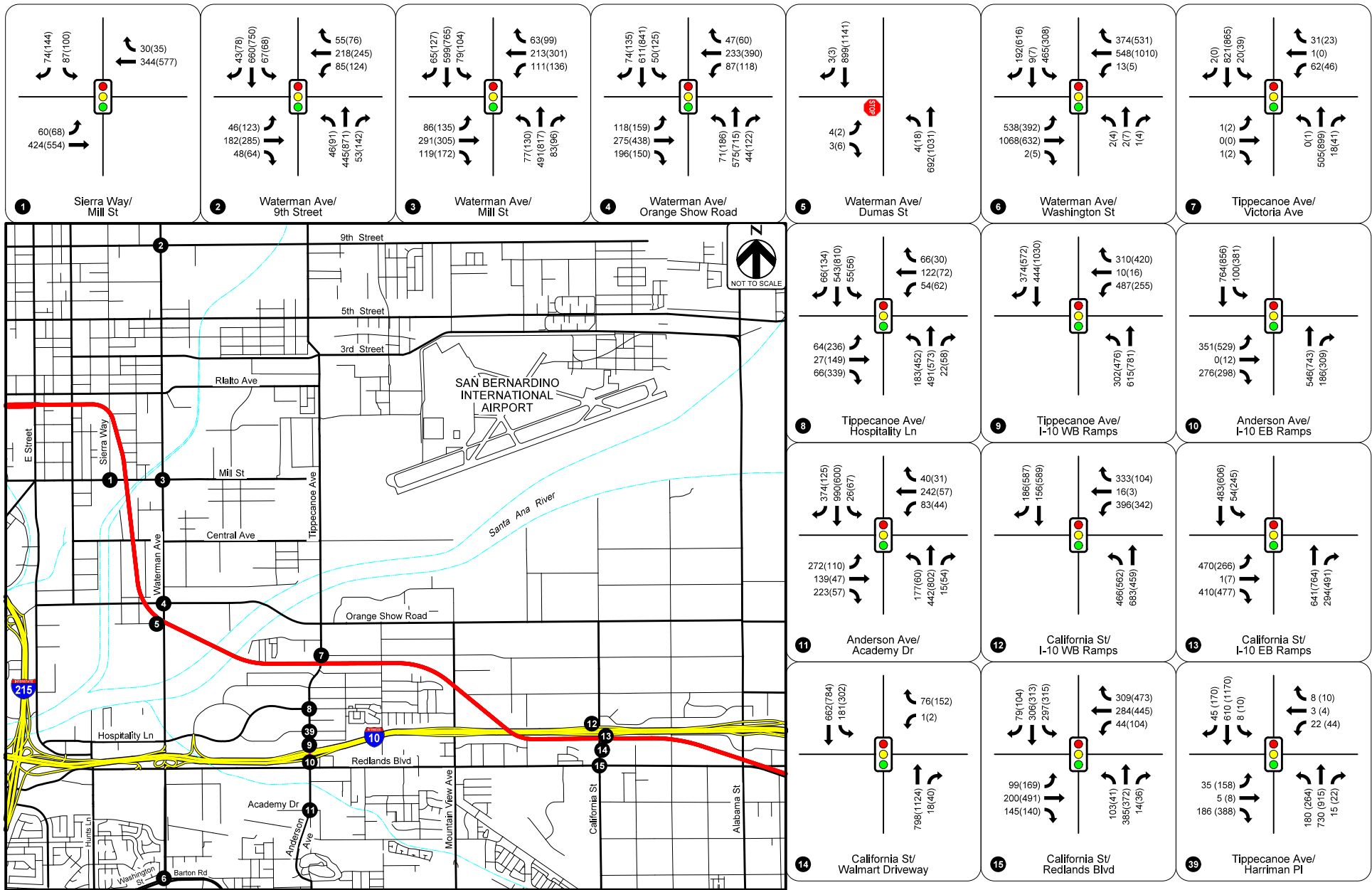
Intersection of Tippecanoe Avenue at	Year	Scenario	TURNING MOVEMENT COUNTS											
			NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
			L	T	R	L	T	R	L	T	R	L	T	R
Hospitality/Coulston	Existing 2011	No Project	260 (452)	491 (573)	22 (58)	55 (56)	543 (949)	66 (134)	64 (236)	27 (149)	66 (339)	54 (62)	122 (72)	66 (30)
		With Project	258 (456)	489 (580)	22 (59)	55 (57)	542 (960)	66 (134)	63 (240)	27 (152)	67 (346)	55 (68)	123 (78)	67 (33)
	Year 2018	No Project	550 (484)	677 (915)	50 (62)	67 (63)	647 (960)	78 (151)	88 (353)	37 (225)	92 (510)	105 (160)	135 (109)	73 (45)
		With Project	550 (484)	671 (915)	50 (62)	66 (63)	640 (955)	77 (151)	85 (356)	36 (227)	88 (514)	97 (160)	135 (113)	70 (48)
	Year 2038	No Project	550 (782)	1403 (992)	115 (125)	81 (100)	920 (1450)	95 (241)	148 (600)	63 (381)	153 (865)	150 (178)	211 (209)	111 (88)
		With Project	548 (769)	1398 (976)	112 (98)	90 (98)	920 (1424)	94 (237)	145 (589)	62 (375)	149 (850)	148 (166)	207 (195)	109 (82)
Harriman Place	Existing 2011	No Project	180 (264)	730 (915)	15 (22)	8 (10)	610 (1170)	45 (170)	35 (158)	5 (8)	186 (388)	22 (44)	3 (4)	8 (10)
		With Project	180 (252)	728 (915)	15 (22)	8 (10)	610 (1189)	46 (175)	33 (170)	5 (8)	186 (375)	22 (44)	3 (4)	8 (10)
	Year 2018	No Project	220 (270)	780 (940)	365 (511)	0 (0)	855 (1290)	88 (219)	81 (205)	0 (0)	215 (688)	650 (310)	71 (179)	430 (350)
		With Project	220 (270)	774 (940)	365 (511)	0 (0)	844 (1293)	80 (215)	81 (205)	0 (0)	215 (688)	650 (310)	71 (179)	430 (350)
	Year 2038	No Project	260 (275)	1400 (1125)	601 (741)	0 (0)	1171 (2150)	125 (214)	194 (221)	0 (0)	402 (892)	675 (340)	100 (162)	440 (625)
		With Project	260 (275)	1400 (1105)	601 (741)	0 (0)	1167 (2116)	123 (195)	190 (205)	0 (0)	408 (892)	675 (340)	100 (162)	440 (605)
I-10 Westbound Ramp (assumed to be built out in 2015)	Existing 2011	No Project	302 (476)	615 (781)	0 (0)	0 (0)	444 (1030)	374 (572)	0 (0)	0 (0)	0 (0)	487 (255)	10 (16)	310 (420)
		With Project	317 (473)	605 (769)	0 (0)	0 (0)	478 (1042)	340 (566)	0 (0)	0 (0)	0 (0)	517 (255)	10 (16)	318 (420)
	Year 2018	No Project	0 (0)	1365 (1721)	0 (0)	0 (0)	1325 (1602)	395 (686)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		With Project	0 (0)	1359 (1721)	0 (0)	0 (0)	1314 (1599)	395 (692)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Year 2038	No Project	0 (0)	2261 (2141)	0 (0)	0 (0)	1513 (2182)	735 (1200)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
		With Project	0 (0)	2261 (2121)	0 (0)	0 (0)	1505 (2163)	745 (1185)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

X (Y): AM (PM) Peak

8-Nov-13

Appendix D

Peak Hour Volume Figures

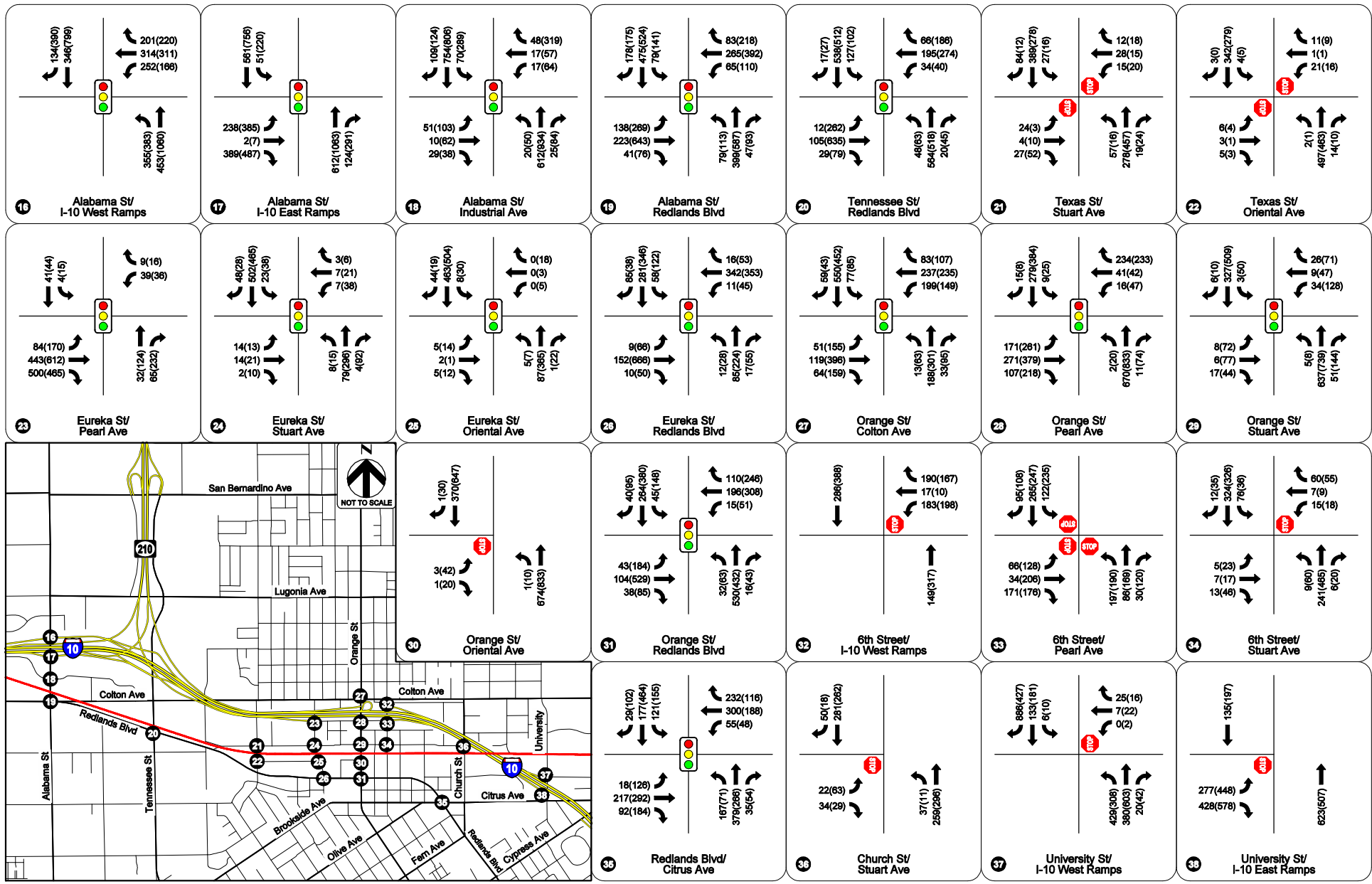


LEGEND:
 # Existing Study Intersection
 XXX(XXX) AM/PM Volumes



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 REDLANDS PASSENGER RAIL PROJECT**
 2011 WITHOUT PROJECT PEAK HOUR VOLUMES

FIGURE D-1a

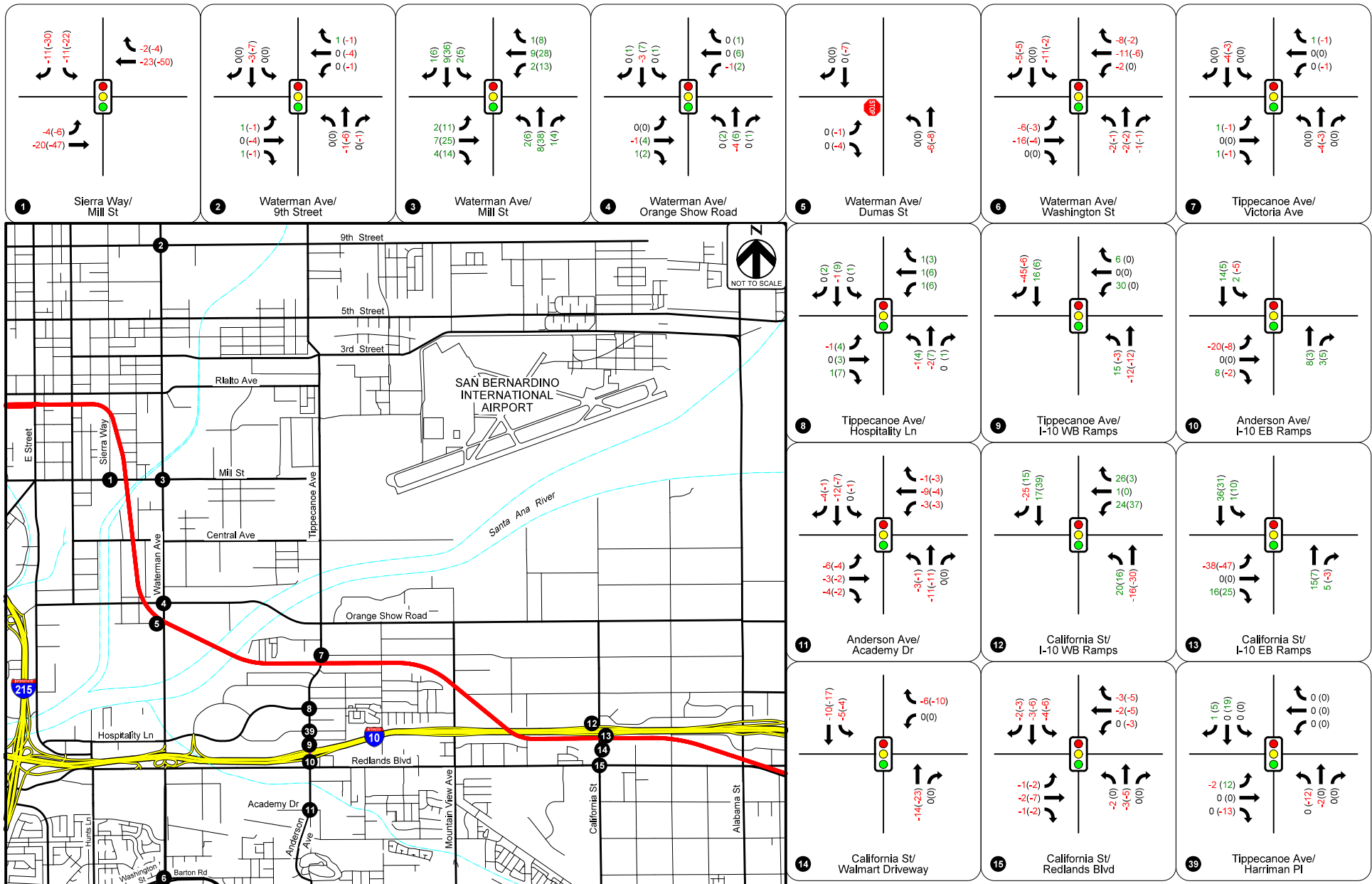


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FIGURE D-1b



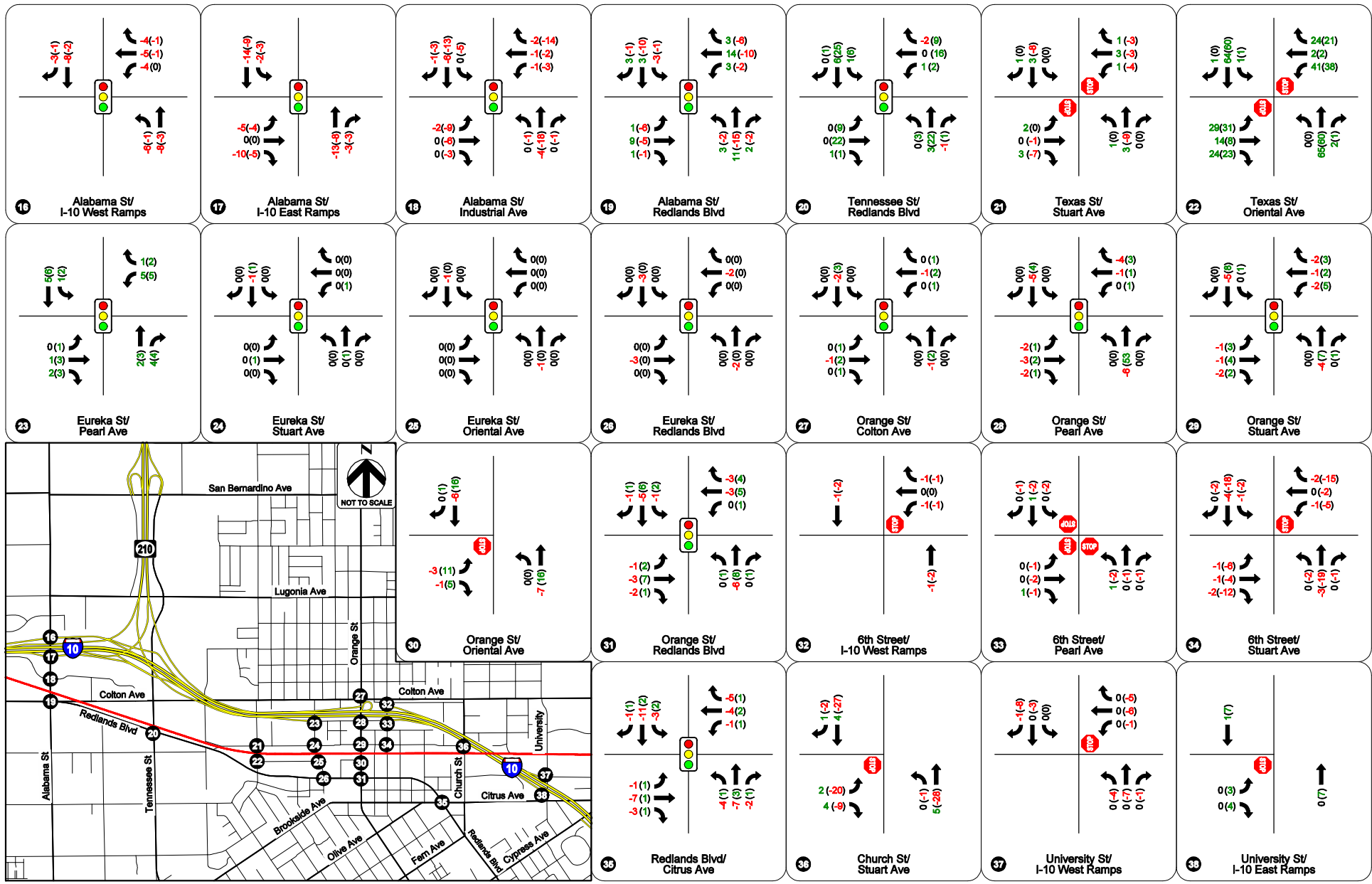
LEGEND:
 # Existing Study Intersection
 XXX(XXX) AM/PM Volumes
 XXX Project Added Volume
 -XXX Project Decrease in Volume

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 2011 WITH AND WITHOUT PROJECT VOLUME DIFFERENCE

FIGURE D-3a



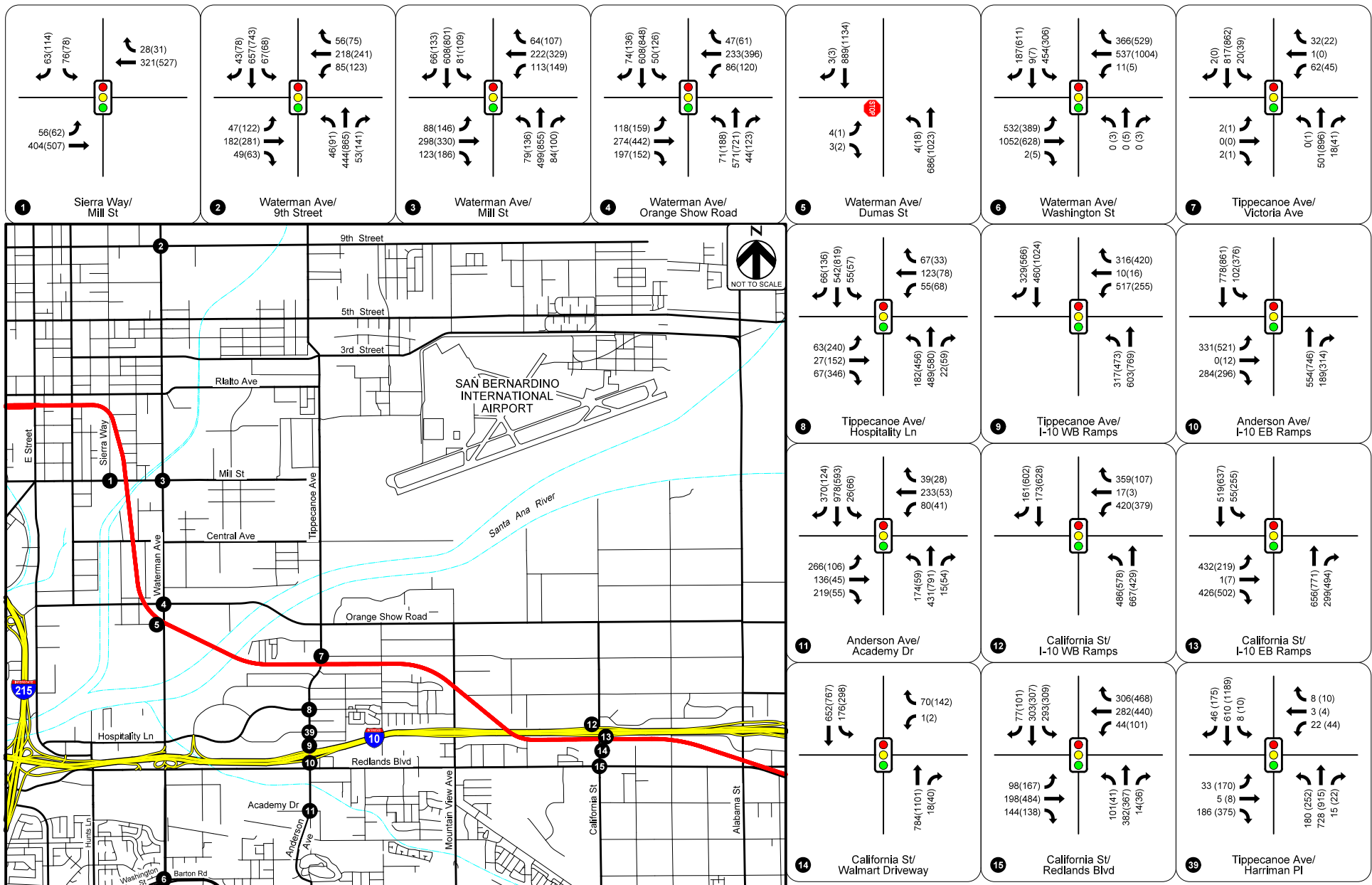
LEGEND:
 ● Existing Study Intersection
 XXX(XXXX) AM/PM Volumes
 XXXX Project Added Volume
 -XXX Project Decrease in Volume

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FIGURE D-3b



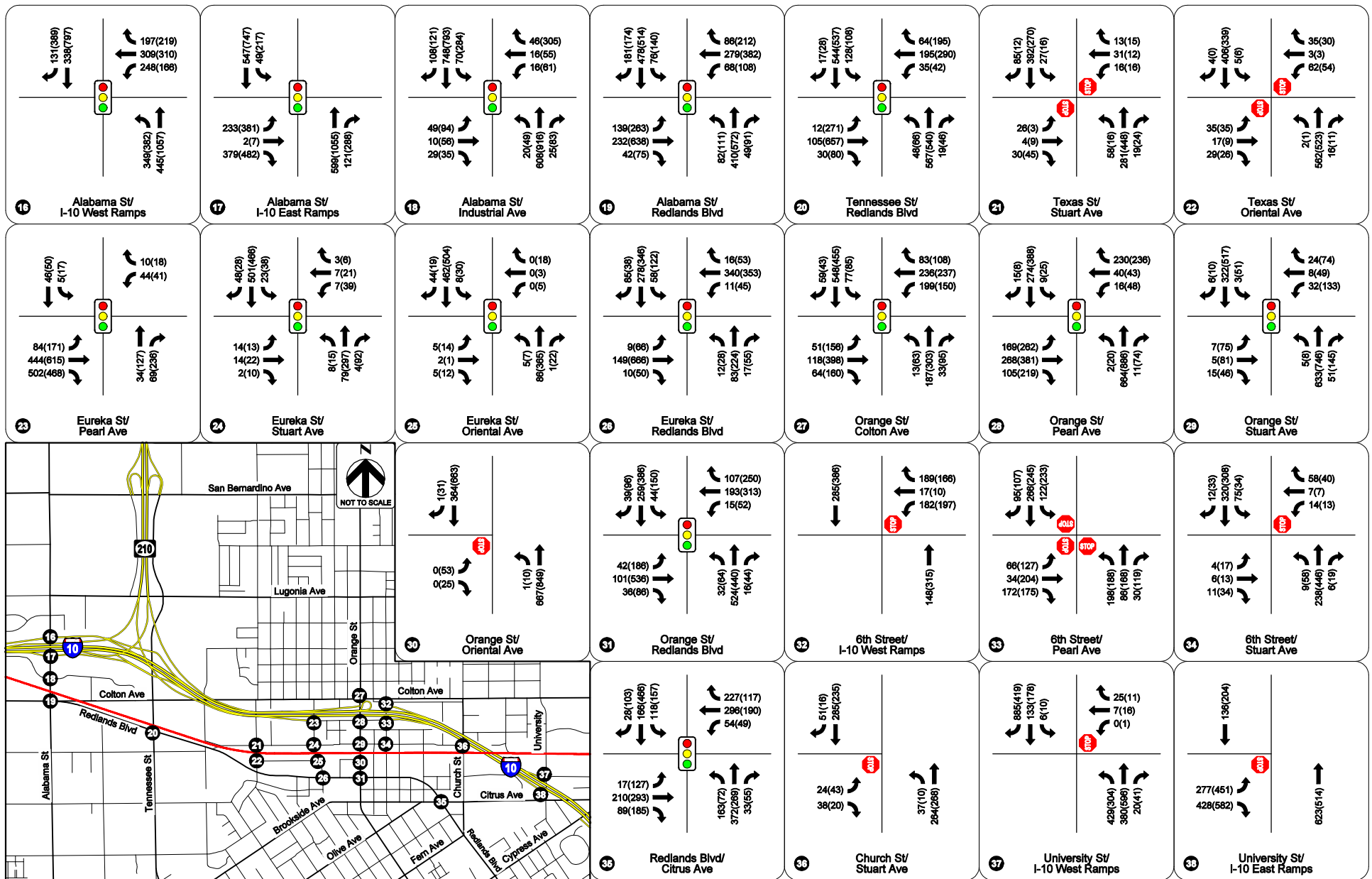
LEGEND:
 # Existing Study Intersection
 XXX(XXX) AM/PM Volumes

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 2011 WITH PROJECT PEAK HOUR VOLUMES

FIGURE D-2a



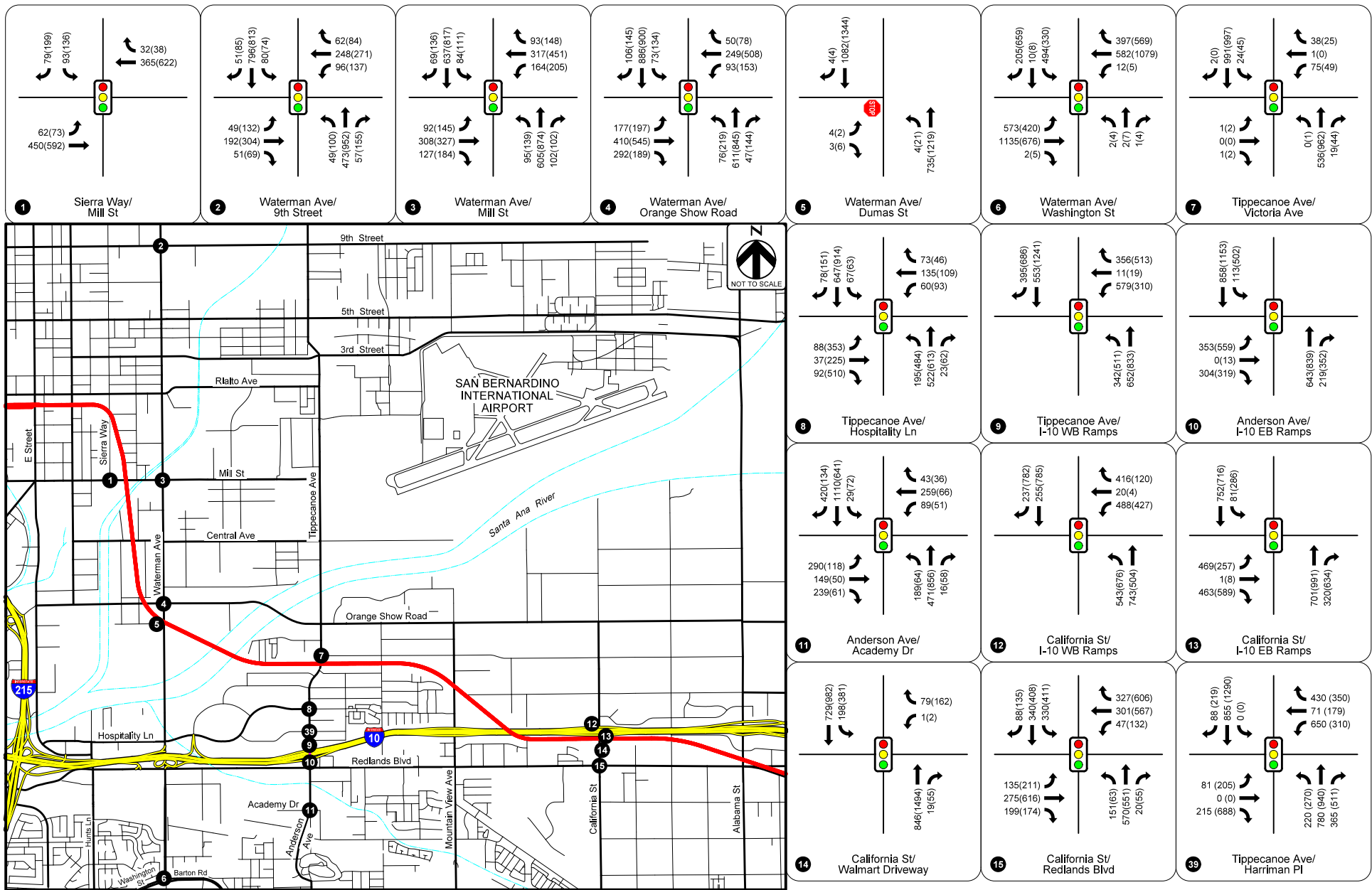
LEGEND:
 ● Existing Study Intersection
 XXX(XXX) AM/PM Volumes

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 2011 WITH PROJECT PEAK HOUR VOLUMES

FIGURE D-2b

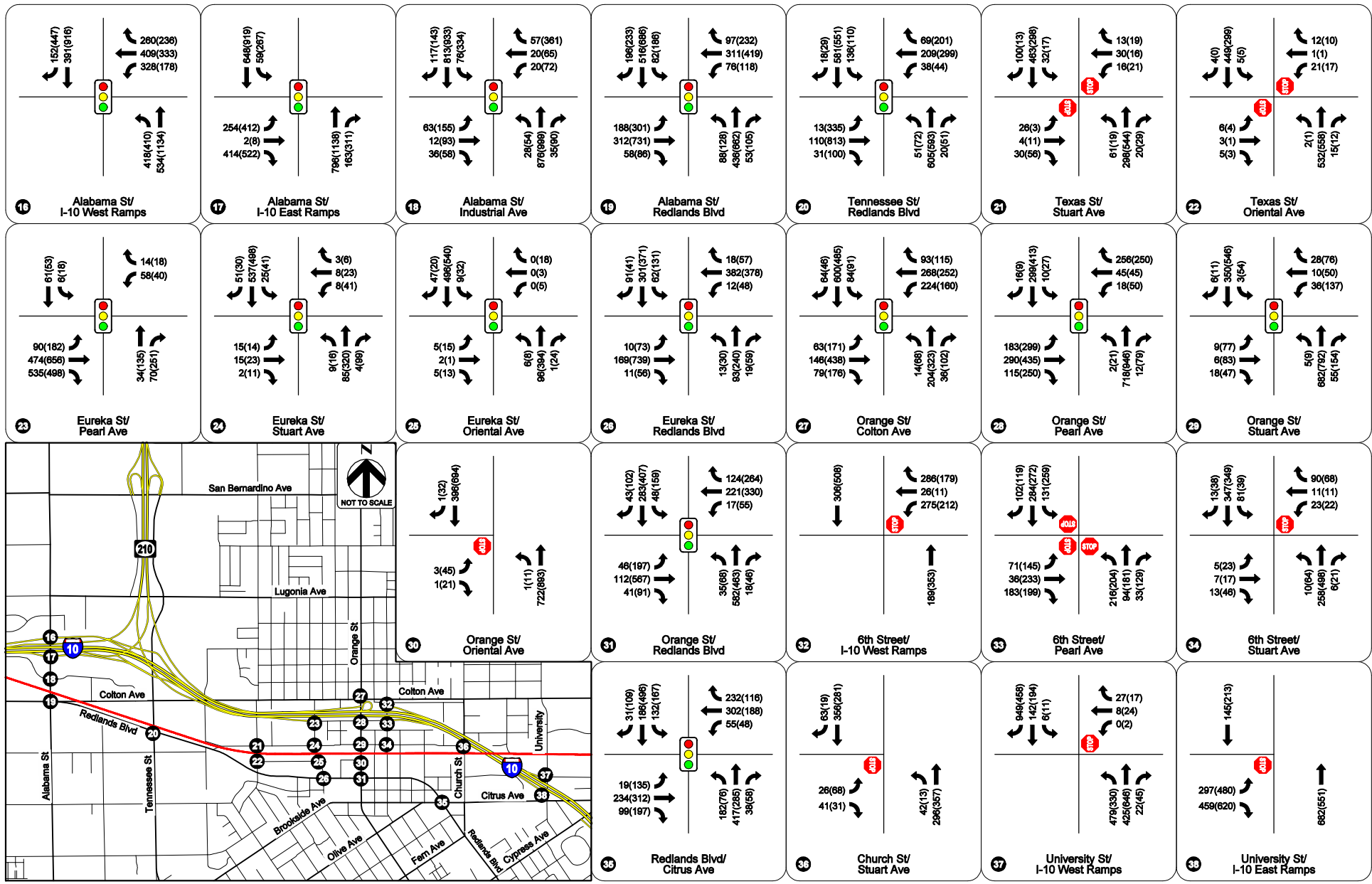


LEGEND:
 # Existing Study Intersection
 XXX(XXX) AM/PM Volumes



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 2018 WITHOUT PROJECT PEAK HOUR TRAFFIC VOLUMES

FIGURE D-4a



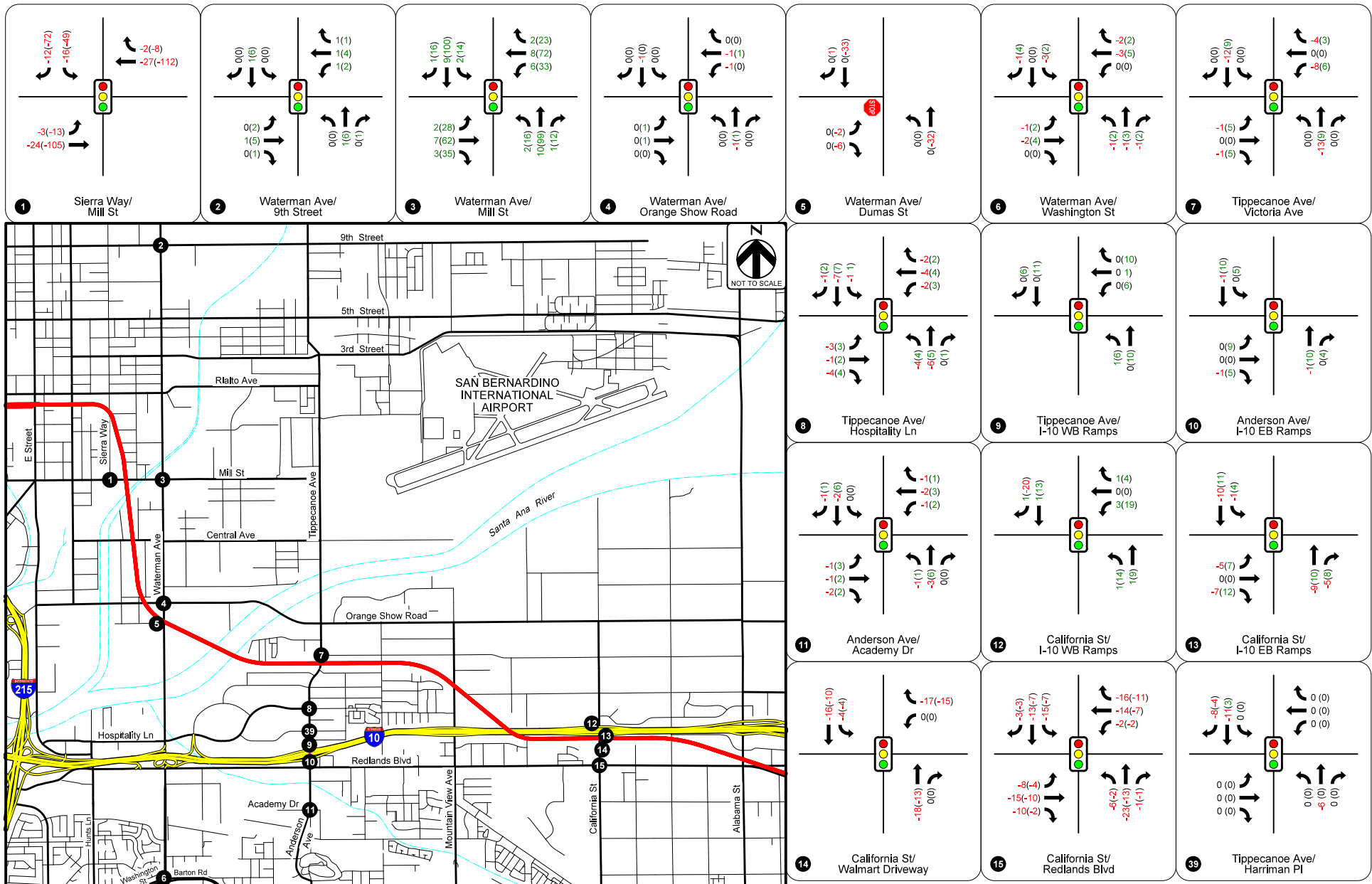
LEGEND:
 ● Existing Study Intersection
 XXX(XXX) AM/PM Volumes

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FIGURE D-4b



LEGEND:

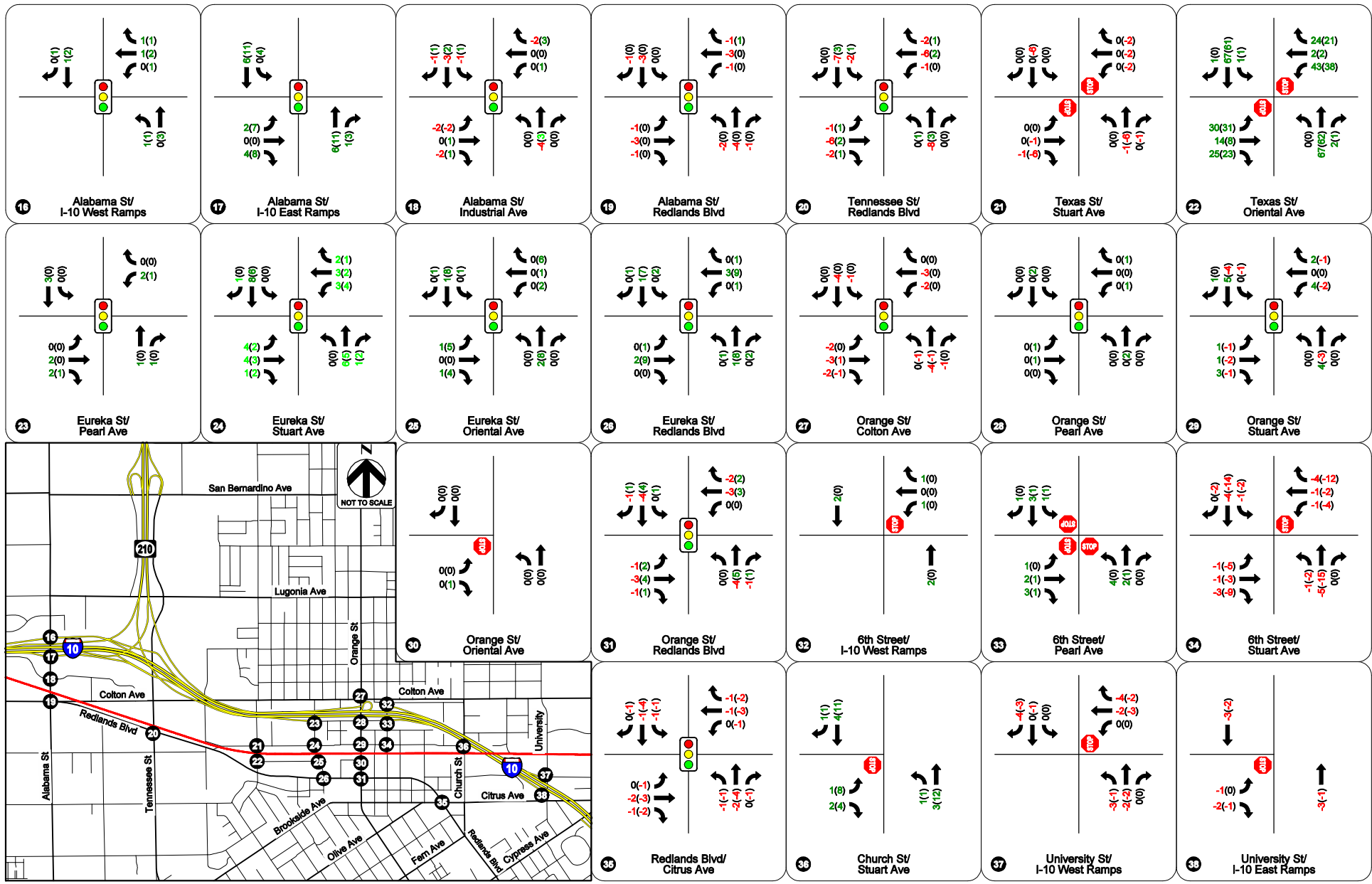
- Existing Study Intersection
- XXX(XXX) AM/PM Volumes
- XXX Project Added Volume
- XXX Project Decrease in Volume

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FIGURE D-6a



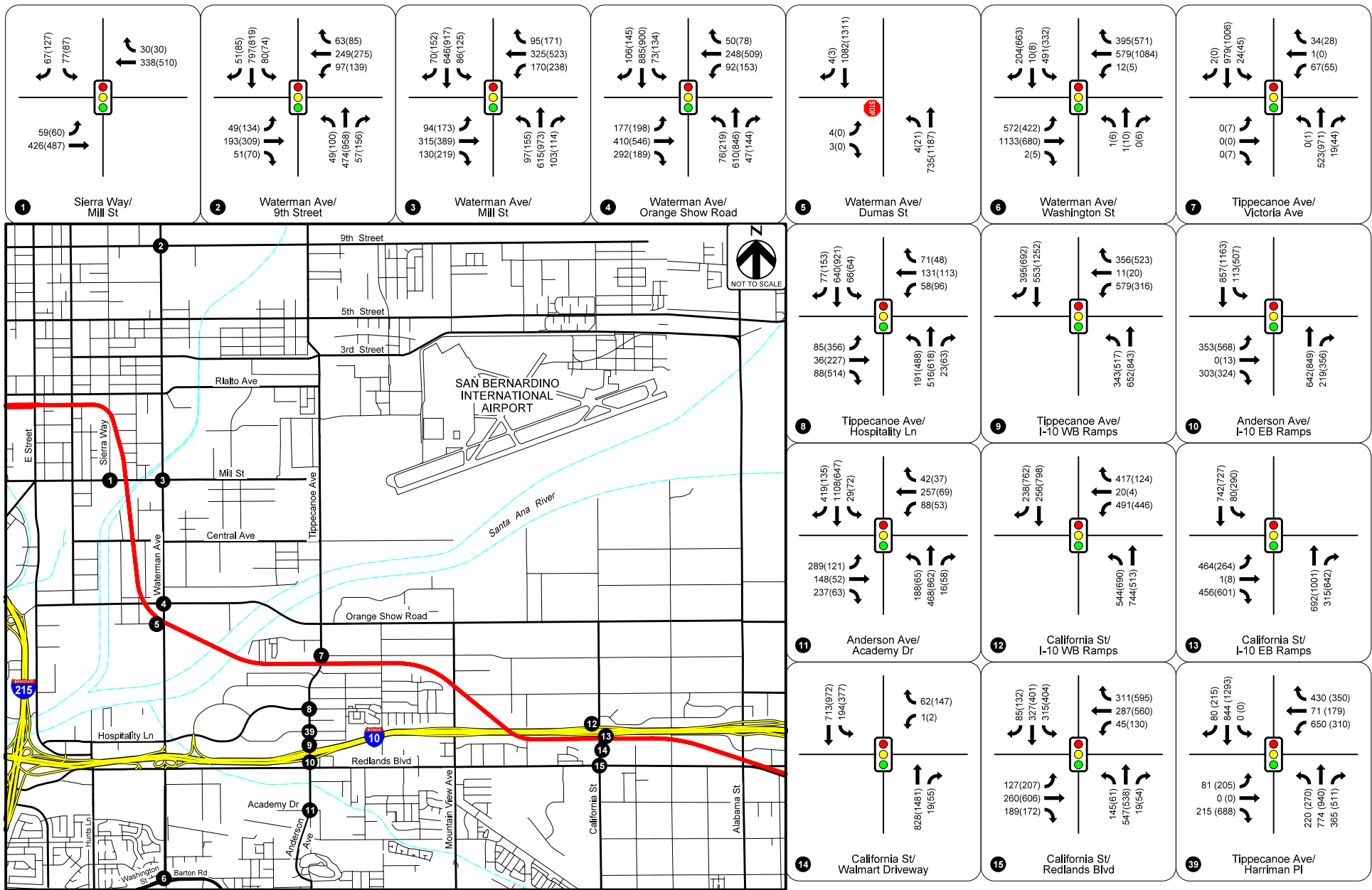
LEGEND:
 ● Existing Study Intersection
 XXX(XXX) AM/PM Volumes
 XXX Project Added Volume
 -XXX Project Decrease in Volume

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FIGURE D-6b

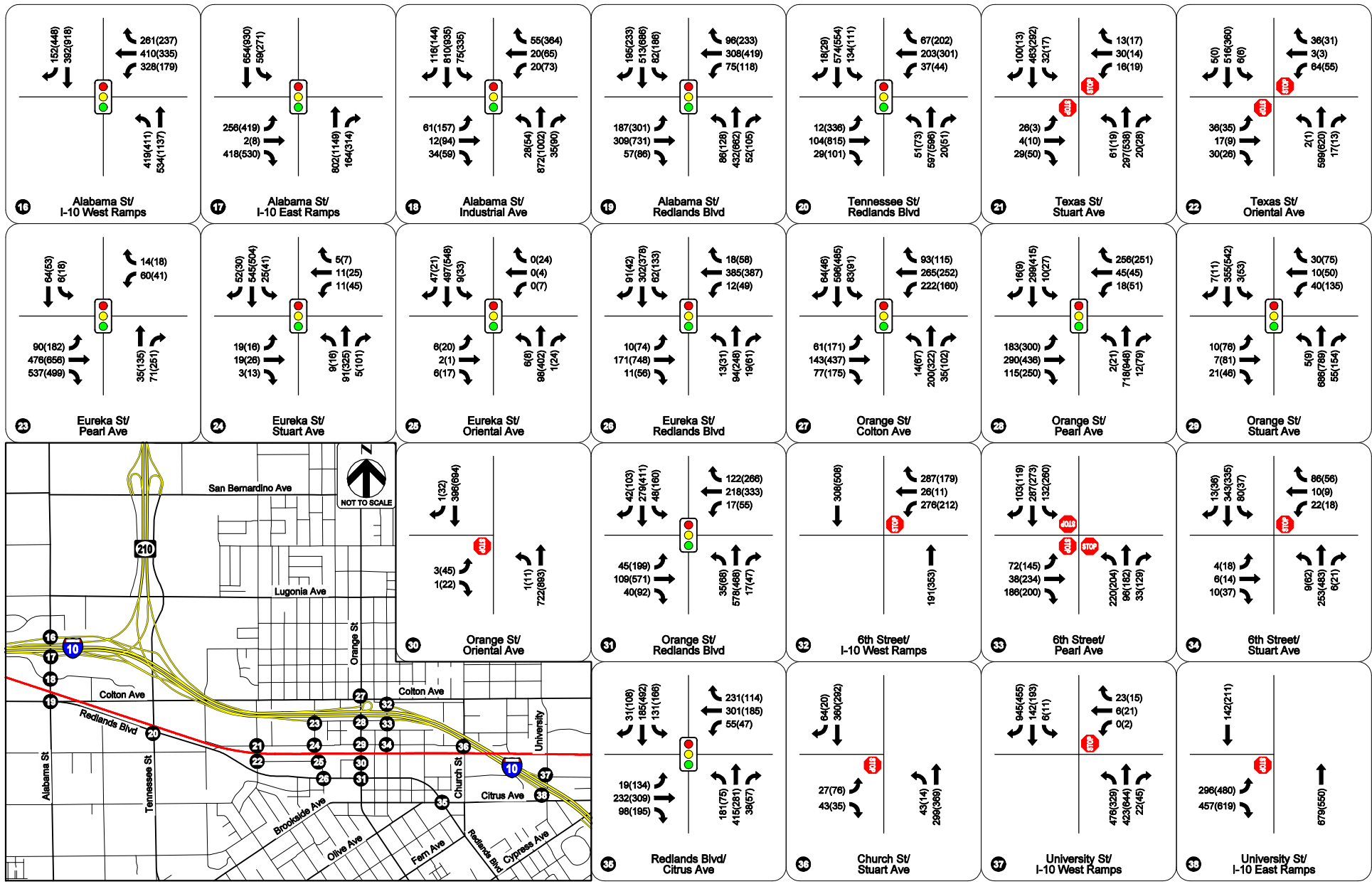


LEGEND:
 # Existing Study Intersection
 XXX(XXX) AM/PM Volumes



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 2018 WITH PROJECT PEAK HOUR TRAFFIC VOLUMES

FIGURE D-5a

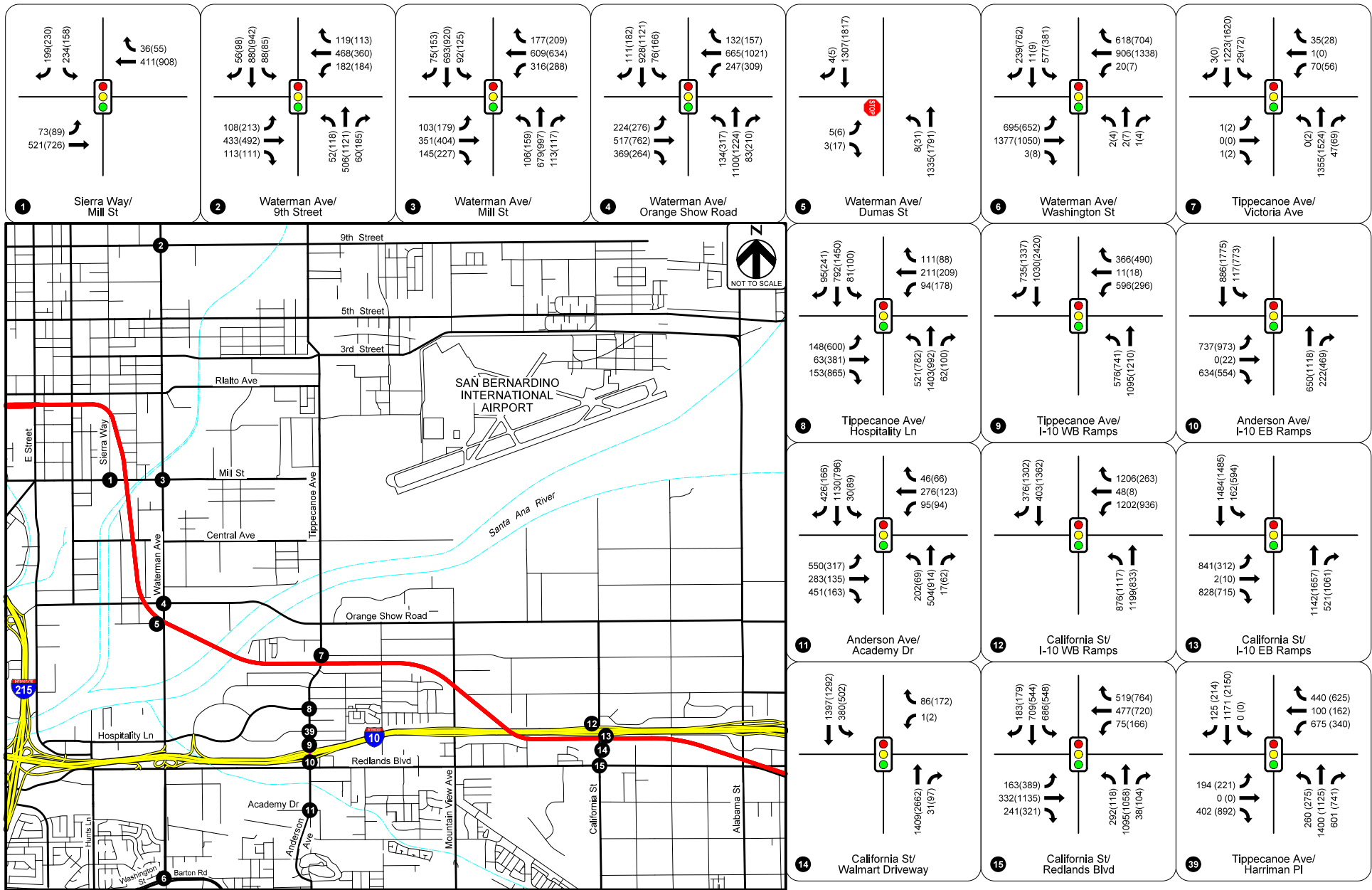


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 2018 WITH PROJECT PEAK HOUR TRAFFIC VOLUMES

FIGURE D-5b



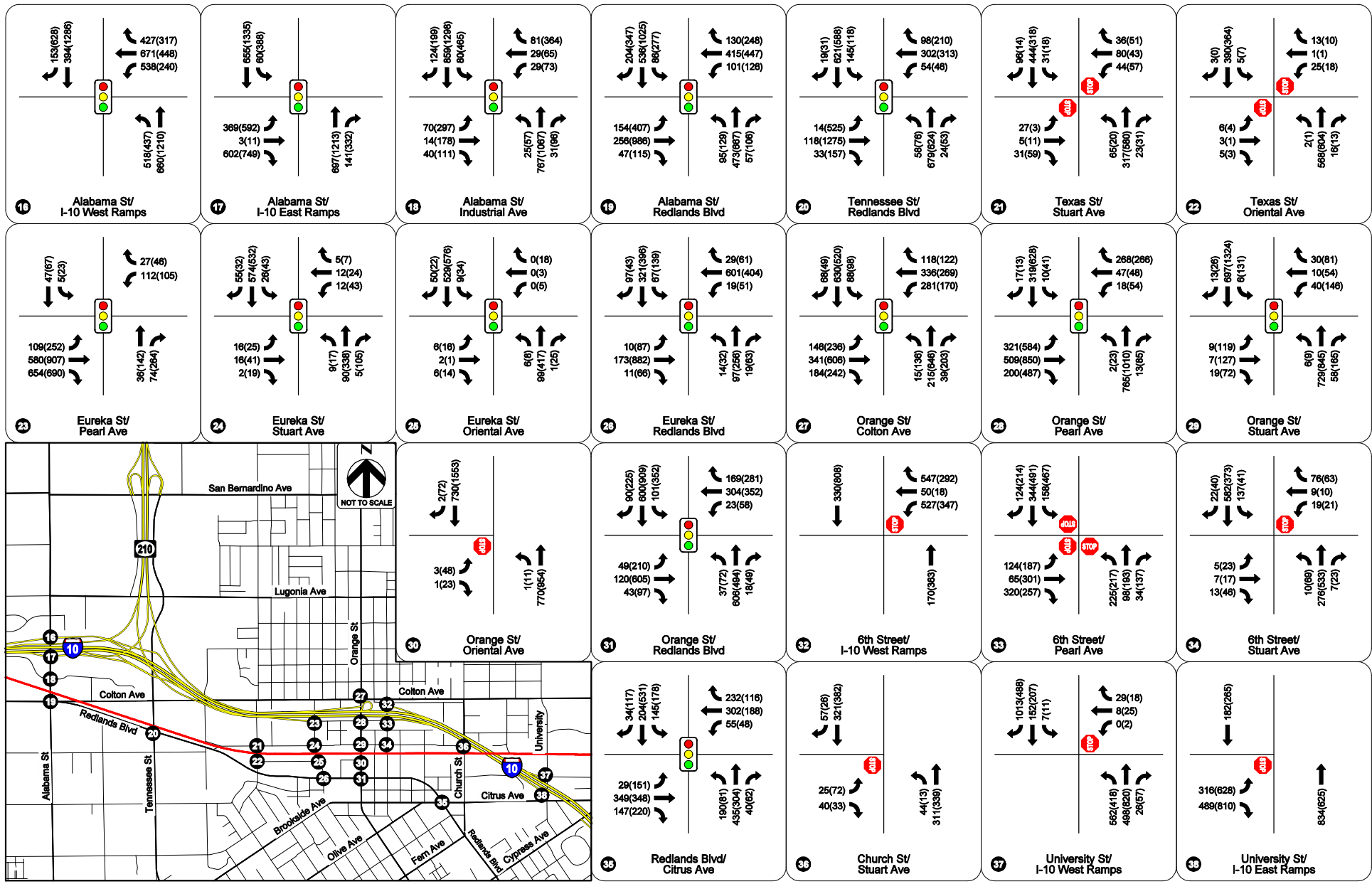
LEGEND:
 # Existing Study Intersection
 XXX(XXX) AM/PM Volumes

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 2038 WITHOUT PROJECT PEAK HOUR TRAFFIC VOLUMES

FIGURE D-7a



LEGEND:

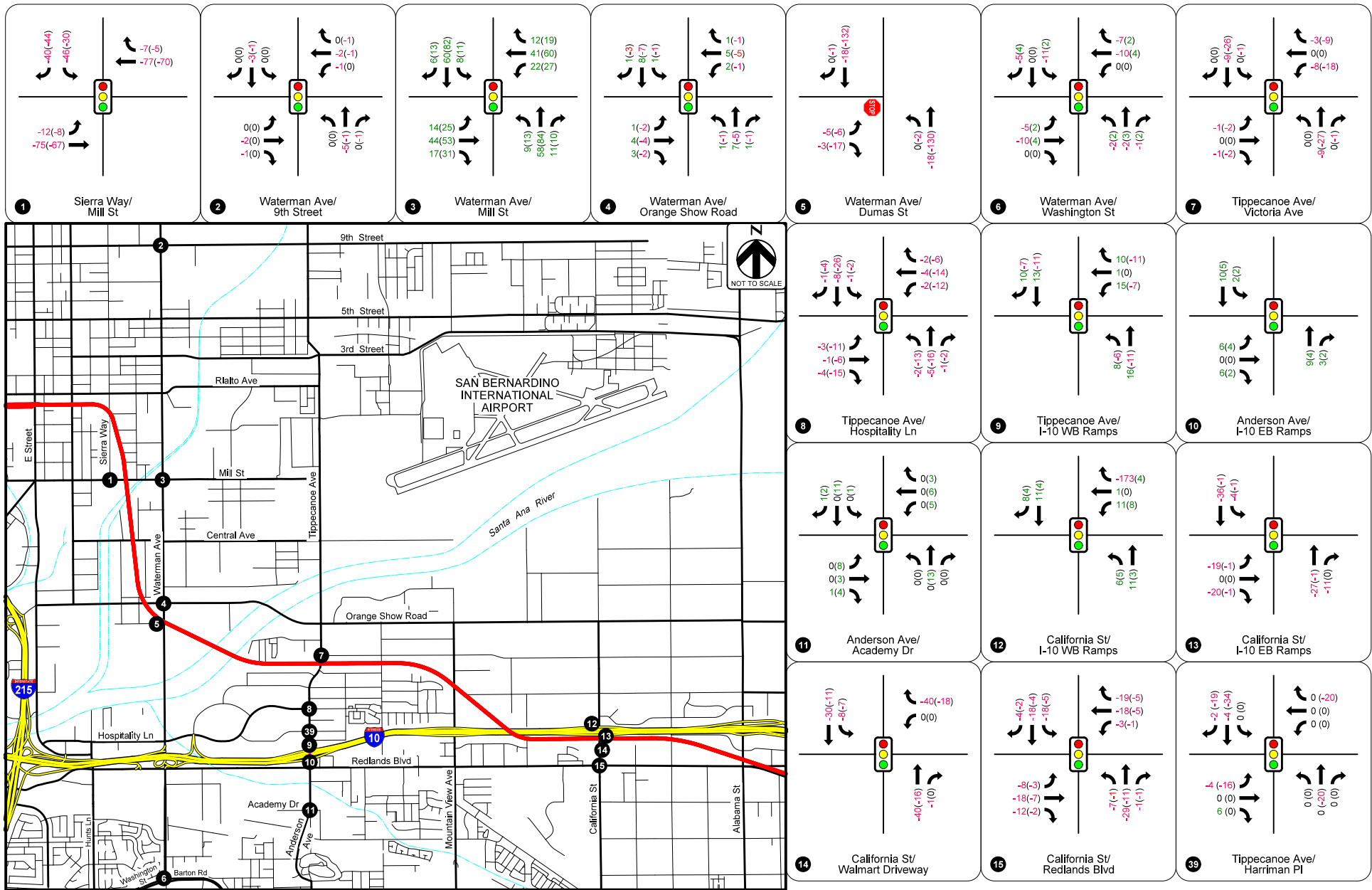
- Existing Study Intersection
- XXX(XXX) AM/PM Volumes

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FIGURE D-7b

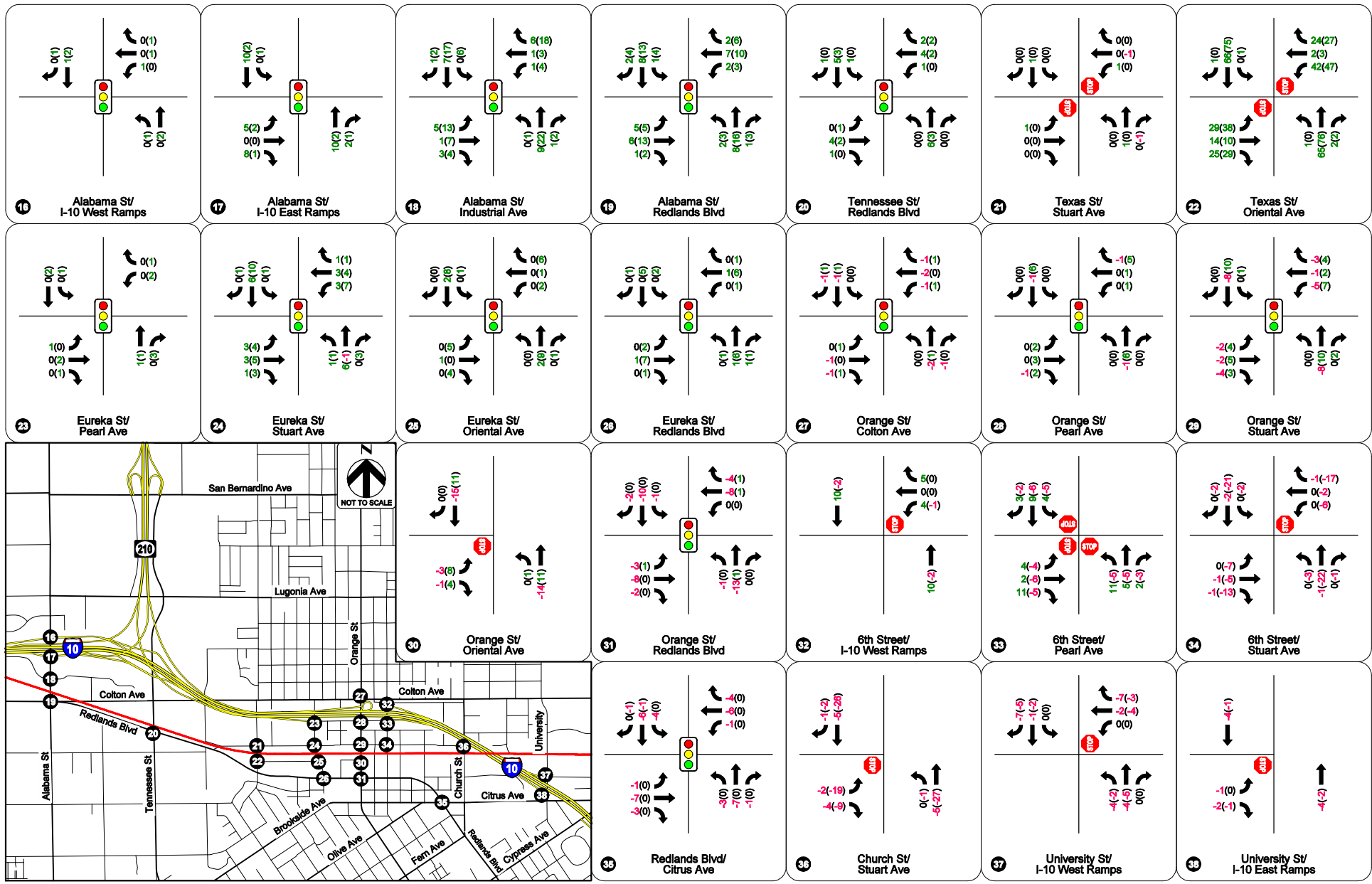


LEGEND:
 # Existing Study Intersection
 XXX(XXX) AM/PM Volumes
 XXX Project Added Volume
 -XXX Project Decrease in Volume



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REDLANDS PASSENGER RAIL PROJECT
 2038 WITH AND WITHOUT PROJECT VOLUME DIFFERENCE

FIGURE D-9a

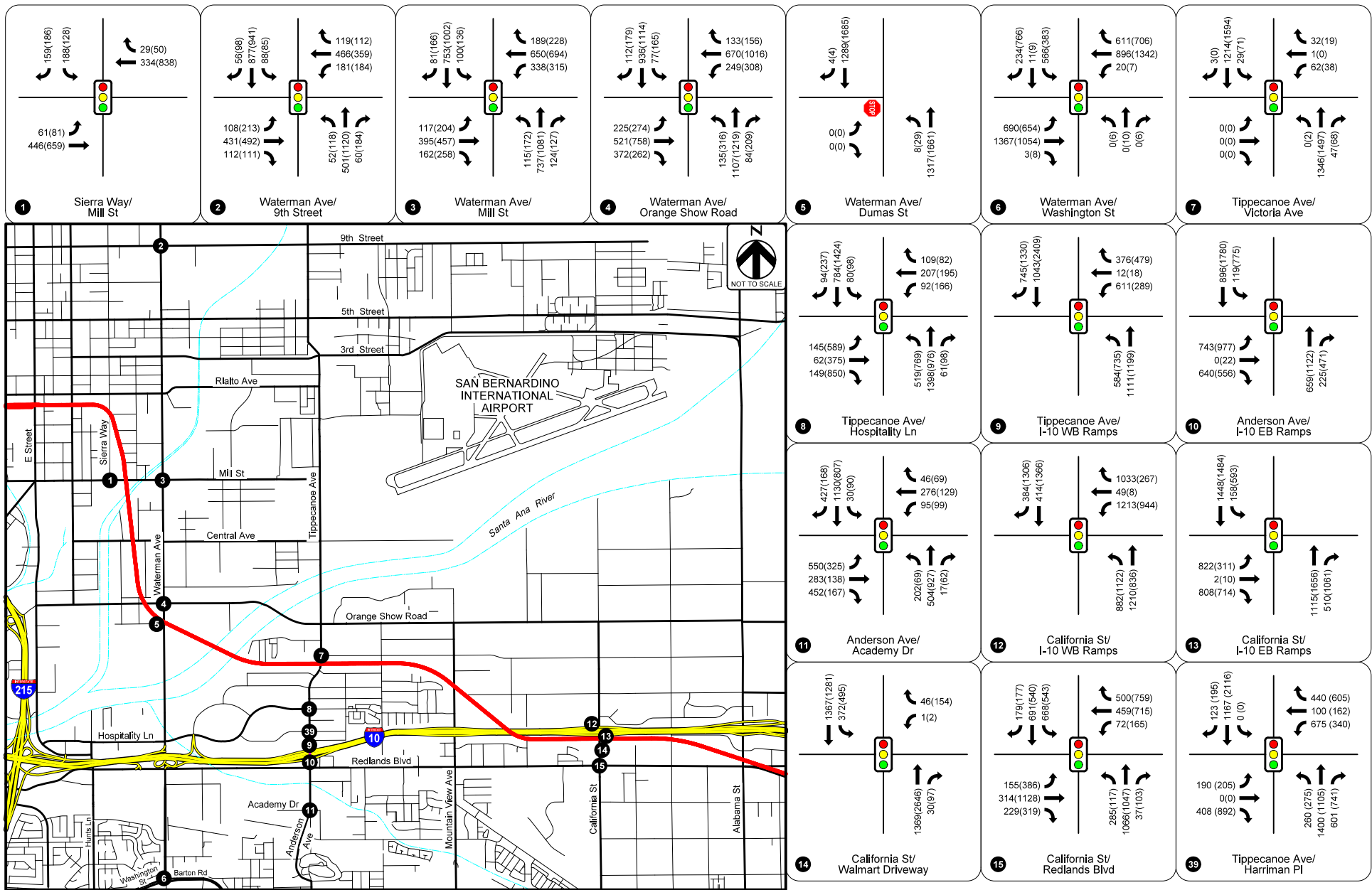


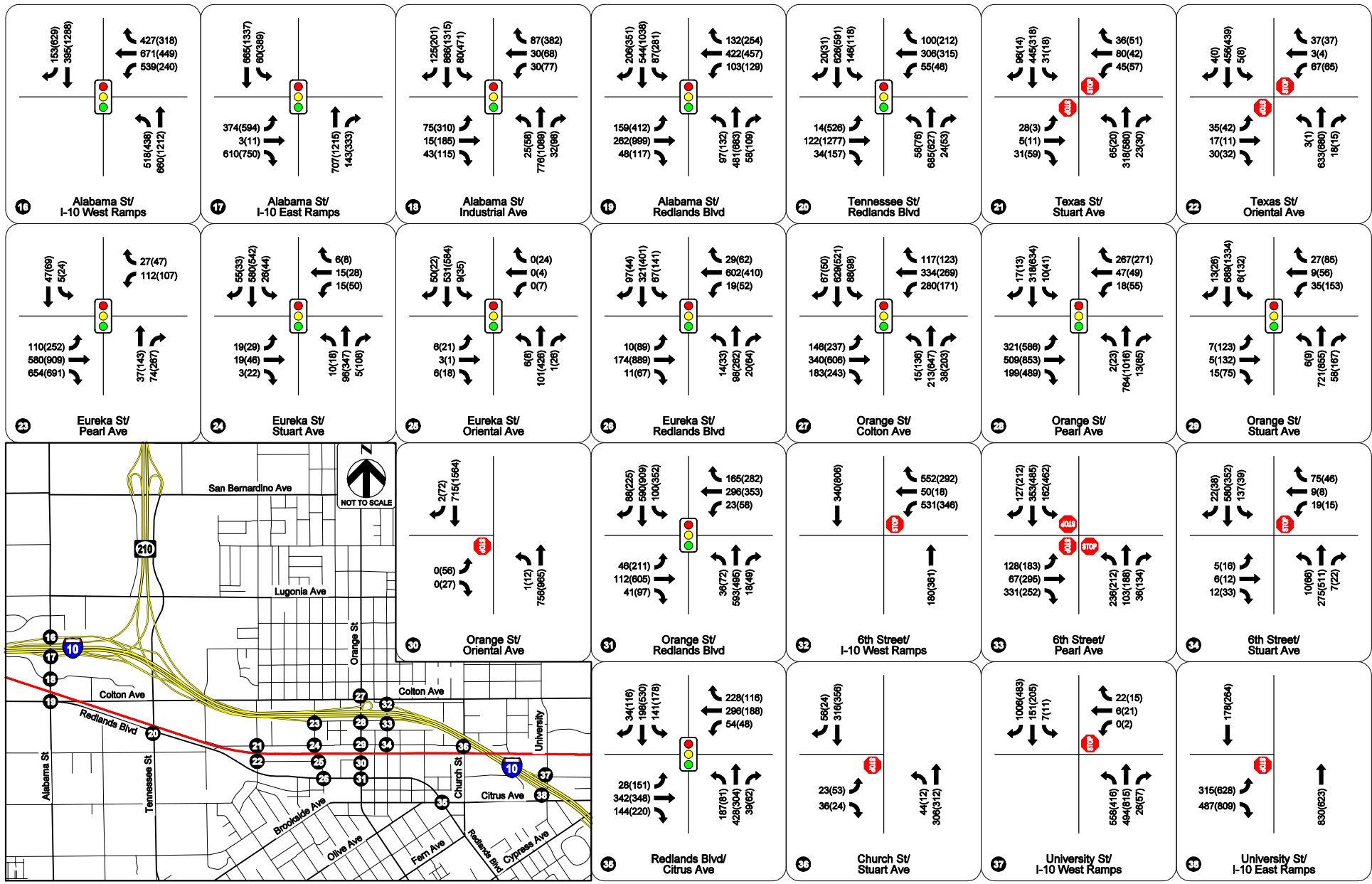
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 HDR Engineering, Inc.
 ONE COMPANY
 Many Solutions
 3230 El Camino Real, Suite 200
 Irvine, CA 92602

Governments
SANBAG
 Working Together

SAN BERNARDINO ASSOCIATED GOVERNMENTS
REDLANDS PASSENGER RAIL PROJECT
 2038 WITH AND WITHOUT PROJECT VOLUME DIFFERENCE

FIGURE D-9b





LEGEND:
 ● Existing Study Intersection
 XXX(XXX) AM/PM Volumes

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**SAN BERNARDINO ASSOCIATED GOVERNMENTS
 REDLANDS PASSENGER RAIL PROJECT**
 2038 WITH PROJECT PEAK HOUR TRAFFIC VOLUMES

FIGURE D-8b

Appendix E

Traffic Forecasting

Redlands Passenger Rail Project

Model Application and Ridership Forecasts – Updated for Phase 1

draft technical

memorandum

prepared for

San Bernardino Associated Governments

prepared by

Cambridge Systematics, Inc.

draft technical memorandum

Redlands Passenger Rail Project

Model Application and Ridership Forecasts – Updated for Phase 1

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January 2013

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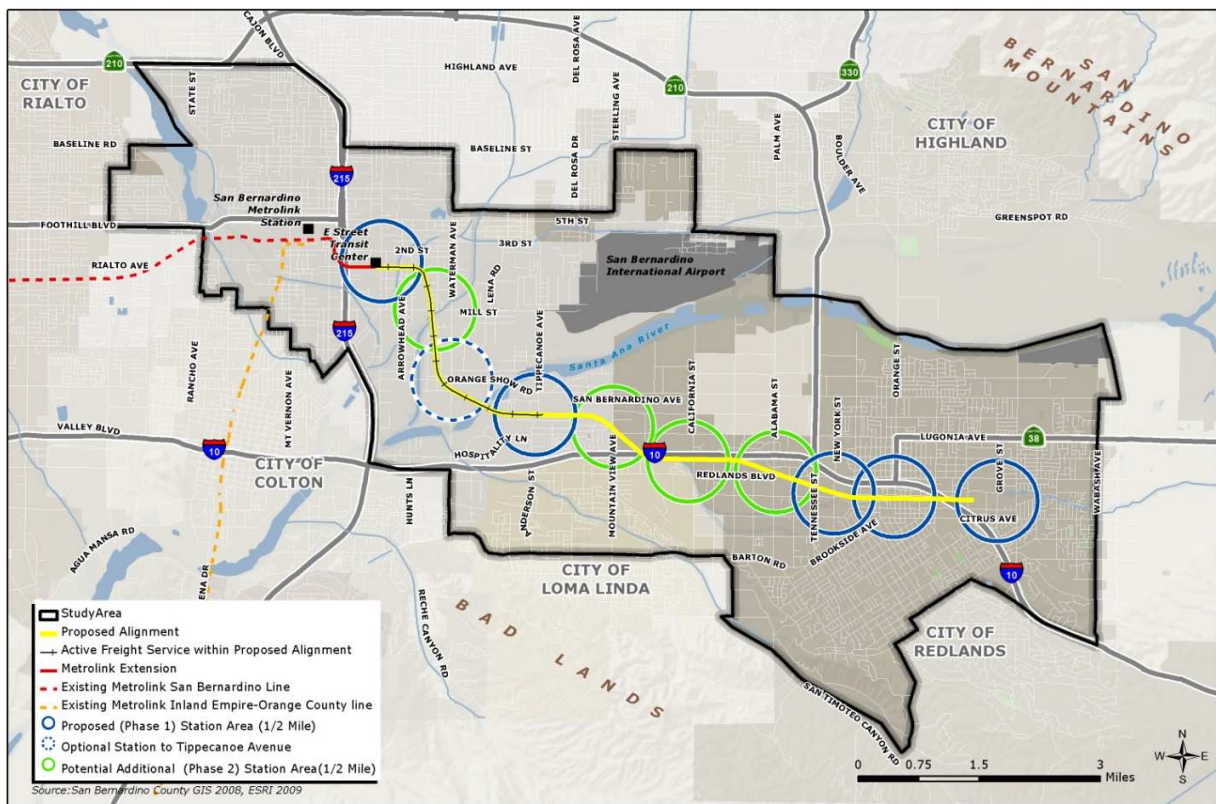
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1.0 Overview

The original purpose of the Redlands Passenger Rail Project was to evaluate alternatives for the introduction of passenger rail services along the Redlands Corridor (see Figure 1.1), and to identify a locally preferred alternative that best serves local transportation needs.

Figure 1.1 Redlands Corridor Study Area Map



The Redlands Corridor is a nine-mile corridor running between downtown San Bernardino and the University of Redlands. Metrolink, the regional commuter railway that provides passenger transport service from the Santa Fe Depot (on the west side of I-215) is planning the extension of commuter rail service to the planned downtown San Bernardino Transit Center at E Street and Rialto Avenue (on the east side of I-215). The study area for the Redlands Passenger Rail Project represents a varied mixture of land uses, from dense urban centers with residential and retail or office commercial establishments to low-density highway commercial and light industrial uses. A mixture of transportation facilities, including highways, bus transit networks, freight railroads, and the San Bernardino International Airport, serves the San Bernardino Valley.

The approach used by San Bernardino Associated Governments (SANBAG) and the HDR consulting team for studying the Redlands Passenger Rail Project has evolved since the initiation of the project, and each change in approach has required revisions to the approach for model application and ridership forecasts. The original approach assumed that the project would pursue the Federal Transit Administration (FTA) New Starts/Small Starts funding, using the traditional alternatives analysis process to identify a locally preferred alternative.

The Alternatives Analysis approach for the Redland Passenger Rail Project was initiated in 2010. This Alternatives Analysis studied two baseline alternatives and four build alternatives. The alternatives under consideration in the Alternatives Analysis were a No-Build Baseline, a Transportation Systems Management (TSM) Baseline, and four Build alternatives. The four build alternatives included Diesel Multiple Unit (DMU), Light-Rail Transit (LRT), Commuter Rail (extension of Metrolink service), and Bus Rapid Transit (BRT). The four proposed build alternatives would all utilize the railroad right-of-way owned by SANBAG, which is sufficient to accommodate the proposed guideway and station platforms. The alternatives and the operating plans are described in greater detail in the Draft Environmental Impact Statement and Environmental Impact Report (EIS/EIR) for the Redlands Passenger Rail Project (scheduled for publication in June 2013).

Preliminary results of the Alternatives Analysis showed that the project was unlikely to qualify for FTA Section 5309 New Starts/Small Starts funding under any of the alternatives identified for study. Based on this preliminary assessment and recent changes in funding requirements with the adoption of MAP-21, the approach for the project changed from an alternative analysis to a strategic planning process to develop the passenger rail service in the Redlands Corridor in phases, with different funding sources identified to complete each phase of the strategic plan. Phase 1 of the strategic planning process would connect the San Bernardino Transit Center at E Street to Redlands University using passenger rail vehicles on a single-track alignment with three intermediate stations. The Phase 1 operations are similar, though not identical, to the definition of the Commuter Rail Alternative of the Alternatives Analysis. Phase 1 operations would more closely resemble a local transit service, which would operate back and forth between the station platforms with express train service during the peak commute hours.

Phase 2 of the strategic planning process upgrades the rail service in Phase 1 to LRT, with double tracking and five additional stations. Phase 3 of the strategic planning process extends the passenger rail alignment to create a loop that connects the Redlands Corridor to San Bernardino International Airport and the City of Highland.

Throughout the strategic planning process, the engineering team has provided SANBAG with alternatives analyses and ridership forecasts for a wide range of variables, including alternative modes of transportation, service levels, and station locations. Concurrent with the change in approach from the alternative

analysis to the strategic plan, the engineering team has engaged in a process of educating and engaging local governments to reevaluate their land use plans and to concentrate transit-oriented development in the Redlands Corridor station areas. The results of the updated land use plans have been used to prepare alternate land use scenarios and socioeconomic data input for application in the travel demand model.

The purpose of this model application and ridership report is to describe the application of the travel demand model, and to summarize the resulting ridership forecasts for Phase 1 of the Strategic Plan. **Section 2.0** of this technical memorandum summarizes the basic procedures for application of the San Bernardino Valley Focus Model (SBVFM).

Section 3.0 of this technical memorandum presents a summary of the input assumptions and summarizes the ridership forecasting results for Phase 1 of the strategic plan process.

Section 4.0 of this technical memorandum presents summaries of the impacts of several input assumptions, and provides estimates of elasticity values that can be used to assess the range of ridership forecasting results that could occur in the future.

2.0 Travel Demand Model Application

The forecasting tool employed for the Redlands Passenger Rail Project is the San Bernardino Valley Focus Model (SBVFM), which is a focused model derived from the Southern California Association of Governments (SCAG) regional model. Elements of the SCAG model are documented in *2003 SCAG Model Validation and Summary – Regional Transportation Model* (January 2008).

The SBVFM uses the basic structure of the SCAG model, with the mode choice model derived from the Orange County Transportation Authority Model (OCTAM) – customized for use in the San Bernardino Valley – with a focused definition of the networks and zone system within the San Bernardino Valley.

The SBVFM employs the traditional 4-step modeling process used in the SCAG model. Special features of the SBVFM include the following:

- All person trips are modeled (including nonmotorized);
- Auto-ownership is tied to transit accessibility;
- Person trip data is split into peak and off-peak trips before application of distribution models;
- Feedback loops are used for highway and transit skims;
- Logsums are used to estimate composite impedance for application within trip distribution models for the home-based work trip purpose;
- Vehicle trip data is split into four time periods and converted to origin-destination format using time-of-day models; and
- Transit trip data is assigned to peak (AM) and off-peak (midday) time periods in production-attraction format.

The travel demand model methodology and validation are described in greater detail in *Redlands Passenger Rail Project Travel Demand Model Methodology and Validation draft technical memorandum* (August 2011). That technical memorandum summarizes modeling methodology and model validation for the Redlands Passenger Rail Project, using the SBVFM.

Following validation of the SBVFM, this model was used to produce travel forecasts and user benefits for future year conditions to assess future year transit ridership sensitivity for several combinations of transit alternatives for the Redlands Corridor.

Application of the SBVFM is performed in two steps: creation of baseline person trip tables; and mode choice and assignment for transit alternatives. This two-

step process has been utilized in order to satisfy the FTA requirement for New Starts projects that requires alternatives analyses to use common person trip tables and common highway skim data.

The SBVFM could, hypothetically, be applied in a single step process whereby each transit scenario is run through the complete model stream. This approach would allow the model to recognize the incremental effects that the transit scenarios have on the highway skims and trip distribution (e.g., if a transit scenario attracted significant ridership from auto modes, traffic volumes for that scenario would be lower and highway speeds would be faster). These faster highway speeds would result in changes to the highway and transit skims, the trip distribution, as well as the mode choice results.

Under the two-step application process, the baseline person trip tables are created by preparing the input data for the baseline alternative (socioeconomic data files and highway and transit networks) and running the model stream through three full feedback loops to bring the skims and trip distribution models into a state of equilibrium.

A new database is then built for each future transit scenario using a transit network coded to represent the operations of that transit scenario. The baseline person trip tables and highway skims are then used to build transit skims for each transit scenario, and the mode choice model is used to create a final set of highway and transit trip tables. The transit trip tables are assigned to the transit networks and the results are analyzed to compare the transit scenarios.

3.0 RPRP – Phase 1 Ridership Forecasts

Subsequent to the strategic planning process, SANBAG has continued to study options for a Phase 1 project, including station platform locations and operating plans. The remainder of this chapter is used to document the Phase 1 alternative and ridership results for opening year 2018 and horizon year 2038.

3.1 DESCRIPTION OF ALTERNATIVES

No Project Alternative

The No Project Alternative includes existing and committed infrastructure, facilities, and services contained in the SCAG Federally-approved transportation plan, the Federal Statewide Transportation Improvement Program (FSTIP). A No Project Alternative provides an essential benchmark to test whether project alternatives improve future transit service compared to improvements planned to be implemented without the proposed project. The No Project Alternative includes existing transit services in the Cities of San Bernardino, Loma Linda, and Redlands (consisting of 12 local bus routes and one express bus route operated by Omnitrans, and two bus routes serving the mountain areas of Big Bear and Lake Arrowhead operated by Mountain Area Transit Authority). The No Project Alternative also includes the E Street Corridor sbX (BRT) project and the one-mile extension of Metrolink service to the new San Bernardino Transit Station at Rialto and E Streets in downtown San Bernardino. Of the transit services listed above, five local Omnitrans bus routes provide transit service within the Redlands Corridor, while the other transit routes provide transfer opportunities at the San Bernardino Transit Station.

Phase 1 Alternative – Passenger Rail

The first phase of the Redlands Passenger Rail Project Strategic Plan supports the development of a passenger rail service operating between the San Bernardino Transit Center and the University of Redlands. The proposed Phase 1 alternative begins at the future San Bernardino Transit Center, and extends east eight blocks before turning southward, passing to the southwest of Waterman Avenue and Orange Show Road. The right-of-way then crosses the Santa Ana River and turns east until reaching Richardson Street, where the corridor turns southeast until passing under I-10 near Bryn Mawr Avenue. The corridor then turns to the east, paralleling I-10 to Nevada Street until turning southeast again, running parallel to Redlands Boulevard to Texas Street. It then turns east, passing under

I-10 again near Church Street, and ending at the south end of the University of Redlands.

Passenger rail technology was selected for Phase 1 because it allows for quicker and less expensive implementation. Passenger rail vehicles (engines and cab cars) are readily available through Metrolink and would require only minimal rehabilitation to go from storage to operation. The Phase 1 service is proposed to operate on 30-minute headways in the peak periods and 1-hour headways in the off-peak periods.

The five stations proposed would be located at the San Bernardino Transit Center, Tippecanoe Avenue or Waterman Avenue, New York Street, Downtown Redlands, and University of Redlands. The Phase 1 alignment is illustrated in Figure 3.1.

Operating Plans

Operating plans for Phase 1 in both future years are displayed in Table 3.1. The operating assumptions include service frequency, vehicle capacity and station-to-station run time estimates for the Phase 1 alternatives.

For the purposes of estimating ridership forecasts for Phases 1 and 2 of the RPRP Strategic Plan, the horizon year (2038) and operating plans are based on the same assumptions used for the RPRP Alternatives Analysis.

Table 3.1 Operating Plans for RPRP Phase 1 (Opening and Horizon Years)

Variable	Value
Number of Stations	5
Length (miles)	8.95
Travel Time - Tippecanoe (min:sec)	15:55
Travel Time – Waterman Option (min:sec)	16:15
Capacity (seated)	132
Peak Headway	30
Off-peak Headway	60
Weekend Headway	60

The Phase 1 train sets shuttling between the University of Redlands station and the San Bernardino Transit Center would not interline with Metrolink and would be composed of a locomotive and a cab car—much shorter than the standard Metrolink train sets. The exception to this would be two express (Metrolink) trains that would operate in the AM and PM peak hours. Heavy maintenance activities would be completed at a Metrolink facility, saving the cost of constructing a maintenance facility.

Figure 3.1 Phase 1 – Passenger Rail Alignment



If future phases of this project result in a change in technology to LRT, passenger rail platform heights are compatible with LRT, thus reducing the costs to retrofit stations and platforms. That potential cost savings for LRT would have to be balanced against the cost of an electrified traction power system and the lower vehicle costs of DMUs in the analysis and selection of a mode to replace passenger rail in the future.

Phase 1 would require removal and replacement of the existing track and addition of an approximately 1-mile-long passing track near the halfway point of the proposed corridor. Also, as a part of Phase 1, safety improvements would be made at 24 grade crossings. The grade crossings will include crossing gates. Phase 1 will replace the rail bridge over the Santa Ana River, as well as rehabilitate/reconstruct four other drainage crossings.

The annual operations and maintenance costs for Phase 1 are \$8 million (2012 dollars). The capital cost for Phase 1 is estimated to cost up to \$200 million. Phase 1 would be funded using a combination of regional, state, and Federal sources.

The Phase 1 track alignment will be designed to the extent feasible so that in later phases of the project the corridor can be expanded to become double tracked, and so that rail technology such as LRT or DMU can replace the passenger rail technology at minimal costs.

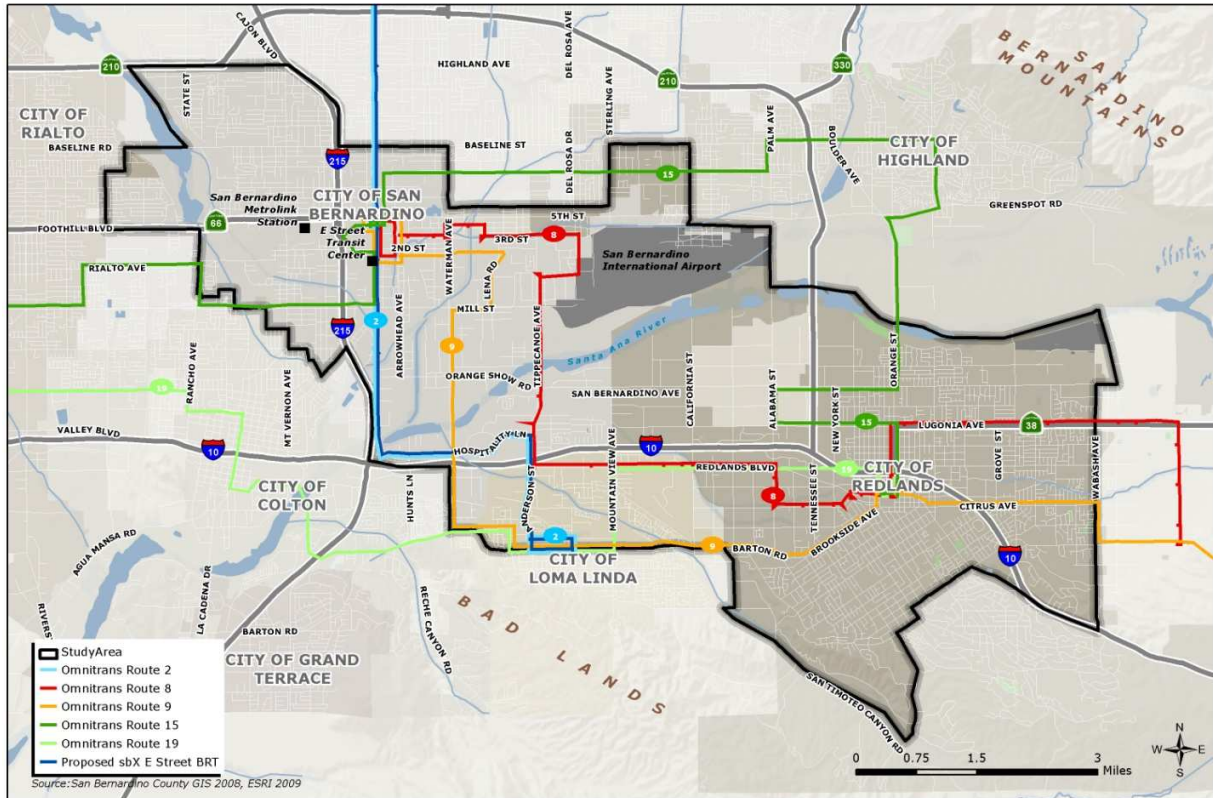
Interface with Other Existing and Planned Transit Services

Both No Project and Phase 1 alternatives assume that Metrolink will be extended from the existing Santa Fe Depot to the new E Street Transit Center, and that the E Street sbX, currently under construction, will be in operation. The Phase 1 Passenger Rail alternatives would require a transfer at the E Street Transit Center to access Metrolink Commuter Rail service to Downtown Los Angeles and Riverside, E Street sbX service, and local bus services. Two Metrolink lines currently run all day service into the existing Santa Fe Depot and terminate west of the I-215 freeway and downtown San Bernardino. The Inland Empire-Orange County Line operates 14 trains daily, and extends from Oceanside in San Diego County north through Anaheim and Riverside into San Bernardino. The San Bernardino Line has Metrolink's most frequent service with 42 weekday trains, as well as weekend service into downtown Los Angeles.

Existing transit service in the study area includes five fixed-route bus routes (Omnitrans Routes 2, 8, 9, 15, and 19), which are operated by Omnitrans in the Redlands Corridor. The baseline and build alternatives assume that the existing Omnitrans local bus routes and the proposed sbX E Street BRT route will be operated in the Redlands Corridor. Alignments for these routes are assumed to be maintained with only minor alignment variations to serve the new San Bernardino Transit Station at E Street.

Figure 3.2 shows the existing bus service that will interface with the proposed for the Redlands corridor.

Figure 3.2 Bus Services in Redlands Corridor Alternatives



Source: HDR, Inc., 2011.

Service Frequency

Service frequencies for transit routes in both the No Project and RPRP Phase 1 alternatives are assumed the same for both analysis years. Service frequencies for Route 2 and the E Street sbX are consistent with short-range and long-range plans for the sbX system. Table 3.2 summarizes the assumed service frequencies for Omnitrans bus routes in the No Project and Phase 1 alternatives.

Table 3.2 Peak Headways for Transit Routes Phase in Redlands Corridor

Route	Opening Year 2018	Horizon Year 2038
Omnitrans Route 2	30	20
Omnitrans Route 8	60	60
Omnitrans Route 9	60	60
Omnitrans Route 15	30	30
Omnitrans Route 19	30	30
Omnitrans sbX E Street BRT	10	5

3.2 TRANSIT RIDERSHIP FORECASTS

The ridership forecasts for the No Project and RPRP Phase 1 alternatives documented in this section were prepared for opening year 2018 and for horizon year 2038 using socioeconomic data derived from SCAG RTP 2008. SCAG RTP 2012 socioeconomic data were not available for this analysis. However, subsequent comparison of the socioeconomic data in the 2008 and 2012 datasets confirms that there is minimal difference in the long-range data in the Phase 1 station area.

The ridership forecasts are based on the operating plans for the alternatives, as described above.

Linked Transit Trips – New Transit Trips

The total numbers of daily linked transit trips associated with the No Project and RPRP Phase 1 alternatives are summarized in Table 3.3. The estimated numbers of transit trips are shown for both San Bernardino County and the Redlands Corridor study area.

Table 3.3 Daily Linked Transit Trips for Phase 1 Alternatives – Years 2018 and 2038

Area/Statistic	Opening Year 2018		Horizon Year 2038	
	No Project	Phase 1	No Project	Phase 1
San Bernardino County	56,730	56,940	102,390	102,560
New Trips	–	210	–	170
Corridor Study Area	21,950	22,190	27,990	28,180
New Trips	–	240	–	190

This table shows that the Phase 1 improvements are forecast to attract approximately 200 new transit trips in both opening year 2018 and horizon year 2038, as compared to the No Project Baseline.

Unlinked Transit Trips – Transit Ridership by Route

The Phase 1 ridership forecasts are based on a five station passenger rail alignment that includes four stations at San Bernardino Transit Center, New York Street, Downtown Redlands and University of Redlands, plus one additional station that will be located at either Tippecanoe Avenue or Waterman Avenue. In both future year model runs the alignment with the Tippecanoe Avenue Station is forecast to attract more passengers than the alignment with the Waterman Avenue Station. The tabulated ridership forecasts for each future year presents a range of values wherein the higher value is associated with the Tippecanoe Avenue station location and the lower value is associated with the Waterman Avenue station location.

The daily unlinked transit ridership forecasts for the transit routes serving the Redlands Corridor study area in the No Project and RPRP Phase 1 alternatives are summarized in Table 3.4. This table shows that the Redlands Rail route is forecast to carry between 720 and 820 daily riders in opening year 2018 (depending on the Tippecanoe/Waterman station location) and between 1,120 and 1,340 daily riders in horizon year 2038.

Table 3.4 Daily Transit Trips (Boardings) for Redlands Corridor Routes

Route	Opening Year 2018		Horizon Year 2038	
	No Project	Phase 1 ^a	No Project	Phase 1 ^a
Redlands Rail	–	720/820	–	1,120/1,340
Omnitrans Route 2	1,550	1,540	2,170	2,160/2,170
Omnitrans Route 8	1,590	1,520	1,810	1,830/1,840
Omnitrans Route 9	1,950	1,860/1,870	2,190	2,080
Omnitrans Route 15	4,320	4,420	4,840	4,830
Omnitrans Route 19	3,950	3,880	4,490	4,340
Omnitrans sbX E Street	6,210	6,130/6,030	9,670	9,370/9,160
Other Omnitrans Routes ^b	20,000	20,050	28,770	28,790
San Bernardino Metrolink	10,910	10,930	20,640	20,670
IE-OC Metrolink Line	6,250	6,260	8,720	8,760
All Study Area Routes	56,730	57,310/57,320	83,300	83,950/83,980
Additional Transit Boardings				
vs. No Project Alternative	–	580/590	–	650/680

^a Multiple values reflect differences in ridership forecasts for alternate station options (Waterman/Tippecanoe).

^b Other routes serving San Bernardino Station include Omnitrans Routes 1, 3, 4, 5, 7, 10, and 14.

Comparison of these ridership forecasts to the new trips presented in Table 3.3 shows that the model assumes that the majority of passengers riding the Redlands Rail route will be existing transit riders, who alter their transit paths to include the Redlands Rail route. In opening year 2018, approximately 30 percent of the passengers on the Redlands Rail route are assumed to be new transit riders, and the remaining 70 percent existing riders. In horizon year 2038, approximately 15 percent of the Redlands Rail passengers are new transit riders.

The transit routes serving the Redlands Corridor study area in opening year 2018 are forecast to accommodate 56,700 (No Project) and 57,300 (Phase 1) total daily boardings, a net increase of approximately 600 boardings for the Phase 1 alternative over the No Project Baseline Alternative. Similarly, the transit routes serving the Redlands Corridor study area in 2038 are forecast to accommodate 83,300 (No Project) and 83,950 (Phase 1) total daily boardings, a net increase of approximately 650 boardings for the Phase 1 alternative over the No Project Baseline.

Since there are approximately 200 new transit trips forecast for each of the future years (Table 3.3), this data implies that the transfer rates for trips associated with the Redlands Rail route are higher than the transfer rate for transit routes that currently operate in the Redlands corridor (the current transfer rate equates to approximately 1.4 boardings per transit trip). The increased transfer rates imply that the travel time savings provided by the Redlands Rail route will make multi-seat transit paths more attractive than in the current transit system. For example, with the Redlands Rail route, Metrolink riders from Redlands who currently drive to the Metrolink station in San Bernardino are likely to change their behavior and use the Redlands Rail route to get from Redlands to the Metrolink station, thereby, adding a transfer to their transit path.

Most Omnitrans bus routes within the Redlands Corridor study area (Omnitrans Routes 2, 8, 9, 19, and sbX) are forecast to experience minor ridership losses with the Phase 1 Alternative, as compared to the No Project Baseline, due to competition between the local routes and the Redlands Rail route. Other Omnitrans bus routes that operate outside the Redlands Corridor study area but interface with Redlands Rail at the San Bernardino Transit Center are forecast to experience minor ridership gains with the Phase 1 Alternative, as compared to the No Project Baseline, due to the improved mobility and travel times offered by the Redlands Rail route. Similarly, ridership on the Metrolink routes that serve the San Bernardino Transit Center – the San Bernardino and Inland Empire-Orange County Metrolink Lines – is forecast to increase with the Phase 1 Alternative due to the improved connectivity offered by the Redlands Rail route.

Ridership Activity at Stations

The daily station activity forecasts for Phase 1 Redlands Rail route in 2018 and 2038 are summarized in Table 3.5. This table shows the number of daily boardings (and alightings) forecast for the stations in each future year.

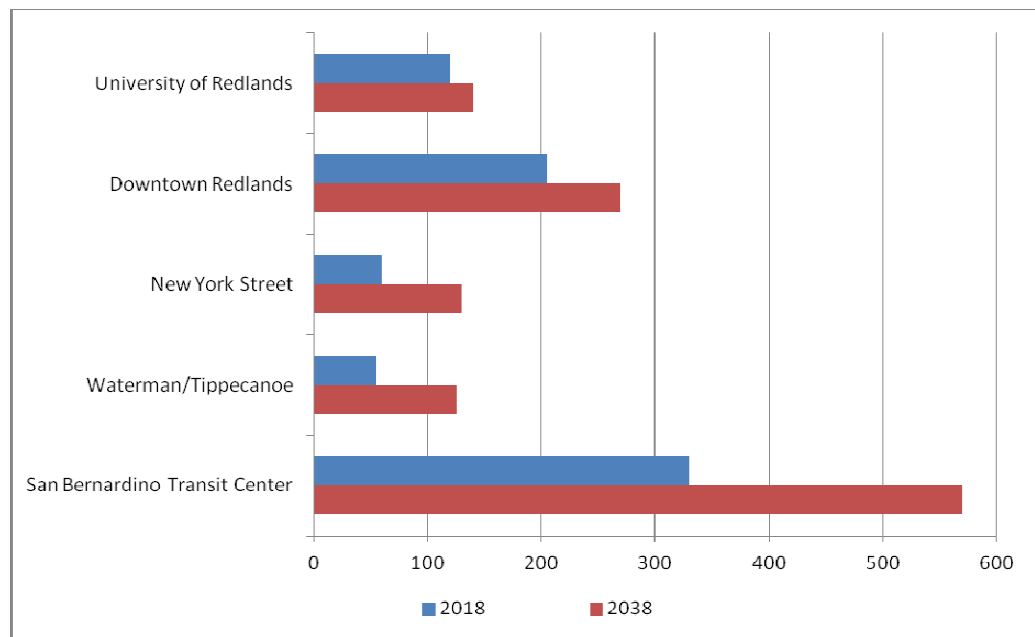
Table 3.5 Daily Transit Boardings at Redlands Rail Stations

Station	Opening Year 2018 ^a	Horizon Year 2038 ^a
San Bernardino Transit Center	310/350	520/610
Waterman Avenue/Tippecanoe Avenue	30/80	70/180
New York Street	60	130
Downtown Redlands	200/210	260/280
University of Redlands	120	140
Total	720/820	1,120/1,340

^a Multiple values reflect differences in ridership forecasts for alternate station options (Waterman/Tippecanoe).

The San Bernardino Transit Center is forecast to serve the greatest passenger volume in both future years, followed by the Downtown Redlands Station. The data in Table 3.5 is displayed graphically in Figure 3.3.

Figure 3.3 Daily Transit Boardings at Redlands Rail Stations



Access Modes

Table 3.6 displays the access mode shares forecast for each station, and aggregated for the entire system, for year 2018 and 2038 operations of the Phases 1 Redlands Rail route. In both forecast years, walk access is more popular than transfer access as the most common access mode. Walk access is the predominant access mode at most of the stations except Downtown Redlands, where transfer access is the predominant access mode, and San Bernardino,

where walk and transfer access are almost equal. It is possible to transfer from other transit routes at only three of the five stations in the Phase 1 alternatives. Auto access accounts for only three percent of the total station access forecast for the Phase 1 Redlands Rail alignment for both future years.

Table 3.6 Transit Access Shares at Redlands Rail Stations

Station	Opening Year 2018			Horizon Year 2038		
	Walk	Auto	Transfer	Walk	Auto	Transfer
San Bernardino Transit Center	50%	1%	49%	48%	1%	51%
Waterman Avenue/ Tippecanoe Avenue	57%	0%	43%	82%	0%	18%
New York Street	99%	1%	0%	100%	0%	0%
Downtown Redlands	32%	0%	68%	24%	6%	70%
University of Redlands	84%	16%	0%	95%	5%	0%
Total	56%	3%	41%	51%	3%	46%

Transit Loads

Transit loads are the number of passengers on transit vehicles at any point on the transit route. Transit *loads* differ from transit *activity*, which represents the number of passengers boarding and alighting at each station. Transit loads are compared to vehicle capacity in order to assess the ability of the planned operations to serve the forecast demand. Daily transit loads are tabulated for year 2018 and 2038 operations of the Phase 1 Redlands Rail route in Table 3.7.

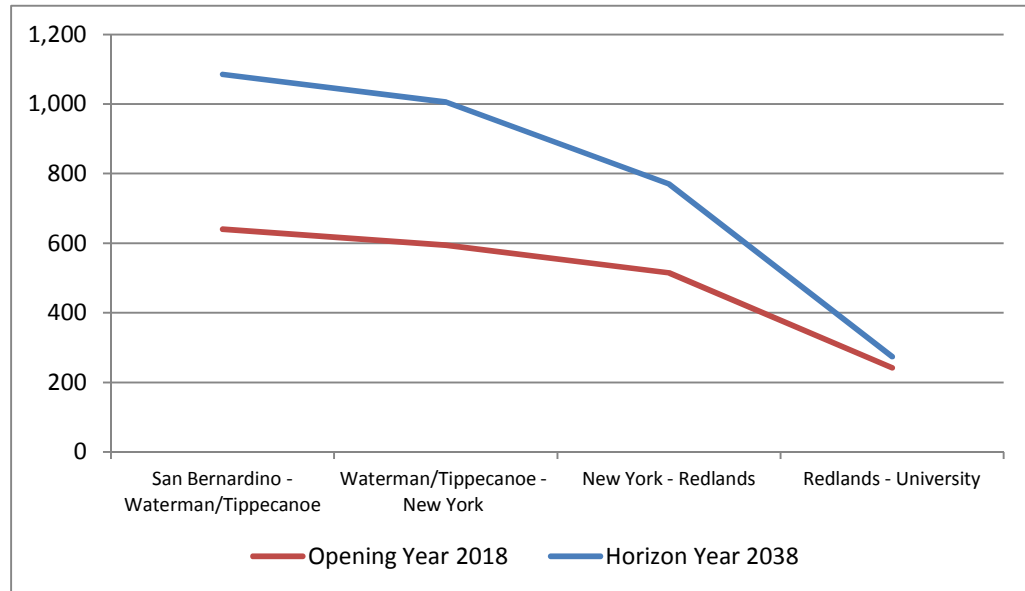
Table 3.7 Daily Transit Loads between Redlands Rail Stations

Stations	Opening Year 2018 ^a	Horizon Year 2038 ^a
San Bernardino – Waterman/Tippecanoe	620/660	1,050/1,230
Tippecanoe/Waterman – New York	590/600	990/1,020
New York – Redlands	510/520	760/790
Redlands – University	240	270/280

^a Multiple values reflect differences in ridership forecasts for alternate station options (Waterman/Tippecanoe).

The data in Table 3.7 is displayed graphically in Figure 3.4. The peak loads for Phase 1 are forecast to be over 600 riders per day in opening year 2018 and over 1,000 riders per day in horizon year 2038. These exhibits show that the peak loads for both future years are in the western end of the corridor, in the City of San Bernardino.

Figure 3.4 Daily Transit Loads between Phase 1 Redlands Rail Stations



Peak-Hour Ridership

Peak-hour ridership forecasts can be used to plan such design elements as station design, platform length and fleet requirements. Peak-hour boarding forecasts at transit stations for year 2018 and 2038 operations of the Phase 1 Redlands Rail route are tabulated in Table 3.8. This table shows that, for both future years, in the AM peak hour the San Bernardino Transit Center and Downtown Redlands stations will have the greatest demand for transit boardings. In the PM peak hour the San Bernardino Transit Center is forecast to have, by far, the greatest demand for transit boardings.

Table 3.8 AM and PM Peak-Hour Transit Boardings at Rail Stations

Station	Opening Year 2018 ^a		Horizon Year 2038 ^a	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
San Bernardino Transit Center	35/46	46/49	58/74	75/80
Waterman Avenue/ Tippecanoe Avenue	4/10	3/8	4/12	11/29
New York Street	8	9	19	13
Downtown Redlands	32/33	19	43/44	21
University of Redlands	20	14	25	12
Total	99/117	90/99	148/174	132/155

^a Multiple values reflect differences in ridership forecasts for alternate station options (Waterman/Tippecanoe).

Peak-hour transit loads are tabulated for year 2018 and 2038 operations of the Phase 1 Redlands Rail route in Table 3.9. The peak-hour loads forecast for both directions of travel are tabulated separately to allow computation of transit demand to seating capacity ratios on the system. The transit load data in this table are displayed graphically in Figures 3.5 and 3.6 for the AM and PM peak hours, respectively.

These exhibits show that the peak loads for both future years are found in the western end of the corridor, in the City of San Bernardino. For both future years, the peak transit loads are forecast for the westbound direction during the AM peak hour, and for the eastbound direction during the PM peak hour.

Table 3.9 Peak-Hour Transit Loads between Rail Stations

Stations	Opening Year 2018 ^a		Horizon Year 2038 ^a	
	Eastbound	Westbound	Eastbound	Westbound
AM Peak Hour				
San Bernardino – Waterman/Tippecanoe	35/46	50/54	58/74	81/88
Waterman/Tippecanoe – New York	34	48/49	49	81/83
New York – Redlands	27	44/45	36	64/66
Redlands – University	15	20	15	25
PM Peak Hour				
San Bernardino – Waterman/Tippecanoe	46/49	33/42	75/80	53/67
Waterman/Tippecanoe – New York	44/45	31	74/76	45
New York – Redlands	40/41	25	59/61	33
Redlands – University	18	14	23	13/14

^a Multiple values reflect differences in ridership forecasts for alternate station options (Waterman/Tippecanoe).

The peak-hour transit loads can be used to assess the ability of the planned operations to serve the forecast demand. Table 3.10 presents a tabulation of the demand-to-capacity ratio for year 2018 and 2038 operations of the Phase 1 Redlands Rail route. The number of peak-hour vehicles and seating capacities are derived from the operating assumptions for the two future years. Operations for both future years assume single-car consists. The highest peak load on a single vehicle operating during the peak hour is estimated assuming a peak-hour factor of 1.25 (i.e., the peak vehicle is assumed to carry 25 percent more passengers than the average peak hour vehicle).

Figure 3.5 AM Peak-Hour Transit Loads for Phase 1 Redlands Rail Stations

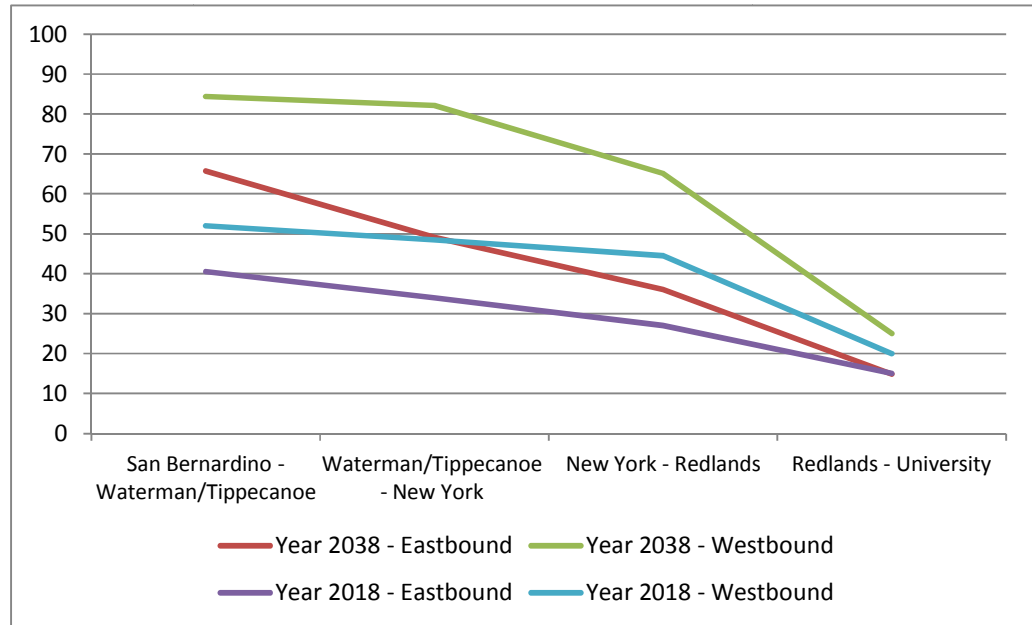
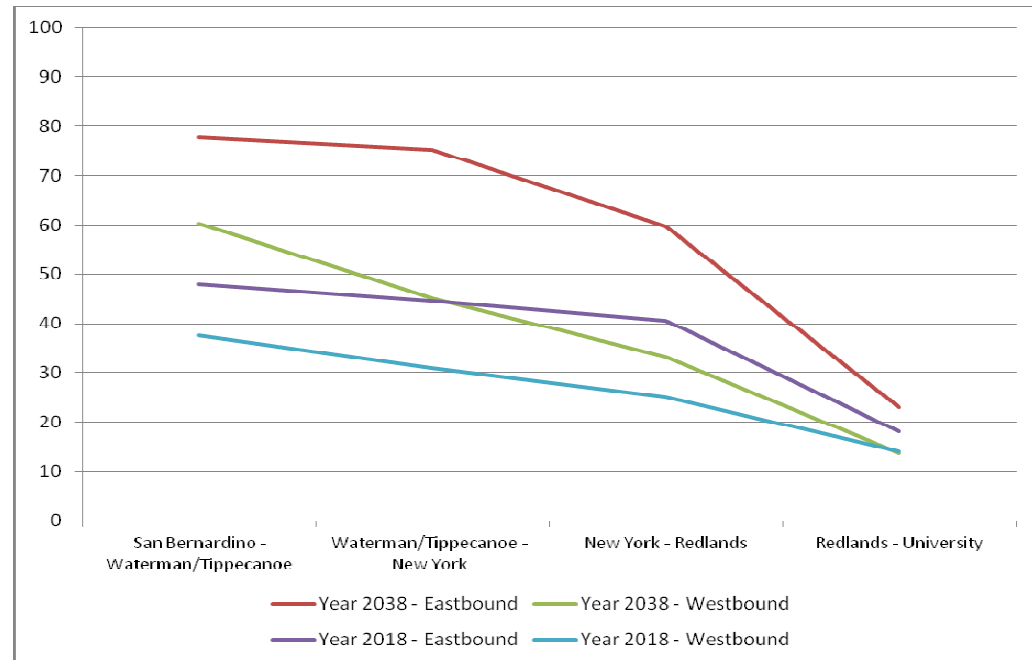


Figure 3.6 PM Peak-Hour Transit Loads for Phase 1 Redlands Rail Stations



The demand-to-capacity ratios calculated for both future years demonstrate that the operating plans and vehicle seating capacities will easily supply sufficient seating for all passenger demand on the peak vehicles. Peak vehicle demands on the Phase 1 system are forecast to consume approximately 25 percent of total capacity in opening year 2018, and 40 percent of capacity in horizon year 2038.

Table 3.10 Demand-to-Capacity Ratios

Variable	Opening Year 2018 ^a	Horizon Year 2038 ^a
Vehicles during Peak Hour	2	2
Vehicle Seating Capacity	132	132
Vehicle Total Capacity	132	132
Peak Passenger Load (Peak Hour)	50/54	81/88
Peak Passenger Load (Peak Vehicle)	31/34	51/55
Peak Vehicle Load/Capacity Ratio	24%/26%	38%/42%

^a Multiple values reflect differences in ridership forecasts for alternate station options (Waterman/Tippecanoe).

3.3 INTERSECTION TURNING MOVEMENT COUNTS

The traffic forecast methodology applies a post-processing procedure to estimate future intersection turning movement volumes. Existing turning movement counts are used as the seed data, and the model-generated traffic assignment volumes are used to calculate and apply traffic growth factors for each intersection approach leg. The post-processing methodology estimates future year background traffic for each approach of intersections being analyzed by comparing future year No Project traffic assignments to validation year traffic assignments. This methodology uses the assignment volume comparisons to calculate annual growth rates for each intersection approach leg, separately for AM and PM peak periods. The future growth for the background traffic is calculated by applying growth factors for the appropriate number of years to grow from observed traffic counts (in year 2011) to the two future years: opening year 2018 (seven years of compounded growth) and horizon year 2038 (27 years of compounded growth).

For estimating the impacts of project related traffic in future years, the post-processing methodology applies a direct adjustment to the background traffic counts. First, future year No Project traffic assignments are compared to future year with Phase 1 traffic assignments to calculate the assignment differences, and then the raw difference in assigned traffic volumes is added to the background traffic counts to estimate the Phase 1 traffic volumes.

Intersection volumes for observed traffic counts and for future alternatives are tabulated in Appendix A.

4.0 Sensitivity Analysis

The transit ridership forecasts presented in Section 3.0 of this memorandum are based on a conservative set of assumptions regarding the socioeconomic characteristics and other variables input to the travel demand model. Such conservative assumptions are necessary when producing ridership forecasts that will be subject to review by agencies, such as the Federal Transit Authority (FTA) that insist that forecasts conform to regionally accepted transportation plans.

However, throughout the planning process for the Redlands Passenger Rail Project, the engineering team has also provided SANBAG with alternatives analyses and ridership forecasts for a wide range of variables, including alternative modes of transportation, service levels and station locations. Concurrently with the change in approach from the alternative analysis to the strategic plan, the engineering team has engaged in a process of educating and engaging local governments to reevaluate their land use plans and to concentrate transit-oriented development in the Redlands Corridor station areas. The results of the updated land use plans have been used to prepare alternate land use scenarios and socioeconomic data input for application in the travel demand model.

This sensitivity analysis documents the impacts of several input assumptions and provides estimates of elasticity values that can be used to assess the range of ridership forecasting results that could occur in the future under a range of conditions. Specific variables subject to analysis include:

- Land use in RPRP corridor and station areas (ranging from current RTP forecast to full TOD build-out plans);
- Number of stations;
- Service characteristics (e.g., service frequency and operating speeds); and
- Travel mode.

Land Use

Of all variables studied, the variable with the greatest potential impact to attract additional transit ridership to the Redlands Corridor is land use density. This is primarily due to the fact that the existing development density along most of the corridor is very low, and increases in the development density to modest levels will have a profound impact on the transit ridership demand on the Redlands Rail route.

The measure of development density chosen for application is the composite of population and employment density in the station areas in the corridor. Comparison of the ridership results of the preferred land use scenarios to the composite development density in the RTP showsthat the ridership forecasts

have an elasticity of approximately 0.63. In other words, a 40-percent increase in the average development density in the station areas will result in a 25-percent increase in the ridership demand on the Redlands Corridor route.

Number of Transit Stations

The number of transit stations served along a transit alignment has both positive and negative impacts on transit ridership on the corridor route. The addition of new stations necessarily reduces the operating speed of the corridor route, due to additional acceleration/deceleration time and dwell time, which reduces transit ridership demand. On the other hand, the addition of stations has a positive impact on transit ridership if the new stations are located within access of trip origins and destinations. In most cases, the positive impacts of the additional coverage area easily outweigh the negative impacts of the additional travel time.

However, this relationship has limitations, and the return on investment in additional stations reaches a point of diminishing returns when stations are spaced too close together. This is due to the fact that most transit riders are willing to walk a reasonable distance to access transit, and spacing stations close together doesn't always increase the catchment area, it merely improves the access time for riders who would use the system regardless of the new stations.

It is difficult to quantify the ridership impact of additional stations because each potential station location is unique, especially in terms of the land use and development density associated with the station location. However, if we assume that development density of the new station location is similar to the development density for other station locations in the corridor, we have found that the ridership impact is almost directly related to the percent increase in the number of stations (i.e., the elasticity of the number of stations is approximately 0.90).

Similarly, if we assume that development density of the new station location is a fraction of the average development density for the other station locations in the corridor, we have found that the ridership impact is then related to the percent increase in the number of stations times the relative development density of the new station area(s).

For example, if we start with an alignment that includes five stations, and add an intermediate station in a location that has a development density that is one-half the development density of the stations along the original alignment, we can calculate that the new six-station alignment will attract 9 percent more ridership than the original route (20 percent increase in number of stations \times 0.90 elasticity \times 0.50 ratio of development densities = 9 percent).

Service Characteristics

The quantifiable service characteristics of the transit alternatives have a direct and quantifiable impact on the transit ridership. Comparison of operating speeds and ridership forecasts for the alternatives analysis allow us to quantify the relationship between transit operating speeds and ridership on the Redlands Rail route. For example, data from the alternatives analysis can be used to estimate that the elasticity for average travel speed on the corridor alignment is approximately 0.40 (i.e., a 10-percent improvement in the average travel speed will result in a 4-percent increase in the ridership on the corridor route).

Similarly, we can calculate the ridership effect of improvements in the service frequency on the corridor route. The elasticity for service frequency on the corridor alignment is approximately 0.80 (i.e., a 25-percent improvement in the service frequency (headway) will result in a 20-percent increase in the ridership on the corridor route. The measure of service frequency is transit headway, which has values that are inversely related to the service frequency. Therefore the elasticity for service frequency is expressed as a negative value (-0.80).

Premium Travel Mode

The premium travel mode chosen to serve the Redlands Corridor has very limited impact on the ridership forecasts. The alternatives analysis was able to identify minor ridership variations for the different travel modes (BRT, LRT, DMU, and commuter rail), but most of the ridership impacts were due to the service characteristics of the alternative modes.

For example, the LRT mode provided the fastest operating speeds of the alternatives tested in the alternatives analysis, and this is the primary reason that LRT achieved the highest ridership forecast. On the other hand, the analysis performed for the Redlands Corridor strategic plan compared the Phase 1 alternative using passenger rail mode, to the Phase 2 alternative using LRT. In this analysis, the Phase 2 alternative was forecast to attract more than twice the ridership of the Phase 1 alternative, even though the operating speeds of the passenger rail route in Phase 1 were much faster than the LRT route in Phase 2. This was because the other operating characteristics for Phase 2 were superior, including service frequency and the number of stations served.

Summary and Combined Effects

The transit ridership elasticities estimated for the premium transit service in the Redlands Corridor are summarized in Table 4.1.

Table 4.1 Summary of Elasticity Values

Variable	Elasticity Value
Land Use Development Density	0.63
Number of Stations	0.90
Operating Speed	0.40
Service Frequency	-0.80

As an example exercise, Table 4.2 presents the results of using elasticity values to estimate the cumulative effects of several changes to the future environment. When estimating the ridership impacts of a combination of variables, it is important to take care to avoid double-counting effects of dependent variables.

Table 4.2 first shows that composite land use density growth is calculated to increase from 17 per acre to 54 per acre, and the elasticity value of 0.63 is applied to calculate that ridership demand will increase from 1,330 daily trips to 2,620 daily trips as a result of the development density in the stations areas. Subsequent rows of Table 4.2 show the effects of changing the number of stations along the alignment (from 5 to 10), the average operating speed (from 34 mph to 30 mph) and the peak service frequency (from 30 minutes to 15 minutes). The cumulative effects of these variables are calculated and applied sequentially to estimate that the total transit demand on the RPRP alignment will increase to a total of 6,100 daily trips.

Table 4.2 Combined Effects of Ridership Impacts

Variable	Base Value	Alternate Value	Variable Change ^a	Elasticity Value	Ridership Change ^a	Cumulative Ridership
Baseline Value (Year 2038 Phase 1 with Tippecanoe)						1,330
Composite Land Use Density (population plus employment/acre)	17	54	104%	0.63	65%	2,620
Number of Stations	5	10	67%	0.52 ^b	34%	3,710
Operating Speed (mph)	34	30	-13%	0.40	-5%	3,530
Service Frequency (minutes)	30	15	-67%	-0.80	53%	6,100

^a When applying arc elasticity procedures, both the variable change and the ridership change are calculated from the mid-point of the Base and Alternative values.

^b The base elasticity value for number of stations (0.90) is factored by the relative density of the new station areas to the original station areas (0.62) to calculate the applied elasticity value (0.52).

A. Intersection Turning Movement Count Volumes

Figure A.1 Year 2011 Intersection Count Volumes

NB Street	SB Street	Peak Hour	South Approach			North Approach			West Approach			East Approach			Total
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Sierra	Mill	AM	0	0	0	80	0	68	54	391	0	0	316	28	937
		PM	0	0	0	98	0	142	67	543	0	0	566	34	1,450
Waterman	9th	AM	42	410	49	61	608	39	42	167	44	78	201	51	1,792
		PM	90	854	140	67	735	77	121	279	63	122	240	75	2,863
Waterman	Mill	AM	71	452	76	73	551	59	79	267	110	102	196	57	2,093
		PM	128	801	94	102	750	125	133	299	168	134	295	97	3,126
Waterman	Orange Show	AM	65	529	40	46	563	68	109	253	181	80	215	43	2,192
		PM	182	702	120	123	825	133	155	429	148	116	383	59	3,375
Waterman	Dumas	AM	4	637	0	0	827	3	4	0	3	0	0	0	1,478
		PM	18	1,011	0	0	1,119	3	2	0	6	0	0	0	2,159
Waterman	Washington	AM	2	2	1	428	9	177	496	983	2	11	504	344	2,959
		PM	4	7	4	302	7	604	385	620	5	5	990	521	3,454
Tippecanoe	Victoria	AM	0	464	16	18	756	2	1	0	1	56	1	29	1,344
		PM	1	882	40	38	848	0	2	0	2	45	0	23	1,881
Tippecanoe	Hospitality	AM	168	452	20	51	501	60	58	25	60	50	113	60	1,618
		PM	443	562	57	55	794	132	231	147	333	61	71	30	2,916
Tippecanoe	I-10 WB Ramps	AM	297	565	0	0	431	308	0	0	0	484	10	297	2,392
		PM	468	763	0	0	1,014	560	0	0	0	254	16	420	3,495
Tippecanoe	I-10 EB Ramps	AM	0	538	183	100	755	0	321	0	276	0	0	0	2,173
		PM	0	735	308	370	849	0	513	12	292	0	0	0	3,079
Anderson	Academy	AM	172	429	15	25	962	364	264	136	217	81	235	39	2,939
		PM	59	786	53	66	589	123	108	46	56	43	56	30	2,015
California	I-10 WB Ramps	AM	433	593	0	1	152	141	0	0	0	373	15	318	2,026
		PM	525	391	1	0	574	549	0	0	0	337	3	95	2,475
California	I-10 EB Ramps	AM	1	605	276	52	477	0	399	1	393	0	0	0	2,204
		PM	0	723	463	239	597	0	205	7	469	0	0	0	2,703
California	Wal-Mart	AM	1	731	16	165	607	0	0	0	0	1	0	69	1,590
		PM	0	1,040	38	281	726	0	0	0	0	2	0	141	2,228
California	Redlands	AM	94	352	12	271	280	72	90	183	133	41	260	283	2,071
		PM	39	344	34	291	289	95	156	455	129	95	413	439	2,779
Alabama	I-10 WB Ramps	AM	342	436	0	0	334	130	0	0	0	243	303	193	1,981
		PM	378	1,045	0	0	788	385	0	0	0	164	307	217	3,284
Alabama	I-10 EB Ramps	AM	0	590	120	49	540	0	229	2	374	0	0	0	1,904
		PM	0	1,048	287	217	745	0	380	7	481	0	0	0	3,165
Alabama	Industrial	AM	19	590	24	68	726	105	49	10	28	16	16	46	1,697
		PM	49	921	83	285	795	122	102	61	38	63	56	315	2,890
Alabama	Redlands	AM	78	388	47	73	454	172	131	217	40	64	262	82	2,008
		PM	112	577	92	140	517	175	264	640	75	109	386	214	3,301
Tennessee	Redlands	AM	47	553	19	125	532	17	12	101	28	34	190	62	1,720
		PM	63	513	44	102	511	27	261	634	78	40	272	183	2,728
Texas	Stuart	AM	56	272	19	26	381	82	23	4	26	15	27	12	943
		PM	16	454	24	16	276	12	3	10	52	20	15	18	916
Texas	Oriental	AM	2	487	14	4	335	3	6	3	5	20	1	11	891
		PM	1	460	10	5	277	0	4	1	3	16	1	9	787
Eureka	Pearl	AM	0	31	63	4	40	0	82	434	490	38	0	9	1,191
		PM	0	123	230	15	44	0	169	608	462	36	0	16	1,703
Eureka	Stuart	AM	8	77	4	22	492	47	14	14	2	7	7	3	697
		PM	15	294	91	38	462	28	13	21	10	38	21	6	1,037
Eureka	Oriental	AM	5	85	1	8	454	43	5	2	5	0	0	0	608
		PM	7	363	22	30	501	19	14	1	12	5	3	18	995
Eureka	Redlands	AM	12	83	17	57	275	83	9	149	10	11	335	16	1,057
		PM	28	223	55	121	344	38	66	662	50	45	351	53	2,036
Orange	Colton	AM	13	186	33	76	544	58	50	117	63	197	235	82	1,654
		PM	63	300	94	85	451	43	154	395	158	148	234	106	2,231
Orange	Pearl	AM	2	662	11	9	276	15	169	268	105	16	40	232	1,805
		PM	20	879	74	25	383	8	260	378	217	47	42	232	2,565
Orange	Stuart	AM	5	630	50	3	323	6	8	6	17	34	9	26	1,117
		PM	8	736	143	50	507	10	72	77	44	127	47	71	1,892
Orange	Oriental	AM	1	666	0	0	366	1	3	0	1	0	0	0	1,038
		PM	10	830	0	0	645	30	42	0	20	0	0	0	1,577
Orange	Redlands	AM	32	524	16	44	261	39	42	103	37	15	194	108	1,415
		PM	63	431	43	147	379	94	183	527	85	51	307	245	2,555
6th	WB Off Ramp	AM	0	147	0	0	283	0	0	0	0	181	17	188	816
		PM	0	316	0	0	387	0	0	0	0	197	10	166	1,076
6th	Pearl	AM	195	85	30	120	262	94	65	34	169	0	0	1	1,055
		PM	189	168	119	234	246	107	127	205	175	0	0	0	1,570
6th	Stuart	AM	9	239	6	75	320	12	5	7	13	15	7	59	767
		PM	60	464	20	36	325	35	23	17	46	18	9	55	1,108
Redlands	Citrus	AM	164	376	34	120	170	29	18	216	91	54	299	230	1,801
		PM	71	265	54	155	462	101	125	290	183	48	187	115	2,056
Church	Stuart	AM	36	256	0	0	278	49	22	0	34	0	0	0	675
		PM	11	295	0	0	261	18	63	0	29	0	0	0	677
University	I-10 WB Ramps	AM	424	376	20	6	131	876	0	0	1	0	7	25	1,866
		PM	307	601	42	10	180	426	0	0	0	2	22	16	1,606
University	I-10 EB Ramps	AM	0	616	0	0	133	0	274	0	423	0	0	0	1,446
		PM	0	505	0	0	196	0	447	1	576	0	0	0	1,725

Figure A.2 Year 2018 Intersection Count Forecasts – No Project

SB Street	NB Street	Period	Northbound			Southbound			Eastbound			Westbound			Total
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Siema	MB	AM	0	0	0	86	0	73	58	419	0	0	336	30	1,005
		PM	0	0	0	134	0	106	72	582	0	0	611	37	1,611
Waterman	NB	AM	45	440	53	74	799	47	45	179	47	85	230	58	2,046
		PM	95	936	153	73	800	94	130	299	68	135	266	83	3,125
Waterman	MB	AM	88	543	95	78	591	63	85	284	114	153	295	88	2,501
		PM	137	859	101	109	804	134	143	321	180	201	444	146	3,578
Waterman	Orange Stew	AM	70	567	43	67	823	99	164	380	272	84	231	44	2,848
		PM	215	830	142	132	885	143	193	535	185	151	488	71	3,967
Waterman	Dumas	AM	4	583	0	0	1,005	4	4	0	3	0	0	0	1,704
		PM	21	1,198	0	0	1,121	4	2	0	6	0	0	0	2,553
Waterman	Washington	AM	2	2	1	459	10	190	532	1,054	2	12	540	369	3,172
		PM	4	7	4	324	8	648	413	665	5	3	1,061	558	3,702
Tippencanoe	Victoria	AM	0	497	17	23	911	2	1	0	1	69	1	36	1,567
		PM	1	546	43	44	980	0	2	0	2	48	0	25	2,090
Tippencanoe	Hospitality	AM	180	485	21	61	801	73	82	35	85	54	136	67	1,873
		PM	475	603	61	62	886	149	147	221	502	92	107	45	3,560
Tippencanoe	I-10 WB Ramps	AM	318	606	0	0	514	367	0	0	0	588	11	330	2,684
		PM	602	818	0	0	1,120	674	0	0	0	805	19	304	4,041
Tippencanoe	I-10 EB Ramps	AM	0	627	213	111	816	0	344	0	296	0	0	0	2,427
		PM	0	826	344	494	1,134	0	550	13	313	0	0	0	3,676
Anderson	Academy	AM	194	460	14	28	1,082	410	283	146	213	87	252	43	3,222
		PM	63	843	57	71	631	132	116	49	60	50	65	35	2,171
California	I-10 WB Ramps	AM	485	664	0	2	329	213	0	0	0	437	18	373	2,457
		PM	627	467	1	0	728	697	0	0	0	396	4	112	3,011
California	I-10 EB Ramps	AM	1	649	294	76	697	0	434	1	429	0	0	0	2,582
		PM	0	829	595	269	671	0	242	8	553	0	0	0	3,266
California	Wal-Mart	AM	1	794	17	184	675	0	0	0	0	1	0	34	1,736
		PM	0	1,402	51	357	1022	0	0	0	0	2	0	131	2,886
California	Redlands	AM	141	529	18	306	316	81	125	254	185	44	279	302	2,582
		PM	58	537	51	385	382	126	388	577	163	123	533	567	3,879
Alabama	I-10 WB Ramps	AM	405	517	0	0	379	348	0	0	0	318	196	252	2,415
		PM	405	1,120	0	0	905	442	0	0	0	176	329	233	3,511
Alabama	I-10 EB Ramps	AM	0	770	157	57	627	0	246	2	403	0	0	0	2,260
		PM	0	1,124	308	264	908	0	407	6	536	0	0	0	3,534
Alabama	Industrial	AM	37	848	34	74	787	114	61	12	35	19	19	55	2,085
		PM	53	987	89	130	923	141	254	92	57	71	64	353	3,317
Alabama	Redlands	AM	85	423	51	80	469	189	182	302	56	74	301	94	2,338
		PM	127	695	104	184	678	230	286	723	85	117	414	279	3,843
Tennessee	Redlands	AM	50	593	20	134	570	38	13	108	30	37	205	67	1,846
		PM	72	590	51	105	548	25	133	808	39	44	297	200	3,179
Texas	Stuart	AM	60	292	20	31	454	98	25	4	29	19	29	13	1,071
		PM	19	541	29	17	296	13	3	11	56	21	16	19	1,042
Texas	Oriental	AM	2	522	15	5	441	4	6	3	5	21	1	13	1,037
		PM	1	555	12	5	397	0	4	1	3	17	1	10	907
Eureka	Pearl	AM	0	23	68	6	80	0	88	465	525	57	0	14	1,316
		PM	0	134	250	18	13	0	181	652	495	40	0	18	1,841
Eureka	Stuart	AM	9	83	4	24	527	50	15	15	2	8	3	747	
		PM	16	318	98	41	495	30	14	23	11	41	23	4	1,116
Eureka	Oriental	AM	6	94	1	9	487	46	5	2	5	0	0	0	655
		PM	8	392	24	32	537	20	15	1	23	5	3	18	1,068
Eureka	Redlands	AM	13	91	19	41	296	89	10	164	11	12	176	18	1,180
		PM	30	239	59	130	369	41	73	735	56	48	376	57	2,213
Orange	Collin	AM	34	202	34	83	594	63	62	144	79	227	265	93	1,895
		PM	68	322	101	91	484	46	170	437	175	259	251	114	2,417
Orange	Pearl	AM	2	710	12	30	296	35	181	287	113	18	44	254	1,942
		PM	21	942	79	27	412	8	296	434	249	50	40	249	2,837
Orange	Stuart	AM	5	675	54	3	346	6	9	6	18	36	10	29	1,198
		PM	8	789	153	54	544	11	77	81	47	136	50	76	2,028
Orange	Oriental	AM	1	714	0	0	392	1	3	0	1	0	0	0	1,113
		PM	11	890	0	0	692	32	45	0	21	0	0	0	1,691
Orange	Redlands	AM	30	576	18	47	380	40	45	110	40	17	219	123	1,500
		PM	68	462	46	158	406	101	196	565	91	55	329	263	2,739
6th	WB Off Ramp	AM	0	187	0	0	309	0	0	0	0	372	76	383	1,071
		PM	0	352	0	0	506	0	0	0	0	211	11	138	1,258
6th	Pearl	AM	214	53	33	129	281	101	70	36	181	0	0	1	1,140
		PM	203	180	128	258	271	118	344	232	198	0	0	0	1,711
6th	Stuart	AM	30	256	6	80	343	13	5	7	13	23	11	89	655
		PM	64	497	21	39	348	38	23	17	46	22	11	68	1,196
Redlands	Citrus	AM	180	412	37	130	184	31	19	232	58	64	299	230	1,905
		PM	76	294	58	156	495	108	134	311	196	48	187	115	2,179
Church	Stuart	AM	40	293	0	0	352	40	26	0	40	0	0	0	814
		PM	13	256	0	0	280	19	68	0	31	0	0	0	767
University	I-10 WB Ramps	AM	474	420	22	6	140	939	0	0	1	0	8	23	2,038
		PM	329	644	45	11	193	413	0	0	0	2	24	17	1,722
University	I-10 EB Ramps	AM	0	675	0	0	143	0	294	0	454	0	0	0	1,565
		PM	0	549	0	0	212	0	478	1	618	0	0	0	1,808

Figure A.3 Year 2018 Intersection Count Forecasts – Phase 1

NB Street	SB Street	Period	South Approach			North Approach			West Approach			East Approach			Total
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Sierra	Mill	AM	0	0	0	71	0	61	55	396	0	0	314	28	924
		PM	0	0	0	86	0	125	55	478	0	0	501	30	1,280
Waterman	9th	AM	45	440	53	74	739	47	45	179	47	89	231	59	2,049
		PM	99	939	154	73	803	84	131	301	68	136	268	94	3,140
Waterman	Mill	AM	90	571	96	80	600	64	87	293	121	157	301	88	2,547
		PM	153	957	112	123	901	150	171	383	215	234	514	169	4,082
Waterman	Orange Show	AM	70	567	43	67	823	98	164	380	272	86	230	46	2,846
		PM	215	830	142	132	885	143	194	536	185	151	500	77	3,989
Waterman	Dumas	AM	4	683	0	0	1,005	4	4	0	3	0	0	0	1,703
		PM	21	1,183	0	0	1,305	3	0	0	0	0	0	0	2,512
Waterman	Washington	AM	1	1	1	458	10	189	531	1,053	2	12	539	388	3,165
		PM	5	9	5	335	8	550	414	667	5	5	1,064	580	3,716
Tippecanoe	Victoria	AM	0	492	17	27	915	2	0	0	0	65	1	34	1,547
		PM	1	950	43	44	984	0	4	0	4	51	0	26	2,109
Tippecanoe	Hospitality	AM	179	492	21	61	598	72	81	35	84	55	124	66	1,877
		PM	477	805	61	82	902	150	345	223	503	93	109	46	3,579
Tippecanoe	I-30 WB Ramps	AM	319	606	0	0	514	367	0	0	0	538	11	330	2,685
		PM	505	823	0	0	1,225	677	0	0	0	908	28	500	4,066
Tippecanoe	I-30 EB Ramps	AM	0	626	219	111	835	0	344	0	296	0	0	0	2,415
		PM	0	811	348	496	1,130	0	555	13	316	0	0	0	3,697
Anderson	Academy	AM	184	459	18	28	1,081	409	282	345	232	86	231	42	3,215
		PM	63	846	57	71	634	132	118	50	61	51	66	36	2,185
California	I-30 WB Ramps	AM	485	665	0	2	729	213	0	0	0	437	18	379	2,421
		PM	633	471	1	0	734	702	0	0	0	405	4	134	3,064
California	I-30 EB Ramps	AM	1	645	294	76	693	0	432	1	425	0	0	0	2,567
		PM	0	934	598	271	677	0	244	8	559	0	0	0	3,291
California	Wal-Mart	AM	1	775	17	182	668	0	0	0	0	1	0	65	1,709
		PM	0	1,296	51	355	917	0	0	0	0	2	0	145	2,865
California	Redlands	AM	158	518	18	299	309	80	122	247	180	43	272	296	2,522
		PM	58	511	50	381	378	124	196	572	562	122	530	563	3,647
Alabama	I-30 WB Ramps	AM	406	517	0	0	379	148	0	0	0	318	396	252	2,416
		PM	406	1,122	0	0	906	443	0	0	0	175	330	233	3,616
Alabama	I-30 EB Ramps	AM	0	773	157	57	630	0	247	2	403	0	0	0	2,770
		PM	0	1,129	309	266	913	0	411	8	520	0	0	0	3,356
Alabama	Industrial	AM	27	846	34	74	785	114	60	12	34	19	39	54	2,078
		PM	53	985	89	331	923	142	154	82	57	72	64	359	3,324
Alabama	Redlands	AM	85	421	51	80	488	189	182	301	55	73	296	94	2,327
		PM	127	655	104	184	678	230	298	723	85	117	414	229	3,844
Tennessee	Redlands	AM	50	589	20	133	567	18	12	105	29	36	202	66	1,828
		PM	73	592	51	110	549	29	333	809	100	44	298	200	3,186
Texas	Stuart	AM	60	291	20	31	454	98	25	4	29	16	29	13	1,070
		PM	19	538	28	17	293	13	3	10	53	20	15	18	1,028
Texas	Oriental	AM	2	587	17	6	506	5	35	17	29	63	3	35	1,905
		PM	1	616	13	6	358	0	35	9	26	55	3	31	1,155
Eureka	Pearl	AM	0	34	68	6	61	0	88	466	526	58	0	14	1,322
		PM	0	134	250	18	53	0	181	652	495	41	0	18	1,842
Eureka	Stuart	AM	9	86	4	24	531	51	17	17	2	9	9	4	783
		PM	16	320	99	41	498	30	15	25	12	43	24	7	1,130
Eureka	Oriental	AM	6	95	1	9	487	46	6	2	6	0	0	0	657
		PM	8	396	24	32	541	21	17	1	15	5	4	21	1,086
Eureka	Redlands	AM	13	92	19	61	296	89	10	367	11	12	377	18	1,165
		PM	31	243	60	131	373	41	74	740	56	49	381	57	2,235
Orange	Cotton	AM	14	200	35	83	592	63	61	343	77	221	264	92	1,844
		PM	67	321	101	91	484	46	170	436	174	159	251	134	2,415
Orange	Pearl	AM	2	710	12	10	296	16	181	287	113	18	44	254	1,942
		PM	21	943	79	27	413	9	299	434	249	51	45	249	2,820
Orange	Stuart	AM	5	677	54	3	348	6	9	7	19	38	10	29	1,306
		PM	9	788	153	33	542	11	77	82	47	135	30	76	2,021
Orange	Oriental	AM	1	714	0	0	392	1	3	0	1	0	0	0	1,113
		PM	11	890	0	0	692	32	45	0	21	0	0	0	1,691
Orange	Redlands	AM	35	574	18	47	278	42	44	309	39	17	217	121	1,541
		PM	68	464	46	138	408	101	197	567	91	55	331	264	2,751
6th	WB Off Ramp	AM	0	188	0	0	304	0	0	0	0	273	28	283	1,074
		PM	0	352	0	0	506	0	0	0	0	211	11	178	1,258
6th	Pearl	AM	216	94	38	129	382	101	70	37	183	0	0	3	1,149
		PM	203	180	128	258	271	118	144	233	199	0	0	0	1,734
6th	Stuart	AM	10	254	6	80	341	13	4	6	12	22	10	87	845
		PM	63	490	21	38	341	37	21	15	41	20	10	62	1,160
Redlands	Citrus	AM	179	411	37	129	183	31	19	231	97	54	298	230	1,900
		PM	76	282	57	166	493	108	133	309	195	48	185	114	2,167
Church	Stuart	AM	41	295	0	0	354	62	26	0	41	0	0	0	820
		PM	14	362	0	0	286	20	72	0	33	0	0	0	786
University	I-30 WB Ramps	AM	472	419	22	6	140	937	0	0	0	0	7	25	2,029
		PM	328	643	45	11	192	455	0	0	0	0	2	22	1,716
University	I-30 EB Ramps	AM	0	673	0	0	142	0	293	0	463	0	0	0	1,560
		PM	0	548	0	0	211	0	479	1	617	0	0	0	1,857

Figure A.4 Year 2038 Intersection Count Forecasts – No Project

NB Street	SB Street	Period	Northbound			Southbound			Eastbound			Westbound			Total
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Sierra	Mill	AM	0	0	0	217	0	184	67	484	0	0	381	34	1,367
		PM	0	0	0	156	0	226	88	714	0	0	892	54	2,130
Waterman	9th	AM	48	469	56	82	817	52	101	402	106	169	435	110	2,848
		PM	116	1,101	181	84	926	97	209	483	109	180	354	111	3,951
Waterman	Mill	AM	99	631	106	85	643	69	96	325	134	294	565	164	3,213
		PM	157	980	115	123	904	151	177	397	223	283	623	205	4,336
Waterman	Orange Show	AM	125	1,021	77	70	862	104	207	480	343	229	617	123	4,258
		PM	312	1,203	206	164	1,101	178	271	749	259	304	1,004	155	5,906
Waterman	Dumas	AM	8	1,239	0	0	1,213	4	5	0	3	0	0	0	2,472
		PM	31	1,761	0	0	1,787	5	6	0	17	0	0	0	3,508
Waterman	Washington	AM	2	2	1	536	11	222	645	1,279	3	18	841	574	4,133
		PM	4	7	4	375	9	749	641	1,032	8	7	1,315	692	4,843
Tiptecanoe	Victoria	AM	0	1,259	43	27	1,136	3	1	0	1	64	1	33	2,568
		PM	2	1,498	68	71	1,593	0	2	0	2	55	0	28	3,319
Tiptecanoe	Hospitality	AM	484	1,303	58	75	735	88	137	59	142	87	196	104	3,466
		PM	769	975	99	99	1,426	237	590	375	850	176	205	87	5,887
Tiptecanoe	I-10 WB Ramps	AM	535	1,018	0	0	956	683	0	0	0	554	11	340	4,097
		PM	729	1,189	0	0	2,379	1,314	0	0	0	291	18	481	6,400
Tiptecanoe	I-10 EB Ramps	AM	0	634	216	114	864	0	719	0	618	0	0	0	3,166
		PM	0	1,100	461	761	1,746	0	957	22	545	0	0	0	5,592
Anderson	Academy	AM	197	491	17	29	1,101	416	536	276	440	93	269	45	3,908
		PM	68	899	61	88	783	164	311	133	161	93	121	65	2,946
California	I-10 WB Ramps	AM	783	1,072	0	2	361	335	0	0	0	1,075	43	917	4,589
		PM	1,035	771	2	0	1,261	1,206	0	0	0	868	8	245	5,394
California	I-10 EB Ramps	AM	2	1,059	483	150	1,375	0	779	2	767	0	0	0	4,618
		PM	0	1,554	995	558	1,393	0	293	10	670	0	0	0	5,472
California	Wal-Mart	AM	2	1,305	29	352	1,295	0	0	0	0	1	0	79	3,063
		PM	0	2,497	91	470	1,213	0	0	0	0	2	0	161	4,435
California	Redlands	AM	271	1,015	35	636	657	169	151	308	224	70	442	481	4,457
		PM	112	992	98	514	510	168	365	1,064	302	155	675	717	5,671
Alabama	I-10 WB Ramps	AM	501	639	0	0	382	149	0	0	0	521	650	414	3,256
		PM	432	1,196	0	0	1,271	621	0	0	0	237	443	313	4,513
Alabama	I-10 EB Ramps	AM	0	675	137	58	634	0	357	3	583	0	0	0	2,447
		PM	0	1,199	328	384	1,319	0	585	11	741	0	0	0	4,568
Alabama	Industrial	AM	24	742	30	78	831	120	68	14	39	28	28	79	2,080
		PM	56	1,054	95	460	1,283	197	294	176	110	72	64	360	4,220
Alabama	Redlands	AM	92	458	55	84	519	197	150	248	46	98	402	126	2,474
		PM	128	660	105	274	1,013	343	402	974	114	125	442	245	4,826
Tennessee	Redlands	AM	57	666	23	143	609	19	14	116	32	53	296	96	2,123
		PM	76	620	53	117	585	31	522	1,269	156	46	311	209	3,995
Texas	Stuart	AM	64	311	22	30	436	94	26	5	30	43	78	35	1,173
		PM	20	577	31	18	316	34	3	11	59	57	43	51	1,201
Texas	Oriental	AM	2	557	16	5	383	3	6	3	5	24	1	13	1,019
		PM	1	601	13	7	362	0	4	1	3	18	1	10	1,021
Eureka	Pearl	AM	0	35	72	5	46	0	107	569	642	110	0	26	1,612
		PM	0	141	263	23	67	0	251	902	686	104	0	46	2,482
Eureka	Stuart	AM	9	88	5	25	563	54	16	16	2	12	12	5	807
		PM	17	336	104	43	529	32	25	41	19	43	24	7	1,222
Eureka	Oriental	AM	6	97	1	9	519	49	6	2	6	0	0	0	696
		PM	8	415	25	34	573	22	16	1	14	5	3	18	1,135
Eureka	Redlands	AM	14	95	19	65	315	95	10	170	11	19	589	28	1,432
		PM	32	255	63	138	394	43	87	877	66	51	402	61	2,470
Orange	Colton	AM	15	213	38	87	624	67	144	337	182	278	332	116	2,432
		PM	135	644	202	98	518	49	235	604	241	169	268	121	3,285
Orange	Pearl	AM	2	757	13	10	316	17	318	504	198	18	46	265	2,465
		PM	23	1,006	85	41	626	13	582	847	486	54	48	265	4,075
Orange	Stuart	AM	6	721	57	6	690	13	9	7	19	39	10	30	1,608
		PM	9	842	164	130	1,319	26	118	126	72	145	54	81	3,086
Orange	Oriental	AM	1	762	0	0	722	2	3	0	1	0	0	0	1,491
		PM	11	950	0	0	1,547	72	48	0	23	0	0	0	2,651
Orange	Redlands	AM	37	600	18	100	594	89	48	118	42	23	301	167	2,137
		PM	72	493	49	351	905	224	209	603	97	58	351	280	3,694
6th	WB Off Ramp	AM	0	168	0	0	327	0	0	0	0	522	49	542	1,608
		PM	0	362	0	0	805	0	0	0	0	346	18	291	1,821
6th	Pearl	AM	223	97	34	156	340	122	122	64	317	0	0	1	1,476
		PM	216	192	136	466	490	213	186	300	256	0	0	0	2,457
6th	Stuart	AM	10	273	7	135	576	22	5	7	13	19	9	75	1,151
		PM	69	531	23	41	372	40	23	17	46	21	10	63	1,255
Redlands	Citrus	AM	188	430	39	143	202	34	29	345	145	54	299	230	2,138
		PM	81	303	62	177	529	116	150	347	219	48	187	115	2,334
Church	Stuart	AM	43	308	0	0	318	56	25	0	39	0	0	0	789
		PM	13	338	0	0	381	26	72	0	33	0	0	0	862
University	I-10 WB Ramps	AM	556	493	26	7	150	1,002	0	0	1	0	8	29	2,272
		PM	417	817	57	11	206	487	0	0	0	2	25	18	2,042
University	I-10 EB Ramps	AM	0	826	0	0	180	0	313	0	484	0	0	0	1,803
		PM	0	623	0	0	264	0	626	1	807	0	0	0	2,322

Figure A.5 Year 2038 Intersection Count Forecasts – Phase 1

NB Street	SB Street	Period	South Approach			North Approach			West Approach			East Approach			Total
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Sierra	Mill	AM	0	0	0	175	0	148	57	415	0	0	310	27	1,133
		PM	0	0	0	126	0	182	80	648	0	0	823	49	1,908
Waterman	9th	AM	48	468	56	82	815	53	101	401	106	369	434	110	2,841
		PM	115	1,101	180	84	525	97	209	483	109	180	354	111	3,949
Waterman	Mill	AM	108	684	115	93	700	75	108	367	151	314	604	176	3,494
		PM	170	1,063	125	134	985	164	200	450	253	330	682	234	4,760
Waterman	Orange Show	AM	126	1,024	77	71	866	105	208	482	345	230	619	134	4,276
		PM	311	1,300	305	164	1,099	177	270	747	258	303	1,003	154	5,891
Waterman	Dumas	AM	8	1,231	0	0	1,205	4	0	0	0	0	0	0	2,448
		PM	30	1,697	0	0	1,722	5	0	0	0	0	0	0	3,454
Waterman	Washington	AM	0	0	0	530	11	219	643	1,274	3	18	836	571	4,105
		PM	5	8	5	376	9	751	642	1,034	8	7	1,317	655	4,855
Tiptecanoe	Victoria	AM	0	1,254	43	27	1,131	3	0	0	0	81	1	32	2,553
		PM	2	1,484	67	71	1,580	0	0	0	0	46	0	23	3,273
Tiptecanoe	Hospitality	AM	483	1,301	58	74	732	88	135	58	140	86	194	109	3,451
		PM	762	967	98	98	1,413	235	585	372	843	170	198	84	5,824
Tiptecanoe	I-10 WB Ramps	AM	339	1,025	0	0	962	688	0	0	0	560	12	344	4,129
		PM	736	1,183	0	0	2,374	1,311	0	0	0	288	18	475	6,375
Tiptecanoe	I-10 EB Ramps	AM	0	639	217	115	869	0	723	0	621	0	0	0	3,183
		PM	0	1,102	462	762	1,748	0	959	22	546	0	0	0	5,601
Anderson	Academy	AM	197	451	17	29	1,101	417	536	276	440	93	269	45	3,910
		PM	68	905	61	88	788	165	315	134	163	95	124	66	2,974
California	I-10 WB Ramps	AM	786	1,077	0	2	365	339	0	0	0	1,080	43	921	4,613
		PM	1,037	772	2	0	1,263	1,208	0	0	0	871	8	246	5,407
California	I-10 EB Ramps	AM	2	1,047	477	148	1,359	0	770	2	758	0	0	0	4,563
		PM	0	1,553	995	558	1,383	0	292	10	669	0	0	0	5,470
California	Wal-Mart	AM	2	1,287	28	348	1,281	0	0	0	0	1	0	81	3,008
		PM	0	2,489	91	467	1,208	0	0	0	0	2	0	153	4,411
California	Redlands	AM	267	1,001	34	628	649	167	147	300	218	58	434	472	4,385
		PM	112	988	98	512	508	167	364	1,060	301	155	672	715	5,650
Alabama	I-10 WB Ramps	AM	501	639	0	0	382	149	0	0	0	521	650	434	3,257
		PM	433	1,197	0	0	1,272	622	0	0	0	237	444	314	4,518
Alabama	I-10 EB Ramps	AM	0	680	138	58	639	0	359	3	587	0	0	0	2,665
		PM	0	1,200	329	384	1,320	0	586	11	742	0	0	0	4,571
Alabama	Industrial	AM	24	746	30	78	834	121	71	14	41	29	29	82	2,099
		PM	57	1,065	96	463	1,291	198	300	180	112	74	66	369	4,270
Alabama	Redlands	AM	93	461	56	84	523	198	152	251	46	99	405	127	2,495
		PM	150	667	106	276	1,020	345	404	981	115	126	447	248	4,865
Tennessee	Redlands	AM	57	669	23	144	611	20	14	118	33	53	298	97	2,136
		PM	76	621	53	117	586	31	523	1,270	156	46	312	230	4,003
Texas	Stuart	AM	64	312	22	30	436	94	27	5	30	43	78	35	1,175
		PM	20	577	31	18	316	14	3	11	59	57	43	51	1,200
Texas	Oriental	AM	3	622	18	5	448	4	34	17	29	65	3	36	1,283
		PM	1	676	15	8	437	0	42	11	32	65	4	37	1,327
Eureka	Pearl	AM	0	36	72	5	46	0	107	569	642	110	0	26	1,613
		PM	0	141	264	23	68	0	251	903	686	105	0	47	2,488
Eureka	Stuart	AM	9	91	5	25	566	54	18	18	3	13	13	6	820
		PM	17	341	105	44	534	32	27	44	21	47	26	7	1,245
Eureka	Oriental	AM	6	98	1	9	520	40	6	2	6	0	0	0	698
		PM	8	419	25	35	577	22	18	1	16	6	4	21	1,153
Eureka	Redlands	AM	14	95	20	65	315	95	10	171	11	19	589	28	1,433
		PM	32	258	64	139	396	44	88	880	66	52	405	61	2,487
Orange	Cofton	AM	15	212	38	87	624	66	144	337	181	278	331	116	2,428
		PM	135	644	202	98	519	49	235	604	242	170	268	121	3,288
Orange	Pearl	AM	2	757	13	10	315	17	318	504	197	18	46	265	2,463
		PM	23	1,009	85	41	629	13	583	848	487	54	48	268	4,089
Orange	Stuart	AM	0	717	57	6	686	13	8	6	17	37	10	28	1,591
		PM	9	847	165	131	1,324	26	120	128	73	148	55	83	3,110
Orange	Oriental	AM	1	755	0	0	714	2	0	0	0	0	0	0	1,472
		PM	12	955	0	0	1,552	72	52	0	25	0	0	0	2,668
Orange	Redlands	AM	36	593	18	96	589	88	47	114	41	23	297	165	2,111
		PM	72	493	49	351	805	224	209	603	97	58	351	280	3,695
Eth	WB Off Ramp	AM	0	173	0	0	331	0	0	0	0	524	49	544	1,622
		PM	0	361	0	0	804	0	0	0	0	345	38	291	1,819
6th	Pearl	AM	228	100	35	158	344	124	124	65	323	0	0	9	1,510
		PM	213	190	134	463	487	212	184	297	254	0	0	0	2,435
6th	Stuart	AM	10	273	7	135	575	22	5	7	12	19	9	74	1,147
		PM	67	520	22	40	362	39	20	15	39	18	9	54	1,205
Redlands	Citrus	AM	186	427	39	141	199	34	28	341	144	53	296	228	2,117
		PM	81	303	62	177	528	116	150	347	219	48	187	115	2,333
Church	Stuart	AM	43	305	0	0	316	56	24	0	37	0	0	0	781
		PM	12	324	0	0	368	25	63	0	29	0	0	0	821
University	I-10 WB Ramps	AM	554	491	26	7	149	999	0	0	0	0	7	25	2,258
		PM	416	815	57	11	205	485	0	0	0	2	23	17	2,031
University	I-10 EB Ramps	AM	0	824	0	0	178	0	313	0	483	0	0	0	1,797
		PM	0	622	0	0	264	0	626	1	807	0	0	0	2,300

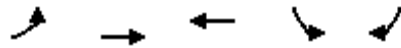
Appendix F

Level of Service Worksheets

Queues

1: Mill St & S Sierra Way

11/25/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	70	493	435	129	58
v/c Ratio	0.15	0.26	0.23	0.27	0.24
Control Delay	6.5	5.8	5.4	11.9	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.5	5.8	5.4	11.9	7.7
Queue Length 50th (ft)	6	23	19	6	0
Queue Length 95th (ft)	20	43	36	22	19
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	537	2162	2144	1609	712
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.13	0.23	0.20	0.08	0.08

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St & S Sierra Way

11/25/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	60	424	344	30	87	74
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.97	0.85
Flt Protected	0.95	1.00	1.00		0.96	1.00
Satd. Flow (prot)	1583	3353	3312		3187	1365
Flt Permitted	0.50	1.00	1.00		0.96	1.00
Satd. Flow (perm)	832	3353	3312		3187	1365
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	70	493	400	35	101	86
RTOR Reduction (vph)	0	0	11	0	25	52
Lane Group Flow (vph)	70	493	424	0	104	6
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	18.7	18.7	18.7		5.4	5.4
Effective Green, g (s)	16.7	16.7	16.7		3.4	3.4
Actuated g/C Ratio	0.50	0.50	0.50		0.10	0.10
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	420	1692	1671		327	140
v/s Ratio Prot		c0.15	0.13		c0.03	
v/s Ratio Perm	0.08					0.00
v/c Ratio	0.17	0.29	0.25		0.32	0.04
Uniform Delay, d1	4.4	4.8	4.7		13.8	13.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.1	0.1		0.6	0.1
Delay (s)	4.6	4.9	4.7		14.3	13.5
Level of Service	A	A	A		B	B
Approach Delay (s)		4.8	4.7		14.1	
Approach LOS		A	A		B	

Intersection Summary

HCM Average Control Delay	6.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	33.1	Sum of lost time (s)	13.0
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

2: Waterman Ave & 9th St

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	50	250	92	297	50	542	73	764
v/c Ratio	0.20	0.42	0.34	0.40	0.23	0.55	0.25	0.78
Control Delay	17.7	21.6	21.0	20.8	13.0	19.2	13.1	25.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.7	21.6	21.0	20.8	13.0	19.2	13.1	25.1
Queue Length 50th (ft)	14	38	25	48	10	84	14	132
Queue Length 95th (ft)	34	70	56	83	27	137	37	#212
Internal Link Dist (ft)		852		841		893		996
Turn Bay Length (ft)	130		100		50		75	
Base Capacity (vph)	252	1260	270	1267	213	1263	295	1267
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.20	0.34	0.23	0.23	0.43	0.25	0.60

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2: Waterman Ave & 9th St

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	46	182	48	85	218	55	46	445	53	67	660	43
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	7.0	7.5		7.0	7.4		7.0	7.5		7.0	7.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.97		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3248		1583	3251		1583	3299		1583	3322	
Flt Permitted	0.57	1.00		0.54	1.00		0.26	1.00		0.44	1.00	
Satd. Flow (perm)	951	3248		895	3251		432	3299		731	3322	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	198	52	92	237	60	50	484	58	73	717	47
RTOR Reduction (vph)	0	35	0	0	33	0	0	12	0	0	7	0
Lane Group Flow (vph)	50	215	0	92	264	0	50	530	0	73	757	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	15.2	12.7		17.7	14.0		20.5	18.0		20.5	18.0	
Effective Green, g (s)	11.2	10.7		13.7	12.0		16.5	16.0		16.5	16.0	
Actuated g/C Ratio	0.19	0.18		0.24	0.21		0.28	0.28		0.28	0.28	
Clearance Time (s)	5.0	5.5		5.0	5.4		5.0	5.5		5.0	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	189	600		232	674		133	912		216	918	
v/s Ratio Prot	0.00	0.07		c0.01	0.08		c0.00	0.16		0.00	c0.23	
v/s Ratio Perm	0.05			c0.08			0.10			0.09		
v/c Ratio	0.26	0.36		0.40	0.39		0.38	0.58		0.34	0.83	
Uniform Delay, d1	19.6	20.6		18.4	19.8		18.1	18.1		16.2	19.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.4		1.1	0.4		1.8	0.9		0.9	6.1	
Delay (s)	20.4	21.0		19.5	20.2		19.8	19.0		17.2	25.8	
Level of Service	C	C		B	C		B	B		B	C	
Approach Delay (s)		20.9			20.0			19.1			25.0	
Approach LOS		C			C			B			C	

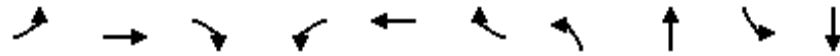
Intersection Summary

HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	57.9	Sum of lost time (s)	21.5
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

11/25/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	91	306	125	117	224	66	81	604	83	699
v/c Ratio	0.32	0.67	0.40	0.39	0.44	0.23	0.23	0.29	0.24	0.34
Control Delay	21.0	40.2	10.0	22.5	32.9	9.8	22.6	17.3	19.1	17.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.0	40.2	10.0	22.5	32.9	9.8	22.6	17.3	19.1	17.8
Queue Length 50th (ft)	32	77	0	42	54	0	24	68	25	86
Queue Length 95th (ft)	56	112	43	69	81	31	65	121	63	137
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	320	559	354	305	545	299	408	2139	376	2115
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	0.55	0.35	0.38	0.41	0.22	0.20	0.28	0.22	0.33

Intersection Summary

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑	↗	↘	↑↑↔		↘	↑↑↔	
Volume (vph)	86	291	119	111	213	63	77	491	83	79	599	65
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0		5.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3353	1500	1583	3353	1500	1583	4714		1583	4747	
Flt Permitted	0.61	1.00	1.00	0.51	1.00	1.00	0.37	1.00		0.34	1.00	
Satd. Flow (perm)	1020	3353	1500	848	3353	1500	624	4714		567	4747	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	91	306	125	117	224	66	81	517	87	83	631	68
RTOR Reduction (vph)	0	0	108	0	0	56	0	26	0	0	15	0
Lane Group Flow (vph)	91	306	17	117	224	10	81	578	0	83	685	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	20.3	12.8	12.8	22.7	14.0	14.0	37.3	35.3		35.6	35.6	
Effective Green, g (s)	16.3	10.8	10.8	18.7	12.0	12.0	35.3	33.3		33.6	33.6	
Actuated g/C Ratio	0.20	0.14	0.14	0.23	0.15	0.15	0.44	0.42		0.42	0.42	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	247	453	203	260	503	225	334	1962		304	1994	
v/s Ratio Prot	0.03	c0.09		c0.04	0.07		0.01	c0.12		0.02	c0.14	
v/s Ratio Perm	0.05		0.01	0.07		0.01	0.09			0.10		
v/c Ratio	0.37	0.68	0.08	0.45	0.45	0.04	0.24	0.29		0.27	0.34	
Uniform Delay, d1	26.9	32.9	30.3	25.4	31.0	29.1	14.4	15.5		14.4	15.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	4.0	0.2	1.2	0.6	0.1	0.4	0.4		0.5	0.5	
Delay (s)	27.8	36.9	30.4	26.6	31.6	29.2	14.7	15.9		14.9	16.2	
Level of Service	C	D	C	C	C	C	B	B		B	B	
Approach Delay (s)		33.8			29.8			15.8			16.1	
Approach LOS		C			C			B			B	

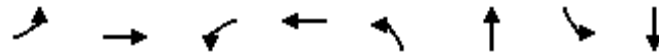
Intersection Summary

HCM Average Control Delay	22.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Waterman & E Orange Show

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	137	548	101	326	83	720	58	796
v/c Ratio	0.39	0.72	0.38	0.51	0.32	0.61	0.20	0.77
Control Delay	21.6	27.5	22.2	31.4	16.0	24.0	14.4	30.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.6	27.5	22.2	31.4	16.0	24.0	14.4	30.2
Queue Length 50th (ft)	45	94	32	71	21	157	15	182
Queue Length 95th (ft)	89	158	68	122	49	234	37	270
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	466	1013	410	949	413	1522	457	1473
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.54	0.25	0.34	0.20	0.47	0.13	0.54

Intersection Summary

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	118	275	196	87	233	47	71	575	44	50	611	74
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	7.0		6.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.94		1.00	0.97		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3144		1583	3268		1583	3317		1583	3299	
Flt Permitted	0.52	1.00		0.34	1.00		0.21	1.00		0.32	1.00	
Satd. Flow (perm)	874	3144		560	3268		347	3317		533	3299	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	137	320	228	101	271	55	83	669	51	58	710	86
RTOR Reduction (vph)	0	128	0	0	17	0	0	5	0	0	9	0
Lane Group Flow (vph)	137	420	0	101	309	0	83	715	0	58	787	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	24.7	16.7		23.1	15.9		34.0	27.7		29.6	25.5	
Effective Green, g (s)	20.7	14.7		19.1	13.9		30.0	25.7		25.6	23.5	
Actuated g/C Ratio	0.28	0.20		0.26	0.19		0.41	0.35		0.35	0.32	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	303	627		217	616		213	1157		215	1052	
v/s Ratio Prot	c0.04	c0.13		0.03	0.09		c0.02	0.22		0.01	c0.24	
v/s Ratio Perm	0.09			0.09			0.14			0.09		
v/c Ratio	0.45	0.67		0.47	0.50		0.39	0.62		0.27	0.75	
Uniform Delay, d1	20.9	27.3		21.7	26.8		14.5	19.9		16.4	22.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	2.7		1.6	0.6		1.2	1.0		0.7	3.0	
Delay (s)	21.9	30.0		23.3	27.4		15.7	20.9		17.1	25.4	
Level of Service	C	C		C	C		B	C		B	C	
Approach Delay (s)		28.4			26.5			20.4			24.8	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	24.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	73.7	Sum of lost time (s)	19.0
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

11/25/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	4	3	4	692	899	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	4	3	4	769	999	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					745	
pX, platoon unblocked	0.85	0.85	0.85			
vC, conflicting volume	1394	501	1002			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1110	60	649			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	100	99			
cM capacity (veh/h)	172	844	793			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	8	4	384	384	666	336
Volume Left	4	4	0	0	0	0
Volume Right	3	0	0	0	0	3
cSH	261	793	1700	1700	1700	1700
Volume to Capacity	0.03	0.01	0.23	0.23	0.39	0.20
Queue Length 95th (ft)	2	0	0	0	0	0
Control Delay (s)	19.2	9.6	0.0	0.0	0.0	0.0
Lane LOS	C	A				
Approach Delay (s)	19.2	0.1	0.0			
Approach LOS	C					

Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			36.3%	ICU Level of Service	A	
Analysis Period (min)			15			

Queues

6: Waterman & Washington

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	656	1304	16	668	456	5	289	289	234
v/c Ratio	0.89	0.70	0.14	0.71	0.61	0.03	0.81	0.79	0.38
Control Delay	49.7	20.2	41.3	35.5	6.9	25.0	46.4	44.1	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.7	20.2	41.3	35.5	6.9	25.0	46.4	44.1	4.8
Queue Length 50th (ft)	188	266	9	183	0	2	152	151	0
Queue Length 95th (ft)	#247	#457	26	228	47	8	213	210	34
Internal Link Dist (ft)		433		239		527		537	
Turn Bay Length (ft)	225		100		200		125		
Base Capacity (vph)	733	1851	387	942	749	586	425	436	684
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.70	0.04	0.71	0.61	0.01	0.68	0.66	0.34

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

6: Waterman & Washington

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	538	1068	2	13	548	374	2	2	1	465	9	192
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1800	1800	1800	1700	1800	1800
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0		4.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00		1.00		0.95	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98		0.95	0.95	1.00
Satd. Flow (prot)	2891	3352		1583	3353	1500		1683		1504	1600	1500
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.93		0.75	0.73	1.00
Satd. Flow (perm)	2891	3352		1583	3353	1500		1597		1195	1226	1500
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	656	1302	2	16	668	456	2	2	1	567	11	234
RTOR Reduction (vph)	0	0	0	0	0	344	0	1	0	0	0	164
Lane Group Flow (vph)	656	1304	0	16	668	112	0	4	0	289	289	70
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8			4		4
Actuated Green, G (s)	26.0	46.5		1.6	22.1	22.1		27.9		26.9	26.9	26.9
Effective Green, g (s)	26.0	46.5		1.6	22.1	22.1		27.9		26.9	26.9	26.9
Actuated g/C Ratio	0.29	0.52		0.02	0.25	0.25		0.31		0.30	0.30	0.30
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0		4.0		5.0	5.0	5.0
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)	835	1732		28	823	368		495		357	366	448
v/s Ratio Prot	c0.23	0.39		0.01	c0.20					c0.24	0.24	0.05
v/s Ratio Perm						0.07		0.00				
v/c Ratio	0.79	0.75		0.57	0.81	0.30		0.01		0.81	0.79	0.16
Uniform Delay, d1	29.4	17.2		43.9	32.0	27.7		21.5		29.2	29.0	23.2
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	4.9	3.1		25.2	8.6	2.1		0.0		12.7	10.8	0.2
Delay (s)	34.3	20.3		69.0	40.6	29.8		21.5		41.9	39.8	23.4
Level of Service	C	C		E	D	C		C		D	D	C
Approach Delay (s)		25.0			36.7			21.5			35.8	
Approach LOS		C			D			C			D	

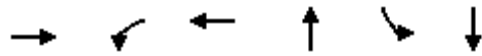
Intersection Summary

HCM Average Control Delay	30.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues

7: S Tippecanoe & E Victoria

11/25/2013



Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	2	73	37	615	24	968
v/c Ratio	0.01	0.61	0.21	0.25	0.04	0.36
Control Delay	29.5	59.3	15.3	5.8	3.2	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	59.3	15.3	5.8	3.2	4.3
Queue Length 50th (ft)	1	41	1	43	2	80
Queue Length 95th (ft)	6	76	25	107	9	124
Internal Link Dist (ft)	87		770	198		507
Turn Bay Length (ft)		100			115	
Base Capacity (vph)	276	238	314	2497	579	2661
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.31	0.12	0.25	0.04	0.36

Intersection Summary

HCM Signalized Intersection Capacity Analysis

7: S Tippecanoe & E Victoria

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↖	↗		↖	↕		↖	↕	
Volume (vph)	1	0	1	62	1	31	0	505	18	20	821	2
Ideal Flow (vphpl)	1800	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.0		6.0	6.0			7.5		6.0	7.5	
Lane Util. Factor		1.00		1.00	1.00			0.95		1.00	0.95	
Frt		0.93		1.00	0.85			0.99		1.00	1.00	
Flt Protected		0.98		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1605		1583	1507			3336		1583	3352	
Flt Permitted		0.89		0.76	1.00			1.00		0.38	1.00	
Satd. Flow (perm)		1458		1261	1507			3336		637	3352	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	1	0	1	73	1	36	0	594	21	24	966	2
RTOR Reduction (vph)	0	1	0	0	33	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	1	0	73	4	0	0	613	0	24	968	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.4		9.4	9.4			64.6		71.1	71.1	
Effective Green, g (s)		7.4		7.4	7.4			62.6		69.1	69.1	
Actuated g/C Ratio		0.08		0.08	0.08			0.70		0.77	0.77	
Clearance Time (s)		4.0		4.0	4.0			5.5		4.0	5.5	
Vehicle Extension (s)		3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		120		104	124			2320		494	2574	
v/s Ratio Prot					0.00			0.18		0.00	c0.29	
v/s Ratio Perm		0.00		c0.06						0.04		
v/c Ratio		0.01		0.70	0.03			0.26		0.05	0.38	
Uniform Delay, d1		37.9		40.2	38.0			5.1		2.7	3.4	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.0		19.2	0.1			0.3		0.0	0.4	
Delay (s)		38.0		59.5	38.1			5.4		2.7	3.8	
Level of Service		D		E	D			A		A	A	
Approach Delay (s)		38.0			52.3			5.4			3.8	
Approach LOS		D			D			A			A	

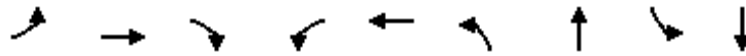
Intersection Summary

HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

11/25/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	45	50	69	57	197	274	540	58	641
v/c Ratio	0.19	0.21	0.21	0.22	0.57	1.57	0.19	0.27	0.45
Control Delay	15.4	15.8	6.5	15.8	18.2	310.2	5.2	14.7	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.4	15.8	6.5	15.8	18.2	310.2	5.2	14.7	11.3
Queue Length 50th (ft)	8	9	0	10	28	~45	19	9	36
Queue Length 95th (ft)	29	32	22	34	78	#112	35	32	63
Internal Link Dist (ft)		517			1151		774		1167
Turn Bay Length (ft)	210			85		260		100	
Base Capacity (vph)	737	733	885	776	972	174	4228	522	3386
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.07	0.08	0.07	0.20	1.57	0.13	0.11	0.19

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.

HCM Signalized Intersection Capacity Analysis

8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖	↖	↖	↖		↖↖	↖↖↖		↖	↖↖↖	
Volume (vph)	64	27	66	54	122	66	260	491	22	55	543	66
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1600	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		0.97	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	0.98	
Flt Protected	0.95	0.98	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1504	1640	1500	1583	1672		2891	4787		1583	4740	
Flt Permitted	0.82	0.77	1.00	0.82	1.00		0.95	1.00		0.44	1.00	
Satd. Flow (perm)	1293	1285	1500	1361	1672		2891	4787		734	4740	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	67	28	69	57	128	69	274	517	23	58	572	69
RTOR Reduction (vph)	0	0	60	0	38	0	0	7	0	0	27	0
Lane Group Flow (vph)	45	50	9	57	159	0	274	533	0	58	614	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)	6.9	6.9	6.9	6.9	6.9		4.2	20.9		12.7	12.7	
Effective Green, g (s)	4.9	4.9	4.9	4.9	4.9		2.2	18.9		10.7	10.7	
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.14		0.06	0.53		0.30	0.30	
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)	177	176	205	186	229		178	2527		219	1417	
v/s Ratio Prot					c0.10		c0.09	0.11			c0.13	
v/s Ratio Perm	0.03	0.04	0.01	0.04						0.08		
v/c Ratio	0.25	0.28	0.05	0.31	0.69		1.54	0.21		0.26	0.43	
Uniform Delay, d1	13.8	13.9	13.4	13.9	14.7		16.8	4.5		9.6	10.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.9	0.1	0.9	8.8		268.8	0.0		0.7	0.2	
Delay (s)	14.6	14.8	13.5	14.9	23.5		285.6	4.5		10.2	10.3	
Level of Service	B	B	B	B	C		F	A		B	B	
Approach Delay (s)		14.2			21.6			99.1			10.3	
Approach LOS		B			C			F			B	

Intersection Summary

HCM Average Control Delay	49.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	35.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

9: Anderson/Tippecanoe/Tippecanoe & WB I-10 Ramps

11/25/2013



Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	264	265	330	321	654	472	398
v/c Ratio	0.90	0.85	0.63	0.91	0.30	0.26	0.49
Control Delay	68.2	59.3	12.2	55.9	4.5	21.8	5.0
Queue Delay	0.7	0.5	0.0	0.0	0.0	0.0	0.0
Total Delay	68.9	59.8	12.2	55.9	4.5	21.8	5.0
Queue Length 50th (ft)	149	148	21	187	46	72	0
Queue Length 95th (ft)	#280	#268	100	#284	45	104	66
Internal Link Dist (ft)		949			347	498	
Turn Bay Length (ft)	225		175				
Base Capacity (vph)	334	355	555	422	2215	1790	808
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	7	8	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.76	0.59	0.76	0.30	0.26	0.49

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

9: Anderson/Tippecanoe/Tippecanoe & WB I-10 Ramps

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↖	↗	↖	↖	↕			↕	↖
Volume (vph)	0	0	0	487	10	310	302	615	0	0	444	374
Ideal Flow (vphpl)	1800	1800	1800	1700	1800	1800	1700	1800	1800	1800	1800	1800
Total Lost time (s)				6.0	6.0	6.0	6.0	7.0			7.0	7.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.91	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1504	1600	1500	1583	3353			4818	1500
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1504	1600	1500	1583	3353			4818	1500
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	518	11	330	321	654	0	0	472	398
RTOR Reduction (vph)	0	0	0	0	0	229	0	0	0	0	0	250
Lane Group Flow (vph)	0	0	0	264	265	101	321	654	0	0	472	148
Turn Type				Perm	NA	Perm	Prot	NA			NA	Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8						6
Actuated Green, G (s)				19.6	19.6	19.6	22.0	61.4			35.4	35.4
Effective Green, g (s)				17.6	17.6	17.6	20.0	59.4			33.4	33.4
Actuated g/C Ratio				0.20	0.20	0.20	0.22	0.66			0.37	0.37
Clearance Time (s)				4.0	4.0	4.0	4.0	5.0			5.0	5.0
Vehicle Extension (s)				2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)				294	313	293	352	2213			1788	557
v/s Ratio Prot							c0.20	c0.20			0.10	
v/s Ratio Perm				c0.18	0.17	0.07						0.10
v/c Ratio				0.90	0.85	0.34	0.91	0.30			0.26	0.27
Uniform Delay, d1				35.3	34.9	31.2	34.1	6.5			19.7	19.7
Progression Factor				1.00	1.00	1.00	0.88	0.61			1.00	1.00
Incremental Delay, d2				27.2	17.9	0.3	22.5	0.3			0.4	1.2
Delay (s)				62.5	52.8	31.5	52.5	4.2			20.1	20.9
Level of Service				E	D	C	D	A			C	C
Approach Delay (s)		0.0			47.6			20.1			20.5	
Approach LOS		A			D			C			C	

Intersection Summary

HCM Average Control Delay	29.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

11/25/2013



Lane Group	EBL	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	355	349	822	112	858
v/c Ratio	0.87	0.74	0.58	0.82	0.44
Control Delay	52.8	28.9	21.6	82.5	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.6
Total Delay	52.8	28.9	21.6	82.5	13.5
Queue Length 50th (ft)	201	128	174	67	129
Queue Length 95th (ft)	276	204	266	m#104	279
Internal Link Dist (ft)		1164	1201		347
Turn Bay Length (ft)	275				
Base Capacity (vph)	535	587	1428	158	1964
Starvation Cap Reductn	0	0	0	0	677
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.66	0.59	0.58	0.71	0.67

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.

HCM Signalized Intersection Capacity Analysis

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	351	0	276	0	0	0	0	546	186	100	764	0
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	6.0						7.0		6.0	7.0	
Lane Util. Factor	0.95	0.95						0.95		1.00	0.95	
Frt	1.00	0.87						0.96		1.00	1.00	
Flt Protected	0.95	0.99						1.00		0.95	1.00	
Satd. Flow (prot)	1504	1445						3225		1583	3353	
Flt Permitted	0.95	0.99						1.00		0.95	1.00	
Satd. Flow (perm)	1504	1445						3225		1583	3353	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	394	0	310	0	0	0	0	613	209	112	858	0
RTOR Reduction (vph)	0	82	0	0	0	0	0	32	0	0	0	0
Lane Group Flow (vph)	355	267	0	0	0	0	0	790	0	112	858	0
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	26.3	26.3						40.9		9.8	54.7	
Effective Green, g (s)	24.3	24.3						38.9		7.8	52.7	
Actuated g/C Ratio	0.27	0.27						0.43		0.09	0.59	
Clearance Time (s)	4.0	4.0						5.0		4.0	5.0	
Vehicle Extension (s)	2.0	2.0						2.0		2.0	2.0	
Lane Grp Cap (vph)	406	390						1394		137	1963	
v/s Ratio Prot								c0.25		c0.07	0.26	
v/s Ratio Perm	c0.24	0.18										
v/c Ratio	0.87	0.68						0.57		0.82	0.44	
Uniform Delay, d1	31.4	29.4						19.2		40.4	10.4	
Progression Factor	1.00	1.00						1.00		1.13	1.05	
Incremental Delay, d2	17.9	3.9						1.7		25.4	0.6	
Delay (s)	49.3	33.3						20.9		71.1	11.6	
Level of Service	D	C						C		E	B	
Approach Delay (s)		41.4			0.0			20.9			18.4	
Approach LOS		D			A			C			B	

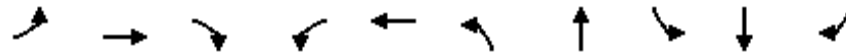
Intersection Summary

HCM Average Control Delay	25.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

11: Anderson & Academy

11/25/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	332	170	272	101	344	216	557	32	1207	456
v/c Ratio	0.89	0.38	0.48	0.42	0.83	0.84	0.31	0.09	0.86	0.54
Control Delay	61.2	42.3	10.2	36.8	70.4	58.6	16.8	13.1	40.2	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.2	42.3	10.2	36.8	70.4	58.6	16.8	13.1	40.2	7.1
Queue Length 50th (ft)	227	119	19	58	146	127	135	11	468	36
Queue Length 95th (ft)	#333	169	67	93	181	#220	155	23	487	79
Internal Link Dist (ft)		21			32		1375		514	
Turn Bay Length (ft)	75			100		100		100		
Base Capacity (vph)	383	471	577	248	435	261	1874	361	1517	889
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	0.87	0.36	0.47	0.41	0.79	0.83	0.30	0.09	0.80	0.51

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

11: Anderson & Academy

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	272	139	223	83	242	40	177	442	15	26	990	374
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	4.0	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	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1583	1765	1500	1583	3281		1583	3337		1583	3353	1500
Flt Permitted	0.21	1.00	1.00	0.65	1.00		0.07	1.00		0.44	1.00	1.00
Satd. Flow (perm)	345	1765	1500	1083	3281		124	3337		739	3353	1500
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	332	170	272	101	295	49	216	539	18	32	1207	456
RTOR Reduction (vph)	0	0	181	0	11	0	0	2	0	0	0	220
Lane Group Flow (vph)	332	170	91	101	333	0	216	555	0	32	1207	236
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)	44.4	31.8	31.8	23.9	15.3		73.9	67.6		56.3	54.0	54.0
Effective Green, g (s)	44.4	31.8	31.8	23.9	15.3		73.9	67.6		56.3	54.0	54.0
Actuated g/C Ratio	0.35	0.25	0.25	0.19	0.12		0.59	0.54		0.45	0.43	0.43
Clearance Time (s)	4.0	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	3.0
Lane Grp Cap (vph)	367	444	378	239	397		256	1786		345	1434	641
v/s Ratio Prot	c0.18	0.10		0.03	0.10		c0.11	0.17		0.00	0.36	
v/s Ratio Perm	c0.14		0.06	0.05			c0.39			0.04		0.16
v/c Ratio	0.90	0.38	0.24	0.42	0.84		0.84	0.31		0.09	0.84	0.37
Uniform Delay, d1	34.5	39.1	37.6	44.3	54.3		35.7	16.4		19.8	32.3	24.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	24.8	0.6	0.3	1.2	14.4		21.6	0.1		0.1	4.7	0.4
Delay (s)	59.3	39.7	38.0	45.5	68.7		57.3	16.5		19.9	37.0	24.9
Level of Service	E	D	D	D	E		E	B		B	D	C
Approach Delay (s)		47.5			63.5			27.9			33.4	
Approach LOS		D			E			C			C	

Intersection Summary

HCM Average Control Delay	38.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	126.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

12: California & WB I-10 Ramps

11/25/2013



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	429	347	485	711	162	194
v/c Ratio	1.11	0.60	1.05	0.90	0.05	0.19
Control Delay	109.9	8.1	82.0	42.9	5.1	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	109.9	8.1	82.0	42.9	5.1	1.4
Queue Length 50th (ft)	~217	0	~232	156	8	0
Queue Length 95th (ft)	#379	64	#403	#254	15	20
Internal Link Dist (ft)	1118			276	113	
Turn Bay Length (ft)						
Base Capacity (vph)	385	578	464	790	3028	1015
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.11	0.60	1.05	0.90	0.05	0.19



















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.

HCM Signalized Intersection Capacity Analysis

12: California & WB I-10 Ramps

11/25/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	396	16	333	466	683	0	0	156	186
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800
Total Lost time (s)					5.0	7.0	6.0	6.0			5.0	5.0
Lane Util. Factor					1.00	1.00	1.00	0.95			0.91	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1684	1500	1583	3353			4818	1500
Flt Permitted					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)					1684	1500	1583	3353			4818	1500
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	412	17	347	485	711	0	0	162	194
RTOR Reduction (vph)	0	0	0	0	0	278	0	0	0	0	0	72
Lane Group Flow (vph)	0	0	0	0	429	69	485	711	0	0	162	122
Turn Type				Perm	NA	Perm	Prot	NA			NA	Perm
Protected Phases					8		5!	6			2!	
Permitted Phases				8		8						2
Actuated Green, G (s)					16.0	16.0	22.5	18.5			46.0	46.0
Effective Green, g (s)					16.0	14.0	20.5	16.5			44.0	44.0
Actuated g/C Ratio					0.23	0.20	0.29	0.24			0.63	0.63
Clearance Time (s)					5.0	5.0	4.0	4.0			3.0	3.0
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					385	300	464	790			3028	943
v/s Ratio Prot							c0.31	c0.21			0.03	
v/s Ratio Perm					0.25	0.05						0.08
v/c Ratio					1.11	0.23	1.05	0.90			0.05	0.13
Uniform Delay, d1					27.0	23.5	24.8	25.9			5.0	5.3
Progression Factor					1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2					80.5	0.1	54.1	15.3			0.0	0.3
Delay (s)					107.5	23.6	78.8	41.3			5.0	5.5
Level of Service					F	C	E	D			A	A
Approach Delay (s)		0.0			70.0			56.5			5.3	
Approach LOS		A			E			E			A	

Intersection Summary

HCM Average Control Delay	53.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

Queues

13: EB I-10 Ramps & California

11/25/2013



Lane Group	EBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	918	668	306	56	503
v/c Ratio	2.71	0.25	0.31	0.55	0.22
Control Delay	795.2	10.8	2.4	60.0	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	795.2	10.8	2.4	60.0	6.0
Queue Length 50th (ft)	~889	68	0	32	51
Queue Length 95th (ft)	#1123	99	39	68	70
Internal Link Dist (ft)	1294	46			276
Turn Bay Length (ft)					
Base Capacity (vph)	339	2726	982	589	2254
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	2.71	0.25	0.31	0.10	0.22


















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.

HCM Signalized Intersection Capacity Analysis

13: EB I-10 Ramps & California

11/25/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	470	1	410	0	0	0	0	641	294	54	483	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800	
Total Lost time (s)		6.0						6.5	6.5	5.5	6.5		
Lane Util. Factor		1.00						0.91	1.00	1.00	0.95		
Frt		0.94						1.00	0.85	1.00	1.00		
Flt Protected		0.97						1.00	1.00	0.95	1.00		
Satd. Flow (prot)		1611						4818	1500	1583	3353		
Flt Permitted		0.97						1.00	1.00	0.95	1.00		
Satd. Flow (perm)		1611						4818	1500	1583	3353		
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	490	1	427	0	0	0	0	668	306	56	503	0	
RTOR Reduction (vph)	0	35	0	0	0	0	0	0	135	0	0	0	
Lane Group Flow (vph)	0	883	0	0	0	0	0	668	171	56	503	0	
Turn Type	Perm	NA						NA	Perm	Prot	NA		
Protected Phases		4						2		1	6		
Permitted Phases	4								2				
Actuated Green, G (s)		19.0						52.2	52.2	6.8	62.5		
Effective Green, g (s)		17.0						50.2	50.2	4.8	60.5		
Actuated g/C Ratio		0.19						0.56	0.56	0.05	0.67		
Clearance Time (s)		4.0						4.5	4.5	3.5	4.5		
Vehicle Extension (s)		2.0						2.0	2.0	2.0	2.0		
Lane Grp Cap (vph)		304						2687	837	84	2254		
v/s Ratio Prot								c0.14		c0.04	0.15		
v/s Ratio Perm		0.55							0.11				
v/c Ratio		2.91						0.25	0.20	0.67	0.22		
Uniform Delay, d1		36.5						10.2	9.9	41.8	5.7		
Progression Factor		1.00						1.00	1.00	1.00	1.00		
Incremental Delay, d2		866.2						0.2	0.6	14.4	0.2		
Delay (s)		902.7						10.4	10.5	56.2	5.9		
Level of Service		F						B	B	E	A		
Approach Delay (s)		902.7			0.0			10.5			11.0		
Approach LOS		F			A			B			B		
Intersection Summary													
HCM Average Control Delay			344.7									HCM Level of Service	F
HCM Volume to Capacity ratio			0.90										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	18.0
Intersection Capacity Utilization			92.4%									ICU Level of Service	F
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

14: California & Shopping Center

11/25/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	1	76	798	18	181	662
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1	84	887	20	201	736
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			652			447
pX, platoon unblocked						
vC, conflicting volume	1667	306			907	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1667	306			907	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	88			73	
cM capacity (veh/h)	64	690			746	

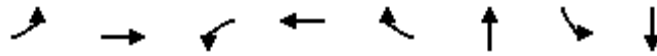
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	86	355	355	197	201	368	368
Volume Left	1	0	0	0	201	0	0
Volume Right	84	0	0	20	0	0	0
cSH	612	1700	1700	1700	746	1700	1700
Volume to Capacity	0.14	0.21	0.21	0.12	0.27	0.22	0.22
Queue Length 95th (ft)	12	0	0	0	27	0	0
Control Delay (s)	11.8	0.0	0.0	0.0	11.6	0.0	0.0
Lane LOS	B				B		
Approach Delay (s)	11.8	0.0			2.5		
Approach LOS	B						

Intersection Summary			
Average Delay		1.7	
Intersection Capacity Utilization	42.9%		ICU Level of Service A
Analysis Period (min)		15	

Queues

15: California/California & W Redlands

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	103	359	46	296	322	523	309	401
v/c Ratio	0.76	0.64	0.52	0.74	0.70	0.95	0.79	0.93
Control Delay	89.1	39.1	78.8	65.6	14.2	71.2	60.0	75.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	89.1	39.1	78.8	65.6	14.2	71.2	60.0	75.5
Queue Length 50th (ft)	85	99	38	126	0	434	237	315
Queue Length 95th (ft)	#163	157	81	180	93	#707	#380	#523
Internal Link Dist (ft)		1468		1180		268		572
Turn Bay Length (ft)	90		150		100			
Base Capacity (vph)	174	609	174	499	497	550	435	477
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.59	0.26	0.59	0.65	0.95	0.71	0.84

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

15: California/California & W Redlands

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	99	200	145	44	284	309	103	385	14	297	306	79
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1800	1800	1800	1700	1800	1800
Total Lost time (s)	6.5	7.7		6.5	7.7	7.7		7.2		7.2	7.2	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00		1.00	1.00	
Frt	1.00	0.94		1.00	1.00	0.85		1.00		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	1.00	
Satd. Flow (prot)	1583	3141		1583	3353	1500		1740		1583	1711	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.99		0.95	1.00	
Satd. Flow (perm)	1583	3141		1583	3353	1500		1740		1583	1711	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	103	208	151	46	296	322	107	401	15	309	319	82
RTOR Reduction (vph)	0	99	0	0	0	284	0	1	0	0	7	0
Lane Group Flow (vph)	103	260	0	46	296	38	0	522	0	309	394	0
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases						6						
Actuated Green, G (s)	12.7	20.4		9.0	16.7	16.7		41.1		32.6	32.6	
Effective Green, g (s)	10.7	18.4		7.0	14.7	14.7		39.1		30.6	30.6	
Actuated g/C Ratio	0.09	0.15		0.06	0.12	0.12		0.32		0.25	0.25	
Clearance Time (s)	4.5	5.7		4.5	5.7	5.7		5.2		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	137	467		90	398	178		550		392	423	
v/s Ratio Prot	c0.07	c0.08		0.03	c0.09			c0.30		0.20	c0.23	
v/s Ratio Perm						0.03						
v/c Ratio	0.75	0.56		0.51	0.74	0.21		0.95		0.79	0.93	
Uniform Delay, d1	55.2	48.9		56.7	52.7	49.3		41.3		43.5	45.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	20.5	1.4		4.8	7.4	0.6		26.0		10.1	27.3	
Delay (s)	75.7	50.3		61.5	60.0	49.9		67.3		53.6	72.9	
Level of Service	E	D		E	E	D		E		D	E	
Approach Delay (s)		56.0			55.2			67.3			64.5	
Approach LOS		E			E			E			E	

Intersection Summary

HCM Average Control Delay	60.8	HCM Level of Service	E
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	123.7	Sum of lost time (s)	36.3
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

16: Alabama St & WB I-10 Ramps

11/25/2013



Lane Group	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	843	390	498	527
v/c Ratio	1.13	0.86	0.24	0.56
Control Delay	108.1	51.8	8.4	32.1
Queue Delay	0.0	0.1	0.0	0.0
Total Delay	108.1	51.9	8.4	32.1
Queue Length 50th (ft)	~317	234	66	136
Queue Length 95th (ft)	#442	308	91	#233
Internal Link Dist (ft)	765		376	271
Turn Bay Length (ft)				
Base Capacity (vph)	749	649	2112	947
Starvation Cap Reductn	0	13	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.13	0.61	0.24	0.56
























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.

HCM Signalized Intersection Capacity Analysis

16: Alabama St & WB I-10 Ramps

11/25/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations					  		 	  			  		
Volume (vph)	0	0	0	252	314	201	355	453	0	0	346	134	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800	
Total Lost time (s)					6.5		6.0	8.0			8.0		
Lane Util. Factor					0.95		1.00	0.95			0.95		
Flt					0.96		1.00	1.00			0.96		
Flt Protected					0.98		0.95	1.00			1.00		
Satd. Flow (prot)					3169		1583	3353			3213		
Flt Permitted					0.98		0.95	1.00			1.00		
Satd. Flow (perm)					3169		1583	3353			3213		
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	0.91	
Adj. Flow (vph)	0	0	0	277	345	221	390	498	0	0	380	147	
RTOR Reduction (vph)	0	0	0	0	36	0	0	0	0	0	34	0	
Lane Group Flow (vph)	0	0	0	0	807	0	390	498	0	0	493	0	
Turn Type				Perm	NA		Prot	NA			NA		
Protected Phases					4		1	6			2		
Permitted Phases				4									
Actuated Green, G (s)					24.5		30.6	65.0			30.4		
Effective Green, g (s)					22.5		28.6	63.0			28.4		
Actuated g/C Ratio					0.22		0.29	0.63			0.28		
Clearance Time (s)					4.5		4.0	6.0			6.0		
Vehicle Extension (s)					3.0		3.0	3.0			3.0		
Lane Grp Cap (vph)					713		453	2112			912		
v/s Ratio Prot							c0.25	0.15			c0.15		
v/s Ratio Perm					0.25								
v/c Ratio					1.13		0.86	0.24			0.54		
Uniform Delay, d1					38.8		33.8	8.0			30.3		
Progression Factor					1.00		1.00	1.00			1.00		
Incremental Delay, d2					76.4		15.3	0.3			2.3		
Delay (s)					115.1		49.1	8.3			32.6		
Level of Service					F		D	A			C		
Approach Delay (s)		0.0			115.1			26.2			32.6		
Approach LOS		A			F			C			C		
Intersection Summary													
HCM Average Control Delay			60.9		HCM Level of Service				E				
HCM Volume to Capacity ratio			0.82										
Actuated Cycle Length (s)			100.0		Sum of lost time (s)				20.5				
Intersection Capacity Utilization			77.4%		ICU Level of Service				D				
Analysis Period (min)			15										
c	Critical Lane Group												

Queues

17: EB I-10 Ramps & Alabama St

11/25/2013



















Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	706	827	57	630
v/c Ratio	0.87	0.49	0.56	0.30
Control Delay	34.1	17.2	61.0	8.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	34.1	17.2	61.0	8.6
Queue Length 50th (ft)	138	152	32	75
Queue Length 95th (ft)	180	258	68	131
Internal Link Dist (ft)	622	505		376
Turn Bay Length (ft)				
Base Capacity (vph)	1064	1697	158	2134
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.66	0.49	0.36	0.30

Intersection Summary

HCM Signalized Intersection Capacity Analysis

17: EB I-10 Ramps & Alabama St

11/25/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	238	2	389	0	0	0	0	612	124	51	561	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800	
Total Lost time (s)		7.0						8.0		6.0	7.0		
Lane Util. Factor		0.95						0.95		1.00	0.95		
Frt		0.91						0.97		1.00	1.00		
Flt Protected		0.98						1.00		0.95	1.00		
Satd. Flow (prot)		2985						3268		1583	3353		
Flt Permitted		0.98						1.00		0.95	1.00		
Satd. Flow (perm)		2985						3268		1583	3353		
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	
Adj. Flow (vph)	267	2	437	0	0	0	0	688	139	57	630	0	
RTOR Reduction (vph)	0	191	0	0	0	0	0	15	0	0	0	0	
Lane Group Flow (vph)	0	515	0	0	0	0	0	812	0	57	630	0	
Turn Type	Perm	NA						NA		Prot	NA		
Protected Phases		8						6		5	2		
Permitted Phases	8												
Actuated Green, G (s)		20.7						47.5		6.8	59.3		
Effective Green, g (s)		18.7						45.5		4.8	57.3		
Actuated g/C Ratio		0.21						0.51		0.05	0.64		
Clearance Time (s)		5.0						6.0		4.0	5.0		
Vehicle Extension (s)		2.0						2.0		2.0	2.0		
Lane Grp Cap (vph)		620						1652		84	2135		
v/s Ratio Prot								c0.25		c0.04	0.19		
v/s Ratio Perm		0.17											
v/c Ratio		0.83						0.49		0.68	0.30		
Uniform Delay, d1		34.1						14.6		41.8	7.3		
Progression Factor		1.00						1.00		1.00	1.00		
Incremental Delay, d2		8.9						1.0		15.7	0.4		
Delay (s)		43.0						15.7		57.6	7.7		
Level of Service		D						B		E	A		
Approach Delay (s)		43.0			0.0			15.7			11.8		
Approach LOS		D			A			B			B		
Intersection Summary													
HCM Average Control Delay			23.2									HCM Level of Service	C
HCM Volume to Capacity ratio			0.60										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	21.0
Intersection Capacity Utilization			77.4%									ICU Level of Service	D
Analysis Period (min)			15										
c	Critical Lane Group												

Queues

18: Alabama St & Industrial Park

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	55	43	18	70	22	692	76	820	118
v/c Ratio	0.22	0.16	0.08	0.26	0.12	0.58	0.32	0.62	0.19
Control Delay	22.0	12.6	20.6	12.5	24.3	14.3	23.7	13.3	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.0	12.6	20.6	12.5	24.3	14.3	23.7	13.3	7.1
Queue Length 50th (ft)	13	3	4	4	5	76	18	88	11
Queue Length 95th (ft)	45	27	21	35	26	146	58	160	39
Internal Link Dist (ft)		298		379		236		505	
Turn Bay Length (ft)	100		50		150		215		55
Base Capacity (vph)	1034	984	1034	993	775	2546	775	2560	1158
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.04	0.02	0.07	0.03	0.27	0.10	0.32	0.10

Intersection Summary

HCM Signalized Intersection Capacity Analysis

18: Alabama St & Industrial Park

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	51	10	29	17	17	48	20	612	25	70	754	109
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.2	6.2		6.2	6.2		6.0	6.2		6.0	6.2	6.2
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.89		1.00	0.89		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1583	1568		1583	1568		1583	3333		1583	3353	1500
Flt Permitted	1.00	1.00		1.00	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1667	1568		1667	1568		1583	3333		1583	3353	1500
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	55	11	32	18	18	52	22	665	27	76	820	118
RTOR Reduction (vph)	0	30	0	0	49	0	0	3	0	0	0	32
Lane Group Flow (vph)	55	13	0	18	21	0	22	689	0	76	820	86
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4								2
Actuated Green, G (s)	4.6	4.6		4.6	4.6		6.9	17.1		8.5	18.7	18.7
Effective Green, g (s)	2.6	2.6		2.6	2.6		4.9	15.1		6.5	16.7	16.7
Actuated g/C Ratio	0.06	0.06		0.06	0.06		0.12	0.35		0.15	0.39	0.39
Clearance Time (s)	4.2	4.2		4.2	4.2		4.0	4.2		4.0	4.2	4.2
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)	102	96		102	96		182	1181		242	1314	588
v/s Ratio Prot		0.01			0.01		0.01	0.21		c0.05	c0.24	
v/s Ratio Perm	c0.03			0.01								0.06
v/c Ratio	0.54	0.13		0.18	0.22		0.12	0.58		0.31	0.62	0.15
Uniform Delay, d1	19.4	18.9		19.0	19.0		16.9	11.2		16.1	10.4	8.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.4	0.6		0.8	1.2		0.3	0.7		0.7	0.9	0.1
Delay (s)	24.8	19.6		19.8	20.2		17.2	11.9		16.8	11.4	8.5
Level of Service	C	B		B	C		B	B		B	B	A
Approach Delay (s)		22.5			20.1			12.1			11.4	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	42.6	Sum of lost time (s)	12.2
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

19: Alabama St & W Redlands

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	153	294	72	386	88	495	88	726
v/c Ratio	0.54	0.61	0.25	0.79	0.25	0.68	0.25	0.98
Control Delay	47.7	44.9	40.7	51.4	36.9	42.2	36.9	68.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.7	44.9	40.7	51.4	36.9	42.2	36.9	68.4
Queue Length 50th (ft)	93	91	41	120	48	155	48	240
Queue Length 95th (ft)	170	135	89	172	98	228	98	#400
Internal Link Dist (ft)		1247		345		380		164
Turn Bay Length (ft)	240		290		115		75	
Base Capacity (vph)	283	964	283	963	348	733	348	739
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.30	0.25	0.40	0.25	0.68	0.25	0.98

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

19: Alabama St & W Redlands

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	138	223	41	65	265	83	79	399	47	79	475	178
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	5.5	6.9		5.5	6.9		6.2	6.2		6.2	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.96		1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3274		1583	3233		1583	3300		1583	3216	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	3274		1583	3233		1583	3300		1583	3216	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	153	248	46	72	294	92	88	443	52	88	528	198
RTOR Reduction (vph)	0	15	0	0	29	0	0	7	0	0	31	0
Lane Group Flow (vph)	153	279	0	72	357	0	88	488	0	88	695	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases												
Actuated Green, G (s)	20.5	16.7		20.5	16.7		24.8	24.8		24.8	24.8	
Effective Green, g (s)	18.5	14.7		18.5	14.7		22.8	22.8		22.8	22.8	
Actuated g/C Ratio	0.18	0.14		0.18	0.14		0.22	0.22		0.22	0.22	
Clearance Time (s)	3.5	4.9		3.5	4.9		4.2	4.2		4.2	4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	283	465		283	459		348	726		348	708	
v/s Ratio Prot	c0.10	0.09		0.05	c0.11		0.06	c0.15		0.06	c0.22	
v/s Ratio Perm												
v/c Ratio	0.54	0.60		0.25	0.78		0.25	0.67		0.25	0.98	
Uniform Delay, d1	38.7	41.7		36.6	42.9		33.4	37.0		33.4	40.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.2	2.2		2.2	8.1		1.7	4.9		1.7	29.6	
Delay (s)	45.9	43.9		38.8	51.0		35.1	41.9		35.1	69.8	
Level of Service	D	D		D	D		D	D		D	E	
Approach Delay (s)		44.6			49.0			40.9			66.0	
Approach LOS		D			D			D			E	

Intersection Summary

HCM Average Control Delay	52.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	103.6	Sum of lost time (s)	24.8
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues

20: Tennessee & Redlands

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	14	152	39	297	719	774
v/c Ratio	0.17	0.41	0.36	0.70	0.96	0.85
Control Delay	41.8	30.5	45.8	38.7	57.3	38.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.8	30.5	45.8	38.7	57.3	38.9
Queue Length 50th (ft)	7	30	19	66	187	191
Queue Length 95th (ft)	25	58	49	105	#318	#306
Internal Link Dist (ft)		2241		737	458	48
Turn Bay Length (ft)	145		140			
Base Capacity (vph)	364	1233	364	1232	750	911
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.12	0.11	0.24	0.96	0.85

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

20: Tennessee & Redlands

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↗	↖
Volume (vph)	12	105	29	34	195	66	48	564	20	127	538	17
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.5	6.9		5.5	6.9			6.9			6.9	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frt	1.00	0.97		1.00	0.96			1.00			1.00	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1583	3244		1583	3226			3324			3310	
Flt Permitted	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (perm)	1583	3244		1583	3226			3324			3310	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	14	119	33	39	222	75	55	641	23	144	611	19
RTOR Reduction (vph)	0	27	0	0	34	0	0	2	0	0	1	0
Lane Group Flow (vph)	14	125	0	39	263	0	0	717	0	0	773	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases												
Actuated Green, G (s)	6.3	10.6		7.5	11.8			20.1			24.1	
Effective Green, g (s)	4.3	8.6		5.5	9.8			18.1			22.1	
Actuated g/C Ratio	0.05	0.11		0.07	0.12			0.22			0.27	
Clearance Time (s)	3.5	4.9		3.5	4.9			4.9			4.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	85	347		108	393			747			909	
v/s Ratio Prot	0.01	0.04		c0.02	c0.08			c0.22			c0.23	
v/s Ratio Perm												
v/c Ratio	0.16	0.36		0.36	0.67			0.96			0.85	
Uniform Delay, d1	36.4	33.4		35.8	33.8			30.8			27.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.9	0.6		2.1	4.3			23.6			7.5	
Delay (s)	37.3	34.0		37.9	38.1			54.4			35.1	
Level of Service	D	C		D	D			D			D	
Approach Delay (s)		34.3			38.1			54.4			35.1	
Approach LOS		C			D			D			D	

Intersection Summary

HCM Average Control Delay	42.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	80.5	Sum of lost time (s)	19.3
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

21: Texas & Stuart

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	24	4	27	15	28	12	57	278	19	27	389	84
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	28	5	32	18	33	14	67	327	22	32	458	99
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	899	1054	278	799	1092	175	556			349		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	899	1054	278	799	1092	175	556			349		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	85	98	96	93	83	98	93			97		
cM capacity (veh/h)	186	204	719	242	194	838	1010			1206		

















Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	65	65	231	186	261	328
Volume Left	28	18	67	0	32	0
Volume Right	32	14	0	22	0	99
cSH	296	249	1010	1700	1206	1700
Volume to Capacity	0.22	0.26	0.07	0.11	0.03	0.19
Queue Length 95th (ft)	20	25	5	0	2	0
Control Delay (s)	20.5	24.5	3.0	0.0	1.2	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	20.5	24.5	1.7		0.5	
Approach LOS	C	C				

Intersection Summary		
Average Delay		3.5
Intersection Capacity Utilization	46.0%	ICU Level of Service
Analysis Period (min)		15
		A

HCM Unsignalized Intersection Capacity Analysis

22: Texas & Oriental

11/25/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	3	5	21	1	11	2	497	14	4	342	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	7	3	6	23	1	12	2	552	16	4	380	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	684	963	192	771	957	284	383			568		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	684	963	192	771	957	284	383			568		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	99	99	92	100	98	100			100		
cM capacity (veh/h)	326	253	818	284	255	713	1172			1000		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	16	37	278	292	194	193						
Volume Left	7	23	2	0	4	0						
Volume Right	6	12	0	16	0	3						
cSH	385	353	1172	1700	1000	1700						
Volume to Capacity	0.04	0.10	0.00	0.17	0.00	0.11						
Queue Length 95th (ft)	3	9	0	0	0	0						
Control Delay (s)	14.7	16.4	0.1	0.0	0.2	0.0						
Lane LOS	B	C	A		A							
Approach Delay (s)	14.7	16.4	0.0		0.1							
Approach LOS	B	C										
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			26.4%	ICU Level of Service	A							
Analysis Period (min)			15									

Queues

23: Eureka & EB I-10 off/Pearl

11/25/2013



Lane Group	EBT	EBR	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	560	532	41	10	34	69	48
v/c Ratio	0.91	0.61	0.43	0.05	0.06	0.12	0.08
Control Delay	48.4	5.1	49.1	17.0	29.8	9.2	29.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.4	5.1	49.1	17.0	29.8	9.2	29.6
Queue Length 50th (ft)	305	0	22	0	16	0	22
Queue Length 95th (ft)	#468	62	54	14	44	36	56
Internal Link Dist (ft)	447				545		418
Turn Bay Length (ft)				75			
Base Capacity (vph)	700	919	136	308	618	570	611
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.58	0.30	0.03	0.06	0.12	0.08

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

23: Eureka & EB I-10 off/Pearl

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖		↗		↑	↗		↕	
Volume (vph)	84	443	500	39	0	9	0	32	65	4	41	0
Ideal Flow (vphpl)	1800	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		7.0	7.0	6.0		6.0		7.0	7.0		7.0	
Lane Util. Factor		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.99	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1751	1500	1583		1500		1765	1500		1757	
Flt Permitted		0.99	1.00	0.41		1.00		1.00	1.00		0.99	
Satd. Flow (perm)		1751	1500	680		1500		1765	1500		1743	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	89	471	532	41	0	10	0	34	69	4	44	0
RTOR Reduction (vph)	0	0	344	0	0	9	0	0	46	0	0	0
Lane Group Flow (vph)	0	560	188	41	0	1	0	34	23	0	48	0
Turn Type	Perm	NA	Perm	custom		custom		NA	Perm	Perm	NA	
Protected Phases		4						2				6
Permitted Phases	4		4	3		3			2	6		
Actuated Green, G (s)		35.6	35.6	11.8		11.8		33.6	33.6		33.6	
Effective Green, g (s)		33.6	33.6	9.8		9.8		31.6	31.6		31.6	
Actuated g/C Ratio		0.35	0.35	0.10		0.10		0.33	0.33		0.33	
Clearance Time (s)		5.0	5.0	4.0		4.0		5.0	5.0		5.0	
Vehicle Extension (s)		2.0	2.0	2.0		2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)		619	531	70		155		587	499		580	
v/s Ratio Prot								0.02				
v/s Ratio Perm		0.32	0.13	c0.06		0.00			0.02		c0.03	
v/c Ratio		0.90	0.35	0.59		0.01		0.06	0.05		0.08	
Uniform Delay, d1		29.2	22.7	40.7		38.2		21.6	21.5		21.8	
Progression Factor		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Incremental Delay, d2		16.4	0.1	7.8		0.0		0.2	0.2		0.3	
Delay (s)		45.6	22.8	48.5		38.2		21.8	21.7		22.0	
Level of Service		D	C	D		D		C	C		C	
Approach Delay (s)		34.5			46.5			21.7			22.0	
Approach LOS		C			D			C			C	

Intersection Summary

HCM Average Control Delay	33.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

24: Eureka & Stuart

11/25/2013



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	34	19	9	93	26	618
v/c Ratio	0.14	0.08	0.04	0.08	0.06	0.51
Control Delay	11.3	10.3	5.5	5.2	5.5	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.3	10.3	5.5	5.2	5.5	7.8
Queue Length 50th (ft)	4	2	1	3	2	27
Queue Length 95th (ft)	16	11	4	9	8	50
Internal Link Dist (ft)	380	399		136		545
Turn Bay Length (ft)			20		20	
Base Capacity (vph)	1467	1459	697	3329	1153	3309
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.01	0.01	0.03	0.02	0.19

Intersection Summary

HCM Signalized Intersection Capacity Analysis

24: Eureka & Stuart

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (vph)	14	14	2	7	7	3	8	79	4	23	502	48
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.98		1.00	0.99		1.00	0.99	
Flt Protected		0.98			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1709			1687		1583	3328		1582	3309	
Flt Permitted		0.84			0.85		0.42	1.00		0.69	1.00	
Satd. Flow (perm)		1470			1461		696	3328		1155	3309	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	16	16	2	8	8	3	9	89	4	26	564	54
RTOR Reduction (vph)	0	2	0	0	3	0	0	3	0	0	6	0
Lane Group Flow (vph)	0	32	0	0	16	0	9	90	0	26	612	0
Confl. Peds. (#/hr)	1		2	2		1			1	1		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.3			6.3		11.6	11.6		11.6	11.6	
Effective Green, g (s)		4.3			4.3		9.6	9.6		9.6	9.6	
Actuated g/C Ratio		0.17			0.17		0.37	0.37		0.37	0.37	
Clearance Time (s)		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	
Lane Grp Cap (vph)		244			243		258	1234		428	1227	
v/s Ratio Prot								0.03			c0.18	
v/s Ratio Perm		c0.02			0.01		0.01			0.02		
v/c Ratio		0.13			0.07		0.03	0.07		0.06	0.50	
Uniform Delay, d1		9.2			9.1		5.2	5.3		5.2	6.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.1		0.1	0.0		0.1	0.3	
Delay (s)		9.5			9.2		5.3	5.3		5.3	6.6	
Level of Service		A			A		A	A		A	A	
Approach Delay (s)		9.5			9.2			5.3			6.6	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	25.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	30.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
25: Eureka & Oriental

11/25/2013



Lane Group	EBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	14	6	99	9	569
v/c Ratio	0.07	0.02	0.06	0.02	0.34
Control Delay	11.8	4.6	4.5	4.5	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.8	4.6	4.5	4.5	5.6
Queue Length 50th (ft)	1	1	4	1	27
Queue Length 95th (ft)	10	3	10	4	45
Internal Link Dist (ft)	432		184		93
Turn Bay Length (ft)		25		40	
Base Capacity (vph)	757	387	1777	610	1765
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.02	0.02	0.06	0.01	0.32

Intersection Summary

HCM Signalized Intersection Capacity Analysis

25: Eureka & Oriental

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (vph)	5	2	5	0	0	0	5	87	1	8	463	44
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.2					6.2	6.2		6.2	6.2	
Lane Util. Factor		1.00					1.00	0.95		1.00	0.95	
Frbp, ped/bikes		0.99					1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99					1.00	1.00		1.00	1.00	
Frt		0.94					1.00	1.00		1.00	0.99	
Flt Protected		0.98					0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1609					1582	3347		1582	3303	
Flt Permitted		0.86					0.44	1.00		0.69	1.00	
Satd. Flow (perm)		1415					730	3347		1149	3303	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	6	2	6	0	0	0	6	98	1	9	520	49
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	11	0
Lane Group Flow (vph)	0	9	0	0	0	0	6	99	0	9	558	0
Confl. Peds. (#/hr)	6		1	1		6	2		1	1		2
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	
Protected Phases		1			5			7				3
Permitted Phases	1			5			7			3		
Actuated Green, G (s)		7.0					20.0	20.0		20.0	20.0	
Effective Green, g (s)		5.0					18.0	18.0		18.0	18.0	
Actuated g/C Ratio		0.14					0.51	0.51		0.51	0.51	
Clearance Time (s)		4.2					4.2	4.2		4.2	4.2	
Vehicle Extension (s)		2.5					2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		200					371	1702		584	1679	
v/s Ratio Prot								0.03			c0.17	
v/s Ratio Perm		c0.01					0.01			0.01		
v/c Ratio		0.04					0.02	0.06		0.02	0.33	
Uniform Delay, d1		13.1					4.3	4.4		4.3	5.1	
Progression Factor		1.00					1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1					0.0	0.0		0.0	0.1	
Delay (s)		13.2					4.3	4.4		4.3	5.2	
Level of Service		B					A	A		A	A	
Approach Delay (s)		13.2			0.0			4.4			5.2	
Approach LOS		B			A			A			A	

Intersection Summary

HCM Average Control Delay	5.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	35.4	Sum of lost time (s)	12.4
Intersection Capacity Utilization	32.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

26: Eureka & Redlands

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	10	176	12	389	123	460
v/c Ratio	0.07	0.26	0.08	0.56	0.16	0.60
Control Delay	22.3	15.5	22.5	19.1	11.5	16.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.3	15.5	22.5	19.1	11.5	16.5
Queue Length 50th (ft)	2	17	3	42	10	45
Queue Length 95th (ft)	15	44	17	91	27	93
Internal Link Dist (ft)		660		354	209	138
Turn Bay Length (ft)	35		40			
Base Capacity (vph)	691	2410	691	2416	1595	1584
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.07	0.02	0.16	0.08	0.29

Intersection Summary

HCM Signalized Intersection Capacity Analysis

26: Eureka & Redlands

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↗	↖
Volume (vph)	9	152	10	11	342	16	12	85	17	58	281	85
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7	6.6		5.7	6.6			6.2			6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.98			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1583	3318		1583	3329			3256			3222	
Flt Permitted	0.95	1.00		0.95	1.00			0.89			0.89	
Satd. Flow (perm)	1583	3318		1583	3329			2915			2883	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	165	11	12	372	17	13	92	18	63	305	92
RTOR Reduction (vph)	0	6	0	0	4	0	0	13	0	0	24	0
Lane Group Flow (vph)	10	170	0	12	385	0	0	110	0	0	436	0
Confl. Peds. (#/hr)	3		7	7		3	2		1	1		2
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			4	
Permitted Phases							4			4		
Actuated Green, G (s)	6.0	10.9		6.1	11.0			13.2			13.2	
Effective Green, g (s)	4.0	8.9		4.1	9.0			11.2			11.2	
Actuated g/C Ratio	0.09	0.21		0.10	0.21			0.26			0.26	
Clearance Time (s)	3.7	4.6		3.7	4.6			4.2			4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	148	692		152	702			765			756	
v/s Ratio Prot	0.01	0.05		c0.01	c0.12							
v/s Ratio Perm								0.04			c0.15	
v/c Ratio	0.07	0.25		0.08	0.55			0.14			0.58	
Uniform Delay, d1	17.6	14.1		17.6	15.0			12.1			13.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	0.2		0.2	0.9			0.1			1.1	
Delay (s)	17.8	14.3		17.8	15.9			12.2			14.8	
Level of Service	B	B		B	B			B			B	
Approach Delay (s)		14.5			16.0			12.2			14.8	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	42.7	Sum of lost time (s)	11.9
Intersection Capacity Utilization	38.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
27: Orange & Colton

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	57	203	221	263	92	14	246	86	677
v/c Ratio	0.27	0.45	0.86	0.59	0.20	0.04	0.13	0.15	0.35
Control Delay	21.8	18.9	53.6	27.2	5.4	9.4	7.2	9.9	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.8	18.9	53.6	27.2	5.4	9.4	7.2	9.9	9.4
Queue Length 50th (ft)	19	56	89	97	0	2	20	16	74
Queue Length 95th (ft)	43	99	#158	148	28	12	43	45	128
Internal Link Dist (ft)		502		260			472		133
Turn Bay Length (ft)	50		65		65	50		75	
Base Capacity (vph)	285	601	347	605	575	365	1899	574	1909
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.34	0.64	0.43	0.16	0.04	0.13	0.15	0.35

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

27: Orange & Colton

11/25/2013



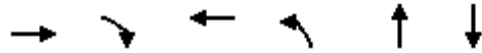
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↑	↗	↖	↕		↖	↕	
Volume (vph)	51	119	64	199	237	83	13	188	33	77	550	59
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1672		1583	1765	1500	1583	3277		1583	3304	
Flt Permitted	0.50	1.00		0.61	1.00	1.00	0.38	1.00		0.60	1.00	
Satd. Flow (perm)	831	1672		1013	1765	1500	635	3277		998	3304	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	57	132	71	221	263	92	14	209	37	86	611	66
RTOR Reduction (vph)	0	31	0	0	0	69	0	16	0	0	10	0
Lane Group Flow (vph)	57	172	0	221	263	23	14	230	0	86	667	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	19.8	19.8		19.8	19.8	19.8	42.2	42.2		42.2	42.2	
Effective Green, g (s)	17.8	17.8		17.8	17.8	17.8	40.2	40.2		40.2	40.2	
Actuated g/C Ratio	0.25	0.25		0.25	0.25	0.25	0.57	0.57		0.57	0.57	
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	3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	211	425		258	449	381	365	1882		573	1897	
v/s Ratio Prot		0.10			0.15			0.07			c0.20	
v/s Ratio Perm	0.07			c0.22		0.02	0.02			0.09		
v/c Ratio	0.27	0.40		0.86	0.59	0.06	0.04	0.12		0.15	0.35	
Uniform Delay, d1	20.9	21.7		24.9	22.9	19.8	6.5	6.8		6.9	7.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.6		23.3	2.0	0.1	0.2	0.1		0.6	0.5	
Delay (s)	21.6	22.3		48.2	24.8	19.8	6.7	7.0		7.5	8.5	
Level of Service	C	C		D	C	B	A	A		A	A	
Approach Delay (s)		22.2			33.0			6.9			8.4	
Approach LOS		C			C			A			A	

Intersection Summary

HCM Average Control Delay	17.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
28: Pearl & Orange

11/25/2013



Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	470	114	310	2	725	323
v/c Ratio	0.81	0.17	0.41	0.01	0.63	0.30
Control Delay	30.2	9.8	8.5	10.5	17.3	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.2	9.8	8.5	10.5	17.3	13.0
Queue Length 50th (ft)	126	15	29	0	101	37
Queue Length 95th (ft)	#360	53	104	4	144	62
Internal Link Dist (ft)	445		279		526	472
Turn Bay Length (ft)		20		75		
Base Capacity (vph)	583	675	755	574	2074	1922
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.17	0.41	0.00	0.35	0.17

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

28: Pearl & Orange

11/25/2013



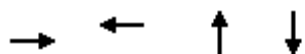
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↗			↖↗	
Volume (vph)	171	271	107	16	41	234	2	670	11	9	279	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95			0.95	
Frt		1.00	0.85		0.89		1.00	1.00			0.99	
Flt Protected		0.98	1.00		1.00		0.95	1.00			1.00	
Satd. Flow (prot)		1731	1500		1569		1583	3345			3323	
Flt Permitted		0.76	1.00		0.97		0.56	1.00			0.93	
Satd. Flow (perm)		1334	1500		1524		927	3345			3097	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	182	288	114	17	44	249	2	713	12	10	297	16
RTOR Reduction (vph)	0	0	19	0	89	0	0	2	0	0	7	0
Lane Group Flow (vph)	0	470	95	0	221	0	2	723	0	0	316	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4			2			2		
Actuated Green, G (s)		26.3	26.3		26.3		21.2	21.2			21.2	
Effective Green, g (s)		24.3	24.3		24.3		19.2	19.2			19.2	
Actuated g/C Ratio		0.44	0.44		0.44		0.35	0.35			0.35	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.5	3.5			3.5	
Lane Grp Cap (vph)		584	657		667		321	1157			1071	
v/s Ratio Prot								c0.22				
v/s Ratio Perm		c0.35	0.06		0.15		0.00				0.10	
v/c Ratio		0.80	0.14		0.33		0.01	0.62			0.30	
Uniform Delay, d1		13.5	9.4		10.3		11.9	15.1			13.2	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		7.9	0.1		0.3		0.0	1.1			0.2	
Delay (s)		21.5	9.5		10.6		11.9	16.3			13.4	
Level of Service		C	A		B		B	B			B	
Approach Delay (s)		19.1			10.6			16.2			13.4	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	15.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	55.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues
29: Orange & Stuart

11/25/2013



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	32	72	730	353
v/c Ratio	0.12	0.28	0.61	0.30
Control Delay	9.0	11.2	9.2	6.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.0	11.2	9.2	6.6
Queue Length 50th (ft)	2	6	35	15
Queue Length 95th (ft)	15	28	72	34
Internal Link Dist (ft)	305	198	150	526
Turn Bay Length (ft)				
Base Capacity (vph)	687	659	3018	3032
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.05	0.11	0.24	0.12
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

29: Orange & Stuart

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	8	6	17	34	9	26	5	637	51	3	327	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.2			6.2			6.2			6.2	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frbp, ped/bikes		0.99			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.92			0.95			0.99			1.00	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1599			1626			3309			3342	
Flt Permitted		0.89			0.83			0.95			0.95	
Satd. Flow (perm)		1443			1375			3151			3168	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	6	18	36	9	27	5	671	54	3	344	6
RTOR Reduction (vph)	0	15	0	0	22	0	0	14	0	0	3	0
Lane Group Flow (vph)	0	17	0	0	50	0	0	716	0	0	350	0
Confl. Peds. (#/hr)	4		2	2		4	3		2	2		3
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.9			6.9			12.5			12.5	
Effective Green, g (s)		4.9			4.9			10.5			10.5	
Actuated g/C Ratio		0.18			0.18			0.38			0.38	
Clearance Time (s)		4.2			4.2			4.2			4.2	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		254			242			1190			1197	
v/s Ratio Prot												
v/s Ratio Perm		0.01			0.04			0.23			0.11	
v/c Ratio		0.07			0.21			0.60			0.29	
Uniform Delay, d1		9.5			9.8			7.0			6.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.4			0.9			0.1	
Delay (s)		9.7			10.2			7.8			6.2	
Level of Service		A			B			A			A	
Approach Delay (s)		9.7			10.2			7.8			6.2	
Approach LOS		A			B			A			A	

Intersection Summary

HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	27.8	Sum of lost time (s)	12.4
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

30: Orange & Oriental

11/25/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	3	1	1	674	370	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	3	1	1	709	389	1
Pedestrians	2			1		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	4.0			4.0		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				464	395	
pX, platoon unblocked	0.87					
vC, conflicting volume	749	198	393			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	403	198	393			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	497	808	1161			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	4	238	473	260	131
Volume Left	3	1	0	0	0
Volume Right	1	0	0	0	1
cSH	550	1161	1700	1700	1700
Volume to Capacity	0.01	0.00	0.28	0.15	0.08
Queue Length 95th (ft)	1	0	0	0	0
Control Delay (s)	11.6	0.0	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	11.6	0.0		0.0	
Approach LOS	B				

Intersection Summary					
Average Delay			0.1		
Intersection Capacity Utilization		30.7%		ICU Level of Service	A
Analysis Period (min)		15			

Queues

31: Orange & Redlands

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	47	154	16	333	35	593	49	330
v/c Ratio	0.32	0.26	0.14	0.60	0.26	0.70	0.32	0.38
Control Delay	34.9	19.1	34.2	24.1	34.7	25.9	34.8	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.9	19.1	34.2	24.1	34.7	25.9	34.8	19.4
Queue Length 50th (ft)	16	18	6	44	12	99	17	47
Queue Length 95th (ft)	54	49	26	100	44	183	55	96
Internal Link Dist (ft)		387		273		223		384
Turn Bay Length (ft)	60		60		75		60	
Base Capacity (vph)	502	2151	502	2124	502	2219	502	2182
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.07	0.03	0.16	0.07	0.27	0.10	0.15

Intersection Summary

HCM Signalized Intersection Capacity Analysis

31: Orange & Redlands

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	43	104	38	15	196	110	32	530	16	45	264	40
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	5.5	6.2		5.5	6.2		5.5	6.2		5.5	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.95		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3219		1583	3157		1583	3337		1583	3281	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	3219		1583	3157		1583	3337		1583	3281	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	47	113	41	16	213	120	35	576	17	49	287	43
RTOR Reduction (vph)	0	30	0	0	66	0	0	1	0	0	9	0
Lane Group Flow (vph)	47	124	0	16	267	0	35	592	0	49	321	0
Confl. Peds. (#/hr)	1					1	3		1	1		3
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	7.8	12.8		6.5	11.5		7.3	17.4		7.9	18.0	
Effective Green, g (s)	5.8	10.8		4.5	9.5		5.3	15.4		5.9	16.0	
Actuated g/C Ratio	0.10	0.18		0.08	0.16		0.09	0.26		0.10	0.27	
Clearance Time (s)	3.5	4.2		3.5	4.2		3.5	4.2		3.5	4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	153	579		119	500		140	856		156	875	
v/s Ratio Prot	c0.03	0.04		0.01	c0.08		0.02	c0.18		c0.03	0.10	
v/s Ratio Perm												
v/c Ratio	0.31	0.21		0.13	0.53		0.25	0.69		0.31	0.37	
Uniform Delay, d1	25.2	21.0		25.9	23.2		25.5	20.2		25.2	17.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.2		0.5	1.1		0.9	2.4		1.2	0.3	
Delay (s)	26.4	21.2		26.4	24.3		26.4	22.6		26.3	18.1	
Level of Service	C	C		C	C		C	C		C	B	
Approach Delay (s)		22.4			24.4			22.8			19.2	
Approach LOS		C			C			C			B	

Intersection Summary

HCM Average Control Delay	22.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	23.4
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

32: 6th St & WB I-10 Ramp

11/25/2013





















Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	183	17	190	0	149	0	0	286	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	0	0	187	17	194	0	152	0	0	292	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	646	444	292	444	444	152	292			152		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	646	444	292	444	444	152	292			152		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	64	97	78	100			100		
cM capacity (veh/h)	293	509	747	524	509	894	1270			1429		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	187	211	152	292
Volume Left	187	0	0	0
Volume Right	0	194	0	0
cSH	524	842	1700	1700
Volume to Capacity	0.36	0.25	0.09	0.17
Queue Length 95th (ft)	40	25	0	0
Control Delay (s)	15.6	10.7	0.0	0.0
Lane LOS	C	B		
Approach Delay (s)	13.0		0.0	0.0
Approach LOS	B			

Intersection Summary			
Average Delay		6.1	
Intersection Capacity Utilization	35.9%		ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
 33: 6th St & EB I-10 Ramp

11/25/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	66	34	171	0	0	0	197	86	30	122	265	95
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	79	40	204	0	0	0	235	102	36	145	315	113
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2						
Volume Total (vph)	119	204	235	138	145	429						
Volume Left (vph)	79	0	235	0	145	0						
Volume Right (vph)	0	204	0	36	0	113						
Hadj (s)	0.36	-0.67	0.53	-0.15	0.53	-0.15						
Departure Headway (s)	7.2	6.2	6.9	6.2	6.6	6.0						
Degree Utilization, x	0.24	0.35	0.45	0.24	0.27	0.71						
Capacity (veh/h)	467	544	497	556	522	586						
Control Delay (s)	11.3	11.3	14.2	9.9	10.9	20.9						
Approach Delay (s)	11.3		12.6		18.4							
Approach LOS	B		B		C							
Intersection Summary												
Delay			14.9									
HCM Level of Service			B									
Intersection Capacity Utilization			48.8%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

34: 6th St & Stuart

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (veh/h)	5	7	13	15	7	60	9	241	6	76	324	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	6	9	17	19	9	78	12	313	8	99	421	16
Pedestrians		1						1			2	
Lane Width (ft)		12.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1048	971	220	770	975	319	437			321		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1048	971	220	770	975	319	437			321		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	96	98	92	96	88	99			92		
cM capacity (veh/h)	145	229	782	256	227	676	1118			1236		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	32	106	12	321	99	281	156
Volume Left	6	19	12	0	99	0	0
Volume Right	17	78	0	8	0	0	16
cSH	306	460	1118	1700	1236	1700	1700
Volume to Capacity	0.11	0.23	0.01	0.19	0.08	0.17	0.09
Queue Length 95th (ft)	9	22	1	0	6	0	0
Control Delay (s)	18.2	15.2	8.3	0.0	8.2	0.0	0.0
Lane LOS	C	C	A		A		
Approach Delay (s)	18.2	15.2	0.3		1.5		
Approach LOS	C	C					

Intersection Summary			
Average Delay		3.1	
Intersection Capacity Utilization	35.8%		ICU Level of Service A
Analysis Period (min)		15	

Queues

35: Redlands Blvd & Citrus Ave

11/25/2013



Lane Group	EBT	WBT	SET	SER	NWT
Lane Group Flow (vph)	480	863	438	43	854
v/c Ratio	0.88	0.86	1.33dl	0.07	1.00
Control Delay	58.8	38.4	34.5	7.9	64.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	58.8	38.4	34.5	7.9	64.5
Queue Length 50th (ft)	152	246	129	0	-322
Queue Length 95th (ft)	161	206	143	14	288
Internal Link Dist (ft)	399	463	375		430
Turn Bay Length (ft)				100	
Base Capacity (vph)	594	1270	664	591	856
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.81	0.68	0.66	0.07	1.00

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

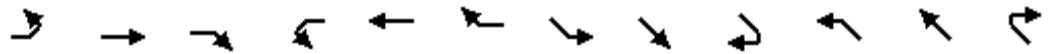
Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

35: Redlands Blvd & Citrus Ave

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕↕			↕↕			↕↕	↗		↕↕	
Volume (vph)	18	217	92	55	300	232	121	177	29	167	379	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.2			6.2	6.2		6.2	
Lane Util. Factor		0.95			0.95			0.95	1.00		0.95	
Frt		0.96			0.94			1.00	0.85		0.99	
Flt Protected		1.00			1.00			0.98	1.00		0.99	
Satd. Flow (prot)		3203			3139			3286	1500		3276	
Flt Permitted		1.00			1.00			0.53	1.00		0.68	
Satd. Flow (perm)		3203			3139			1767	1500		2265	
Peak-hour factor, PHF	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Adj. Flow (vph)	26	319	135	81	441	341	178	260	43	246	557	51
RTOR Reduction (vph)	0	36	0	0	103	0	0	0	27	0	4	0
Lane Group Flow (vph)	0	444	0	0	760	0	0	438	16	0	850	0
Turn Type	Split	NA		Split	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	4	4		1	1			2			2	
Permitted Phases							2		2	2		
Actuated Green, G (s)		18.5			31.9			41.1	41.1		41.1	
Effective Green, g (s)		16.5			29.9			39.1	39.1		39.1	
Actuated g/C Ratio		0.16			0.29			0.38	0.38		0.38	
Clearance Time (s)		4.0			4.2			4.2	4.2		4.2	
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		509			903			665	564		852	
v/s Ratio Prot		c0.14			c0.24							
v/s Ratio Perm								0.25	0.01		c0.38	
v/c Ratio		0.87			0.84			1.33dl	0.03		1.00	
Uniform Delay, d1		42.7			34.8			26.9	20.4		32.4	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		15.1			7.2			2.4	0.0		30.1	
Delay (s)		57.8			42.0			29.2	20.4		62.5	
Level of Service		E			D			C	C		E	
Approach Delay (s)		57.8			42.0			28.4			62.5	
Approach LOS		E			D			C			E	

Intersection Summary

HCM Average Control Delay	48.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	103.9	Sum of lost time (s)	18.4
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

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

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

36: Stuart & Church

11/25/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	22	34	37	259	281	50
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	28	43	47	328	356	63
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	809	387	419			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	809	387	419			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	93	96			
cM capacity (veh/h)	336	661	1140			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	71	375	419			
Volume Left	28	47	0			
Volume Right	43	0	63			
cSH	479	1140	1700			
Volume to Capacity	0.15	0.04	0.25			
Queue Length 95th (ft)	13	3	0			
Control Delay (s)	13.8	1.4	0.0			
Lane LOS	B	A				
Approach Delay (s)	13.8	1.4	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization		48.9%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
 37: Universtiy & WB I-10 Ramp/E Central

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↔			↔	
Volume (veh/h)	0	0	0	0	7	25	429	380	20	6	133	886
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	8	27	466	413	22	7	145	963
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1809	2007	554	1442	2477	217	1108				435	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1809	2007	554	1442	2477	217	1108				435	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	0	100	100	100	0	97	26				99	
cM capacity (veh/h)	0	15	476	36	7	787	626				1121	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2							
Volume Total	35	673	228	79	1035							
Volume Left	0	466	0	7	0							
Volume Right	27	0	22	0	963							
cSH	33	626	1700	1121	1700							
Volume to Capacity	1.06	0.74	0.13	0.01	0.61							
Queue Length 95th (ft)	93	165	0	0	0							
Control Delay (s)	354.9	24.4	0.0	0.7	0.0							
Lane LOS	F	C		A								
Approach Delay (s)	354.9	18.2		0.1								
Approach LOS	F											
Intersection Summary												
Average Delay			14.1									
Intersection Capacity Utilization			72.8%		ICU Level of Service			C				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

38: Universtiy & EB I-10 Ramp

11/25/2013

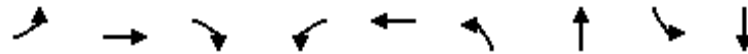


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	277	428	0	623	135	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	334	516	0	751	163	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		12				
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	538	81	163			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	538	81	163			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	29	46	100			
cM capacity (veh/h)	473	962	1414			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	849	375	375	81	81	
Volume Left	334	0	0	0	0	
Volume Right	516	0	0	0	0	
cSH	1204	1700	1700	1700	1700	
Volume to Capacity	0.71	0.22	0.22	0.05	0.05	
Queue Length 95th (ft)	157	0	0	0	0	
Control Delay (s)	19.2	0.0	0.0	0.0	0.0	
Lane LOS	C					
Approach Delay (s)	19.2	0.0		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			9.3			
Intersection Capacity Utilization			42.0%		ICU Level of Service	A
Analysis Period (min)			15			

Queues

39: Tippecanoe & Harriman PI

11/25/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	37	5	196	23	11	100	873	8	689
v/c Ratio	0.24	0.02	0.41	0.15	0.05	0.26	0.32	0.02	0.15
Control Delay	26.8	22.0	7.0	24.7	15.7	4.9	3.1	2.8	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.8	22.0	7.0	24.7	15.7	4.9	3.1	2.8	2.4
Queue Length 50th (ft)	12	2	0	8	1	9	28	1	13
Queue Length 95th (ft)	35	9	26	25	13	32	51	4	25
Internal Link Dist (ft)		525			497		498		774
Turn Bay Length (ft)	280		170	150		260		225	
Base Capacity (vph)	563	794	1230	566	712	387	2744	368	4476
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.01	0.16	0.04	0.02	0.26	0.32	0.02	0.15

Intersection Summary

HCM Signalized Intersection Capacity Analysis

39: Tippecanoe & Harriman PI

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗↘	↖	↗		↖	↖↗↘		↖	↗↘	
Volume (vph)	35	5	186	22	3	8	180	730	15	8	610	45
Ideal Flow (vphpl)	1700	1800	1700	1700	1800	1800	1700	1800	1800	1700	1800	1800
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	0.88	1.00	1.00		0.86	0.86		1.00	0.86	
Frt	1.00	1.00	0.85	1.00	0.89		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.99		0.95	1.00	
Satd. Flow (prot)	1583	1765	2493	1583	1572		1362	4517		1583	6008	
Flt Permitted	0.75	1.00	1.00	0.75	1.00		0.36	0.81		0.30	1.00	
Satd. Flow (perm)	1251	1765	2493	1257	1572		520	3690		495	6008	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	5	196	23	3	8	189	768	16	8	642	47
RTOR Reduction (vph)	0	0	172	0	7	0	0	1	0	0	8	0
Lane Group Flow (vph)	37	5	24	23	4	0	100	872	0	8	681	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	7.4	7.4	7.4	7.4	7.4		44.6	44.6		44.6	44.6	
Effective Green, g (s)	7.4	7.4	7.4	7.4	7.4		44.6	44.6		44.6	44.6	
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12		0.74	0.74		0.74	0.74	
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)	154	218	307	155	194		387	2743		368	4466	
v/s Ratio Prot		0.00			0.00							0.11
v/s Ratio Perm	c0.03		0.01	0.02			0.19	c0.24		0.02		
v/c Ratio	0.24	0.02	0.08	0.15	0.02		0.26	0.32		0.02	0.15	
Uniform Delay, d1	23.8	23.1	23.3	23.5	23.1		2.4	2.6		2.0	2.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.0	0.1	0.4	0.0		1.6	0.3		0.1	0.1	
Delay (s)	24.6	23.2	23.4	23.9	23.2		4.1	2.9		2.1	2.3	
Level of Service	C	C	C	C	C		A	A		A	A	
Approach Delay (s)		23.6			23.7			3.0			2.3	
Approach LOS		C			C			A			A	

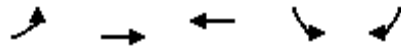
Intersection Summary

HCM Average Control Delay	5.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

1: Mill St & S Sierra Way

11/25/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	70	535	516	129	58
v/c Ratio	0.16	0.28	0.27	0.28	0.24
Control Delay	6.5	5.7	5.5	12.4	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.5	5.7	5.5	12.4	7.9
Queue Length 50th (ft)	6	26	24	7	0
Queue Length 95th (ft)	20	47	44	22	19
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	486	2122	2107	1560	692
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.14	0.25	0.24	0.08	0.08

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St & S Sierra Way

11/25/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	60	460	414	30	87	74
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.97	0.85
Flt Protected	0.95	1.00	1.00		0.96	1.00
Satd. Flow (prot)	1583	3353	3319		3187	1365
Flt Permitted	0.46	1.00	1.00		0.96	1.00
Satd. Flow (perm)	769	3353	3319		3187	1365
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	70	535	481	35	101	86
RTOR Reduction (vph)	0	0	9	0	25	52
Lane Group Flow (vph)	70	535	507	0	104	6
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	19.7	19.7	19.7		5.4	5.4
Effective Green, g (s)	17.7	17.7	17.7		3.4	3.4
Actuated g/C Ratio	0.52	0.52	0.52		0.10	0.10
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	399	1740	1723		318	136
v/s Ratio Prot		c0.16	0.15		c0.03	
v/s Ratio Perm	0.09					0.00
v/c Ratio	0.18	0.31	0.29		0.33	0.04
Uniform Delay, d1	4.3	4.7	4.7		14.3	13.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.1	0.1		0.6	0.1
Delay (s)	4.5	4.8	4.8		14.9	14.0
Level of Service	A	A	A		B	B
Approach Delay (s)		4.8	4.8		14.6	
Approach LOS		A	A		B	

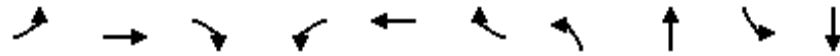
Intersection Summary

HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	34.1	Sum of lost time (s)	13.0
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

11/25/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	95	320	161	117	224	66	141	608	83	765
v/c Ratio	0.33	0.71	0.47	0.41	0.47	0.24	0.39	0.29	0.26	0.40
Control Delay	21.8	42.1	10.4	23.5	34.3	10.6	24.9	16.7	20.1	19.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.8	42.1	10.4	23.5	34.3	10.6	24.9	16.7	20.1	19.0
Queue Length 50th (ft)	34	81	0	42	54	0	44	69	26	97
Queue Length 95th (ft)	63	120	50	75	86	33	97	114	62	148
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	320	546	379	294	516	286	393	2133	350	1969
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	0.59	0.42	0.40	0.43	0.23	0.36	0.29	0.24	0.39

Intersection Summary

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Volume (vph)	90	304	153	111	213	63	134	495	83	79	631	96
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0		5.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3353	1500	1583	3353	1500	1583	4714		1583	4722	
Flt Permitted	0.61	1.00	1.00	0.52	1.00	1.00	0.35	1.00		0.33	1.00	
Satd. Flow (perm)	1020	3353	1500	860	3353	1500	583	4714		551	4722	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	320	161	117	224	66	141	521	87	83	664	101
RTOR Reduction (vph)	0	0	139	0	0	57	0	25	0	0	23	0
Lane Group Flow (vph)	95	320	22	117	224	9	141	583	0	83	742	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	20.5	12.7	12.7	21.9	13.4	13.4	37.7	35.7		32.7	32.7	
Effective Green, g (s)	16.5	10.7	10.7	17.9	11.4	11.4	35.7	33.7		30.7	30.7	
Actuated g/C Ratio	0.21	0.13	0.13	0.22	0.14	0.14	0.45	0.42		0.38	0.38	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	251	448	201	251	478	214	361	1986		277	1812	
v/s Ratio Prot	0.03	c0.10		c0.04	0.07		c0.04	0.12		0.02	c0.16	
v/s Ratio Perm	0.05		0.01	0.07		0.01	c0.13			0.10		
v/c Ratio	0.38	0.71	0.11	0.47	0.47	0.04	0.39	0.29		0.30	0.41	
Uniform Delay, d1	26.8	33.2	30.5	26.0	31.5	29.6	16.2	15.3		16.2	18.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	5.3	0.2	1.4	0.7	0.1	0.7	0.4		0.6	0.7	
Delay (s)	27.8	38.5	30.7	27.4	32.2	29.7	16.9	15.7		16.8	18.7	
Level of Service	C	D	C	C	C	C	B	B		B	B	
Approach Delay (s)		34.6			30.4			15.9			18.5	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	23.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Waterman & E Orange Show

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	142	576	101	326	107	745	58	865
v/c Ratio	0.41	0.77	0.41	0.53	0.42	0.64	0.21	0.79
Control Delay	23.2	30.7	24.3	33.2	17.6	25.4	14.5	31.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.2	30.7	24.3	33.2	17.6	25.4	14.5	31.5
Queue Length 50th (ft)	52	112	36	78	29	168	15	211
Queue Length 95th (ft)	94	173	70	125	60	243	37	#306
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	445	964	382	896	393	1451	439	1383
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.60	0.26	0.36	0.27	0.51	0.13	0.63

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	122	288	207	87	233	47	92	597	44	50	622	122
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	7.0		6.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.94		1.00	0.97		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3143		1583	3268		1583	3319		1583	3270	
Flt Permitted	0.51	1.00		0.30	1.00		0.18	1.00		0.29	1.00	
Satd. Flow (perm)	858	3143		502	3268		302	3319		486	3270	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	142	335	241	101	271	55	107	694	51	58	723	142
RTOR Reduction (vph)	0	130	0	0	17	0	0	5	0	0	15	0
Lane Group Flow (vph)	142	446	0	101	309	0	107	740	0	58	850	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	25.5	17.2		23.3	16.1		35.8	28.8		32.6	27.2	
Effective Green, g (s)	21.5	15.2		19.3	14.1		31.8	26.8		28.6	25.2	
Actuated g/C Ratio	0.28	0.20		0.25	0.18		0.42	0.35		0.37	0.33	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	300	624		200	602		209	1161		230	1076	
v/s Ratio Prot	c0.04	c0.14		0.03	0.09		c0.03	0.22		0.01	c0.26	
v/s Ratio Perm	0.09			0.09			0.18			0.08		
v/c Ratio	0.47	0.71		0.51	0.51		0.51	0.64		0.25	0.79	
Uniform Delay, d1	21.8	28.7		23.0	28.2		15.2	20.8		15.8	23.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	3.9		2.0	0.7		2.1	1.2		0.6	3.9	
Delay (s)	23.0	32.6		25.0	28.9		17.3	22.0		16.4	27.2	
Level of Service	C	C		C	C		B	C		B	C	
Approach Delay (s)		30.7			28.0			21.4			26.5	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	26.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	76.6	Sum of lost time (s)	19.0
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

11/25/2013

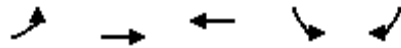


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	4	3	4	727	911	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	4	3	4	808	1012	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1427	508	1016			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1427	508	1016			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	99			
cM capacity (veh/h)	125	510	679			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	8	4	404	404	675	341
Volume Left	4	4	0	0	0	0
Volume Right	3	0	0	0	0	3
cSH	185	679	1700	1700	1700	1700
Volume to Capacity	0.04	0.01	0.24	0.24	0.40	0.20
Queue Length 95th (ft)	3	0	0	0	0	0
Control Delay (s)	25.3	10.3	0.0	0.0	0.0	0.0
Lane LOS	D	B				
Approach Delay (s)	25.3	0.1			0.0	
Approach LOS	D					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			36.7%		ICU Level of Service	A
Analysis Period (min)			15			

Queues

1: Mill St & S Sierra Way

11/25/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	74	602	665	181	85
v/c Ratio	0.20	0.32	0.35	0.36	0.32
Control Delay	7.2	6.0	6.1	10.9	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.2	6.0	6.1	10.9	8.0
Queue Length 50th (ft)	7	31	34	8	0
Queue Length 95th (ft)	24	58	64	27	25
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	421	2121	2107	1571	714
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.18	0.28	0.32	0.12	0.12

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St & S Sierra Way

11/25/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↶↶	↶↶		↶↶↶	↶
Volume (vph)	68	554	577	35	100	144
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.94	0.85
Flt Protected	0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	1583	3353	3324		3125	1365
Flt Permitted	0.40	1.00	1.00		0.97	1.00
Satd. Flow (perm)	665	3353	3324		3125	1365
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	74	602	627	38	109	157
RTOR Reduction (vph)	0	0	7	0	65	76
Lane Group Flow (vph)	74	602	658	0	116	9
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	19.2	19.2	19.2		5.5	5.5
Effective Green, g (s)	17.2	17.2	17.2		3.5	3.5
Actuated g/C Ratio	0.51	0.51	0.51		0.10	0.10
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	339	1711	1697		325	142
v/s Ratio Prot		0.18	c0.20		c0.04	
v/s Ratio Perm	0.11					0.01
v/c Ratio	0.22	0.35	0.39		0.36	0.06
Uniform Delay, d1	4.5	4.9	5.0		14.1	13.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.1	0.1		0.7	0.2
Delay (s)	4.9	5.0	5.2		14.7	13.8
Level of Service	A	A	A		B	B
Approach Delay (s)		5.0	5.2		14.4	
Approach LOS		A	A		B	

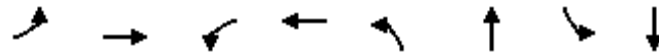
Intersection Summary

HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	33.7	Sum of lost time (s)	13.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

2: Waterman Ave & 9th St

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	131	371	132	342	97	1078	72	881
v/c Ratio	0.47	0.76	0.49	0.67	0.39	0.82	0.39	0.69
Control Delay	26.8	44.1	27.5	38.4	18.1	34.1	20.1	29.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.8	44.1	27.5	38.4	18.1	34.1	20.1	29.8
Queue Length 50th (ft)	54	100	55	86	27	290	20	222
Queue Length 95th (ft)	85	138	86	124	64	#541	50	#426
Internal Link Dist (ft)		852		841		893		996
Turn Bay Length (ft)	130		100		50		75	
Base Capacity (vph)	337	692	323	700	337	1308	290	1286
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.54	0.41	0.49	0.29	0.82	0.25	0.69

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2: Waterman Ave & 9th St

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	123	285	64	124	245	76	91	871	142	68	750	78
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	7.0	7.5		7.0	7.4		7.0	7.5		7.0	7.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.96		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3261		1583	3234		1583	3282		1583	3306	
Flt Permitted	0.51	1.00		0.45	1.00		0.20	1.00		0.13	1.00	
Satd. Flow (perm)	844	3261		746	3234		339	3282		217	3306	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	131	303	68	132	261	81	97	927	151	72	798	83
RTOR Reduction (vph)	0	23	0	0	35	0	0	11	0	0	7	0
Lane Group Flow (vph)	131	348	0	132	307	0	97	1067	0	72	874	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	25.6	14.9		26.1	15.2		44.0	36.6		42.4	35.8	
Effective Green, g (s)	21.6	12.9		22.1	13.2		40.0	34.6		38.4	33.8	
Actuated g/C Ratio	0.24	0.14		0.25	0.15		0.44	0.38		0.43	0.38	
Clearance Time (s)	5.0	5.5		5.0	5.4		5.0	5.5		5.0	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	274	467		266	474		225	1262		162	1242	
v/s Ratio Prot	0.05	c0.11		c0.05	0.09		c0.03	c0.33		0.02	0.26	
v/s Ratio Perm	0.07			0.07			0.17			0.17		
v/c Ratio	0.48	0.74		0.50	0.65		0.43	0.85		0.44	0.70	
Uniform Delay, d1	28.3	37.0		28.0	36.2		15.9	25.3		17.5	23.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	6.4		1.5	3.0		1.3	7.1		1.9	3.4	
Delay (s)	29.7	43.3		29.4	39.2		17.2	32.3		19.4	27.2	
Level of Service	C	D		C	D		B	C		B	C	
Approach Delay (s)		39.8			36.5			31.1			26.6	
Approach LOS		D			D			C			C	

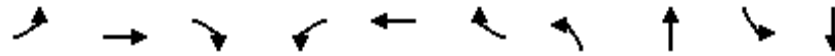
Intersection Summary

HCM Average Control Delay	31.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

11/25/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	150	339	191	151	334	110	144	1015	116	991
v/c Ratio	0.49	0.69	0.50	0.49	0.70	0.36	0.58	0.56	0.36	0.55
Control Delay	26.4	43.9	9.9	26.6	44.3	10.1	31.9	26.3	29.9	25.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.4	43.9	9.9	26.6	44.3	10.1	31.9	26.3	29.9	25.7
Queue Length 50th (ft)	62	97	0	62	95	0	57	174	42	155
Queue Length 95th (ft)	95	134	55	95	133	43	119	#269	102	#284
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	387	857	526	362	782	434	307	1797	342	1787
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	0.39	0.40	0.36	0.42	0.43	0.25	0.47	0.56	0.34	0.55

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗↗	↖	↖	↗↗	↖	↖	↗↗↗		↖	↗↗↗	
Volume (vph)	135	305	172	136	301	99	130	817	96	104	765	127
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0		5.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3353	1500	1583	3353	1500	1583	4741		1583	4715	
Flt Permitted	0.48	1.00	1.00	0.50	1.00	1.00	0.17	1.00		0.27	1.00	
Satd. Flow (perm)	803	3353	1500	832	3353	1500	281	4741		450	4715	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	150	339	191	151	334	110	144	908	107	116	850	141
RTOR Reduction (vph)	0	0	163	0	0	94	0	13	0	0	19	0
Lane Group Flow (vph)	150	339	28	151	334	16	144	1002	0	116	972	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	27.1	15.2	15.2	26.5	14.9	14.9	35.2	35.2		37.7	35.7	
Effective Green, g (s)	23.1	13.2	13.2	22.5	12.9	12.9	33.2	33.2		35.7	33.7	
Actuated g/C Ratio	0.26	0.15	0.15	0.25	0.14	0.14	0.37	0.37		0.40	0.37	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	292	492	220	288	481	215	241	1749		304	1766	
v/s Ratio Prot	c0.06	c0.10		0.06	0.10		0.06	c0.21		0.04	c0.21	
v/s Ratio Perm	0.08		0.02	0.08		0.01	0.16			0.11		
v/c Ratio	0.51	0.69	0.13	0.52	0.69	0.07	0.60	0.57		0.38	0.55	
Uniform Delay, d1	27.5	36.5	33.4	28.0	36.7	33.4	20.8	22.7		22.1	22.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	4.0	0.3	1.7	4.3	0.1	3.9	1.4		0.8	0.4	
Delay (s)	29.0	40.5	33.7	29.7	41.0	33.5	24.8	24.1		22.9	22.6	
Level of Service	C	D	C	C	D	C	C	C		C	C	
Approach Delay (s)		36.0			36.7			24.2			22.6	
Approach LOS		D			D			C			C	

Intersection Summary

HCM Average Control Delay	28.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	64.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Waterman & E Orange Show

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	179	661	133	505	209	940	140	1097
v/c Ratio	0.65	0.96	0.59	0.80	0.81	0.86	0.63	1.09
Control Delay	32.5	61.6	31.5	46.6	43.6	38.9	28.5	88.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.5	61.6	31.5	46.6	43.6	38.9	28.5	88.1
Queue Length 50th (ft)	74	195	54	150	71	267	45	~399
Queue Length 95th (ft)	126	#335	96	#230	#188	#432	87	#546
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	322	689	298	652	295	1097	302	1007
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.96	0.45	0.77	0.71	0.86	0.46	1.09

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.

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	159	438	150	118	390	60	186	715	122	125	841	135
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	7.0		6.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.98		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3224		1583	3286		1583	3280		1583	3283	
Flt Permitted	0.28	1.00		0.23	1.00		0.13	1.00		0.15	1.00	
Satd. Flow (perm)	471	3224		381	3286		217	3280		256	3283	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	179	492	169	133	438	67	209	803	137	140	945	152
RTOR Reduction (vph)	0	33	0	0	12	0	0	13	0	0	13	0
Lane Group Flow (vph)	179	628	0	133	493	0	209	927	0	140	1084	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	33.2	20.9		30.4	19.5		45.6	32.7		40.4	30.1	
Effective Green, g (s)	29.2	18.9		26.4	17.5		41.6	30.7		36.4	28.1	
Actuated g/C Ratio	0.31	0.20		0.28	0.19		0.45	0.33		0.39	0.30	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	272	657		224	620		258	1085		219	994	
v/s Ratio Prot	c0.07	c0.19		0.06	0.15		c0.10	c0.28		0.06	c0.33	
v/s Ratio Perm	0.13			0.11			0.27			0.19		
v/c Ratio	0.66	0.96		0.59	0.79		0.81	0.85		0.64	1.09	
Uniform Delay, d1	25.0	36.5		26.5	35.9		20.6	29.0		20.2	32.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.7	24.3		4.2	7.0		17.2	6.7		6.0	56.6	
Delay (s)	30.6	60.9		30.7	42.9		37.8	35.7		26.3	89.0	
Level of Service	C	E		C	D		D	D		C	F	
Approach Delay (s)		54.4			40.4			36.0			81.9	
Approach LOS		D			D			D			F	

Intersection Summary

HCM Average Control Delay	55.4	HCM Level of Service	E
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	92.8	Sum of lost time (s)	26.0
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

11/25/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	2	6	18	1031	1141	3
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)	2	7	20	1121	1240	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					745	
pX, platoon unblocked	0.79	0.79	0.79			
vC, conflicting volume	1841	622	1243			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1525	0	764			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	97			
cM capacity (veh/h)	83	852	664			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	9	20	560	560	827	417
Volume Left	2	20	0	0	0	0
Volume Right	7	0	0	0	0	3
cSH	256	664	1700	1700	1700	1700
Volume to Capacity	0.03	0.03	0.33	0.33	0.49	0.25
Queue Length 95th (ft)	3	2	0	0	0	0
Control Delay (s)	19.5	10.6	0.0	0.0	0.0	0.0
Lane LOS	C	B				
Approach Delay (s)	19.5	0.2			0.0	
Approach LOS	C					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			43.4%		ICU Level of Service	A
Analysis Period (min)			15			

Queues

6: Waterman & Washington

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	413	670	5	1063	559	15	165	166	648
v/c Ratio	1.10	0.28	0.05	0.55	0.53	0.14	1.10	1.04	0.89
Control Delay	117.3	6.4	45.2	15.6	5.0	39.1	146.4	127.2	19.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	117.3	6.4	45.2	15.6	5.0	39.1	146.4	127.2	19.7
Queue Length 50th (ft)	~154	45	3	182	26	7	~126	~121	3
Queue Length 95th (ft)	#251	152	15	317	117	27	#264	#258	#194
Internal Link Dist (ft)		433		239		527		537	
Turn Bay Length (ft)	225		100		200		125		
Base Capacity (vph)	376	2423	174	1927	1054	507	150	160	729
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.10	0.28	0.03	0.55	0.53	0.03	1.10	1.04	0.89

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.

HCM Signalized Intersection Capacity Analysis

6: Waterman & Washington

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	392	632	5	5	1010	531	4	7	4	308	7	616
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1800	1800	1800	1700	1800	1800
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0		4.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00		1.00		0.95	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	0.95	1.00
Satd. Flow (prot)	2891	3349		1583	3353	1500		1679		1504	1600	1500
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.99		0.95	0.95	1.00
Satd. Flow (perm)	2891	3349		1583	3353	1500		1679		1504	1600	1500
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	413	665	5	5	1063	559	4	7	4	324	7	648
RTOR Reduction (vph)	0	0	0	0	0	202	0	4	0	0	0	579
Lane Group Flow (vph)	413	670	0	5	1063	357	0	11	0	165	166	69
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	13.0	66.7		1.4	55.1	55.1		2.9		10.0	10.0	10.0
Effective Green, g (s)	13.0	66.7		1.4	55.1	55.1		2.9		10.0	10.0	10.0
Actuated g/C Ratio	0.13	0.67		0.01	0.55	0.55		0.03		0.10	0.10	0.10
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0		4.0		5.0	5.0	5.0
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)	376	2234		22	1848	827		49		150	160	150
v/s Ratio Prot	c0.14	0.20		0.00	c0.32			c0.01		c0.11	0.10	
v/s Ratio Perm						0.24						0.05
v/c Ratio	1.10	0.30		0.23	0.58	0.43		0.23		1.10	1.04	0.46
Uniform Delay, d1	43.5	6.9		48.8	14.8	13.2		47.5		45.0	45.0	42.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	75.6	0.3		5.2	1.3	1.6		2.4		102.8	81.4	2.2
Delay (s)	119.1	7.3		54.0	16.1	14.9		49.8		147.8	126.4	44.7
Level of Service	F	A		D	B	B		D		F	F	D
Approach Delay (s)		49.9			15.8			49.8			75.9	
Approach LOS		D			B			D			E	

Intersection Summary

HCM Average Control Delay	41.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

7: S Tippecanoe & E Victoria

11/25/2013



Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	4	49	25	1	1011	42	930
v/c Ratio	0.04	0.50	0.05	0.00	0.41	0.11	0.35
Control Delay	30.5	56.0	0.2	3.0	7.2	3.2	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.5	56.0	0.2	3.0	7.2	3.2	4.8
Queue Length 50th (ft)	1	27	0	0	128	4	67
Queue Length 95th (ft)	11	61	0	1	202	12	172
Internal Link Dist (ft)	87		770		198		507
Turn Bay Length (ft)		100		150		115	
Base Capacity (vph)	377	335	699	440	2466	589	2644
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.15	0.04	0.00	0.41	0.07	0.35

Intersection Summary

HCM Signalized Intersection Capacity Analysis

7: S Tippecanoe & E Victoria

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↙	↘		↙	↕		↙	↕	
Volume (vph)	2	0	2	46	0	23	1	899	41	39	865	0
Ideal Flow (vphpl)	1800	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.0		6.0	6.0		6.0	7.5		6.0	7.5	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt		0.93		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1605		1583	1500		1583	3331		1583	3353	
Flt Permitted		0.86		0.76	1.00		0.31	1.00		0.25	1.00	
Satd. Flow (perm)		1409		1259	1500		512	3331		425	3353	
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)	2	0	2	49	0	25	1	967	44	42	930	0
RTOR Reduction (vph)	0	2	0	0	23	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	2	0	49	2	0	1	1009	0	42	930	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.9		7.9	7.9		65.9	64.8		71.3	67.5	
Effective Green, g (s)		5.9		5.9	5.9		62.8	62.8		67.3	65.5	
Actuated g/C Ratio		0.07		0.07	0.07		0.70	0.70		0.75	0.73	
Clearance Time (s)		4.0		4.0	4.0		4.0	5.5		4.0	5.5	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		92		83	98		357	2324		341	2440	
v/s Ratio Prot					0.00			c0.30		c0.00	c0.28	
v/s Ratio Perm		0.00		c0.04			0.00			0.09		
v/c Ratio		0.02		0.59	0.02		0.00	0.43		0.12	0.38	
Uniform Delay, d1		39.4		40.9	39.3		4.1	5.9		3.2	4.6	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1		10.7	0.1		0.0	0.6		0.2	0.5	
Delay (s)		39.5		51.6	39.4		4.1	6.5		3.4	5.1	
Level of Service		D		D	D		A	A		A	A	
Approach Delay (s)		39.5			47.5			6.5			5.0	
Approach LOS		D			D			A			A	

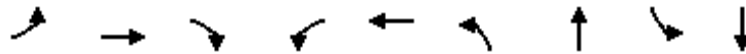
Intersection Summary

HCM Average Control Delay	7.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	27.0
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

11/25/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	189	212	353	65	106	471	657	58	1129
v/c Ratio	0.74	0.62	0.60	0.27	0.25	0.86	0.25	0.33	0.87
Control Delay	39.7	29.3	8.0	21.0	14.7	51.2	8.2	24.9	30.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.7	29.3	8.0	21.0	14.7	51.2	8.2	24.9	30.3
Queue Length 50th (ft)	71	77	11	21	23	98	32	18	148
Queue Length 95th (ft)	126	128	64	46	52	#240	64	49	#218
Internal Link Dist (ft)		517			1151		773		1167
Turn Bay Length (ft)	210			85		260		100	
Base Capacity (vph)	352	474	699	332	566	546	2634	181	1337
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.45	0.51	0.20	0.19	0.86	0.25	0.32	0.84

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖	↖	↖	↖		↖↖	↖↖↖		↖	↖↖↖	
Volume (vph)	236	149	339	62	72	30	452	573	58	56	949	134
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1600	1800	1800	1700	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		6.0	7.0		7.0	7.0	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		0.97	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99		1.00	0.98	
Flt Protected	0.95	0.99	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1504	1654	1500	1583	1687		2891	4752		1583	4728	
Flt Permitted	0.69	0.87	1.00	0.62	1.00		0.95	1.00		0.39	1.00	
Satd. Flow (perm)	1090	1466	1500	1028	1687		2891	4752		651	4728	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	246	155	353	65	75	31	471	597	60	58	989	140
RTOR Reduction (vph)	0	0	243	0	24	0	0	15	0	0	29	0
Lane Group Flow (vph)	189	212	110	65	82	0	471	642	0	58	1101	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)	17.2	17.2	17.2	17.2	17.2		14.3	37.8		19.5	19.5	
Effective Green, g (s)	15.2	15.2	15.2	15.2	15.2		12.3	35.8		17.5	17.5	
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.23		0.19	0.55		0.27	0.27	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		4.0	5.0		5.0	5.0	
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)	255	343	351	240	394		547	2617		175	1273	
v/s Ratio Prot					0.05		c0.16	0.14			c0.23	
v/s Ratio Perm	c0.17	0.14	0.07	0.06						0.09		
v/c Ratio	0.74	0.62	0.31	0.27	0.21		0.86	0.25		0.33	0.86	
Uniform Delay, d1	23.1	22.3	20.6	20.4	20.1		25.5	7.6		19.1	22.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.13	0.97		1.00	1.00	
Incremental Delay, d2	11.0	3.3	0.5	0.6	0.3		11.5	0.2		5.0	8.0	
Delay (s)	34.1	25.6	21.1	21.0	20.3		40.4	7.6		24.1	30.6	
Level of Service	C	C	C	C	C		D	A		C	C	
Approach Delay (s)		25.6			20.6			21.3			30.3	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	25.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

9: Anderson/Tippecanoe/Tippecanoe & WB I-10 Ramps

11/25/2013



Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	139	140	433	491	805	1062	590
v/c Ratio	0.53	0.50	0.97	1.33	0.35	0.58	0.68
Control Delay	41.4	39.9	54.8	178.0	7.1	24.0	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.8	0.0	0.0
Total Delay	41.4	39.9	54.8	178.0	7.9	24.0	9.4
Queue Length 50th (ft)	74	74	123	~361	145	176	43
Queue Length 95th (ft)	136	135	#309	m#285	m129	221	161
Internal Link Dist (ft)		949			347	499	
Turn Bay Length (ft)	225		175				
Base Capacity (vph)	284	303	466	369	2286	1841	869
Starvation Cap Reductn	0	0	0	0	1089	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.46	0.93	1.33	0.67	0.58	0.68

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.

HCM Signalized Intersection Capacity Analysis

9: Anderson/Tippecanoe/Tippecanoe & WB I-10 Ramps

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↖	↖	↖	↖	↕			↕	↖
Volume (vph)	0	0	0	255	16	420	476	781	0	0	1030	572
Ideal Flow (vphpl)	1800	1800	1800	1700	1800	1800	1700	1800	1800	1800	1800	1800
Total Lost time (s)				6.0	6.0	6.0	6.0	7.0			7.0	7.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.91	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1504	1605	1500	1583	3353			4818	1500
Flt Permitted				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1504	1605	1500	1583	3353			4818	1500
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	263	16	433	491	805	0	0	1062	590
RTOR Reduction (vph)	0	0	0	0	0	186	0	0	0	0	0	296
Lane Group Flow (vph)	0	0	0	139	140	247	491	805	0	0	1062	294
Turn Type				Perm	NA	Perm	Prot	NA			NA	Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8						6
Actuated Green, G (s)				17.6	17.6	17.6	23.0	63.4			36.4	36.4
Effective Green, g (s)				15.6	15.6	15.6	21.0	61.4			34.4	34.4
Actuated g/C Ratio				0.17	0.17	0.17	0.23	0.68			0.38	0.38
Clearance Time (s)				4.0	4.0	4.0	4.0	5.0			5.0	5.0
Vehicle Extension (s)				2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)				261	278	260	369	2287			1842	573
v/s Ratio Prot							c0.31	0.24			c0.22	
v/s Ratio Perm				0.09	0.09	c0.16						0.20
v/c Ratio				0.53	0.50	0.95	1.33	0.35			0.58	0.51
Uniform Delay, d1				33.9	33.7	36.8	34.5	6.0			22.0	21.4
Progression Factor				1.00	1.00	1.00	0.81	1.12			1.00	1.00
Incremental Delay, d2				1.0	0.5	41.3	150.5	0.0			1.3	3.3
Delay (s)				34.9	34.2	78.2	178.5	6.7			23.3	24.6
Level of Service				C	C	E	F	A			C	C
Approach Delay (s)		0.0			61.1			71.8			23.8	
Approach LOS		A			E			E			C	

Intersection Summary

HCM Average Control Delay	48.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

11/25/2013



Lane Group	EBL	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	448	408	1073	389	873
v/c Ratio	1.12	0.81	1.23	0.93	0.44
Control Delay	113.9	32.9	144.0	45.5	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.3
Total Delay	113.9	32.9	144.0	45.5	4.1
Queue Length 50th (ft)	~311	144	~403	65	2
Queue Length 95th (ft)	#504	#307	#563	#318	40
Internal Link Dist (ft)		1164	1201		347
Turn Bay Length (ft)	275				
Base Capacity (vph)	401	506	872	492	1975
Starvation Cap Reductn	0	0	0	0	460
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.12	0.81	1.23	0.79	0.58

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.

HCM Signalized Intersection Capacity Analysis

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	529	12	298	0	0	0	0	743	309	381	856	0
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	6.0						7.0		6.0	7.0	
Lane Util. Factor	0.95	0.95						0.95		1.00	0.95	
Frt	1.00	0.89						0.96		1.00	1.00	
Flt Protected	0.95	0.99						1.00		0.95	1.00	
Satd. Flow (prot)	1504	1472						3205		1583	3353	
Flt Permitted	0.95	0.99						1.00		0.95	1.00	
Satd. Flow (perm)	1504	1472						3205		1583	3353	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	540	12	304	0	0	0	0	758	315	389	873	0
RTOR Reduction (vph)	0	114	0	0	0	0	0	48	0	0	0	0
Lane Group Flow (vph)	448	294	0	0	0	0	0	1025	0	389	873	0
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	26.0	26.0						25.2		25.8	55.0	
Effective Green, g (s)	24.0	24.0						23.2		23.8	53.0	
Actuated g/C Ratio	0.27	0.27						0.26		0.26	0.59	
Clearance Time (s)	4.0	4.0						5.0		4.0	5.0	
Vehicle Extension (s)	2.0	2.0						2.0		2.0	2.0	
Lane Grp Cap (vph)	401	393						826		419	1975	
v/s Ratio Prot								c0.32		c0.25	0.26	
v/s Ratio Perm	c0.30	0.20										
v/c Ratio	1.12	0.75						1.24		0.93	0.44	
Uniform Delay, d1	33.0	30.2						33.4		32.3	10.3	
Progression Factor	1.00	1.00						1.00		0.59	0.31	
Incremental Delay, d2	80.7	6.7						118.9		23.2	0.6	
Delay (s)	113.7	36.9						152.3		42.2	3.8	
Level of Service	F	D						F		D	A	
Approach Delay (s)		77.1			0.0			152.3			15.6	
Approach LOS		E			A			F			B	

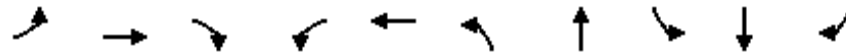
Intersection Summary

HCM Average Control Delay	78.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues

11: Anderson & Academy

11/25/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	113	48	59	45	91	62	883	69	619	129
v/c Ratio	0.28	0.12	0.16	0.14	0.19	0.12	0.52	0.18	0.34	0.15
Control Delay	19.9	26.9	9.8	19.0	22.6	8.0	16.7	8.6	13.8	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.9	26.9	9.8	19.0	22.6	8.0	16.7	8.6	13.8	3.6
Queue Length 50th (ft)	31	16	0	12	11	10	144	11	92	0
Queue Length 95th (ft)	82	52	32	39	37	29	244	32	161	31
Internal Link Dist (ft)		21			32		1375		514	
Turn Bay Length (ft)	75			100		100		100		
Base Capacity (vph)	628	917	808	428	1405	563	3173	495	3222	1447
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	0.18	0.05	0.07	0.11	0.06	0.11	0.28	0.14	0.19	0.09

Intersection Summary

HCM Signalized Intersection Capacity Analysis

11: Anderson & Academy

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	47	57	44	57	31	60	802	54	67	600	125
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	4.0	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	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1583	1765	1500	1583	3176		1583	3321		1583	3353	1500
Flt Permitted	0.42	1.00	1.00	0.73	1.00		0.39	1.00		0.22	1.00	1.00
Satd. Flow (perm)	702	1765	1500	1210	3176		642	3321		373	3353	1500
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	113	48	59	45	59	32	62	827	56	69	619	129
RTOR Reduction (vph)	0	0	50	0	29	0	0	4	0	0	0	68
Lane Group Flow (vph)	113	48	9	45	62	0	62	879	0	69	619	61
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)	17.0	9.5	9.5	9.4	5.7		32.2	28.4		34.4	29.5	29.5
Effective Green, g (s)	17.0	9.5	9.5	9.4	5.7		32.2	28.4		34.4	29.5	29.5
Actuated g/C Ratio	0.27	0.15	0.15	0.15	0.09		0.52	0.45		0.55	0.47	0.47
Clearance Time (s)	4.0	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	3.0
Lane Grp Cap (vph)	297	268	228	204	290		388	1509		300	1583	708
v/s Ratio Prot	c0.05	0.03		0.01	0.02		0.01	c0.26		c0.02	0.18	
v/s Ratio Perm	c0.06		0.01	0.02			0.07			0.11		0.04
v/c Ratio	0.38	0.18	0.04	0.22	0.21		0.16	0.58		0.23	0.39	0.09
Uniform Delay, d1	18.0	23.1	22.6	23.2	26.3		7.7	12.6		7.3	10.7	9.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.8	0.3	0.1	0.5	0.4		0.2	0.6		0.4	0.2	0.1
Delay (s)	18.8	23.4	22.7	23.8	26.7		7.9	13.2		7.7	10.8	9.1
Level of Service	B	C	C	C	C		A	B		A	B	A
Approach Delay (s)		20.8			25.7			12.9			10.3	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	13.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	62.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

12: California & WB I-10 Ramps

11/25/2013



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	383	116	624	510	654	652
v/c Ratio	0.97	0.29	1.31	0.25	0.56	0.89
Control Delay	67.7	7.4	181.2	6.8	25.4	23.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.7	7.4	181.2	6.8	25.4	23.7
Queue Length 50th (ft)	164	0	~355	47	90	60
Queue Length 95th (ft)	#325	38	#541	69	125	#274
Internal Link Dist (ft)	1118			276	113	
Turn Bay Length (ft)						
Base Capacity (vph)	396	403	475	2036	1170	734
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.97	0.29	1.31	0.25	0.56	0.89



















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.

HCM Signalized Intersection Capacity Analysis

12: California & WB I-10 Ramps

11/25/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	0	0	0	342	3	104	562	459	0	0	589	587	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800	
Total Lost time (s)					5.0	7.0	5.5	6.0			5.0	5.0	
Lane Util. Factor					1.00	1.00	1.00	0.95			0.91	1.00	
Frt					1.00	0.85	1.00	1.00			1.00	0.85	
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00	
Satd. Flow (prot)					1681	1500	1583	3353			4818	1500	
Flt Permitted					0.95	1.00	0.95	1.00			1.00	1.00	
Satd. Flow (perm)					1681	1500	1583	3353			4818	1500	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	0	0	0	380	3	116	624	510	0	0	654	652	
RTOR Reduction (vph)	0	0	0	0	0	92	0	0	0	0	0	369	
Lane Group Flow (vph)	0	0	0	0	383	24	624	510	0	0	654	283	
Turn Type				Perm	NA	Perm	Prot	NA			NA	Perm	
Protected Phases					8		5	6			2		
Permitted Phases				8		8						2	
Actuated Green, G (s)					16.5	16.5	23.0	44.5			19.0	19.0	
Effective Green, g (s)					16.5	14.5	21.0	42.5			17.0	17.0	
Actuated g/C Ratio					0.24	0.21	0.30	0.61			0.24	0.24	
Clearance Time (s)					5.0	5.0	3.5	4.0			3.0	3.0	
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0	
Lane Grp Cap (vph)					396	311	475	2036			1170	364	
v/s Ratio Prot							c0.39	0.15			0.14		
v/s Ratio Perm					0.23	0.02						c0.19	
v/c Ratio					0.97	0.08	1.31	0.25			0.56	0.78	
Uniform Delay, d1					26.5	22.4	24.5	6.4			23.2	24.7	
Progression Factor					1.00	1.00	1.00	1.00			1.00	1.00	
Incremental Delay, d2					36.1	0.0	155.6	0.3			1.9	14.9	
Delay (s)					62.6	22.4	180.1	6.7			25.1	39.7	
Level of Service					E	C	F	A			C	D	
Approach Delay (s)		0.0			53.2			102.1			32.4		
Approach LOS		A			D			F			C		
Intersection Summary													
HCM Average Control Delay			62.8		HCM Level of Service				E				
HCM Volume to Capacity ratio			1.04										
Actuated Cycle Length (s)			70.0		Sum of lost time (s)				15.5				
Intersection Capacity Utilization			109.2%		ICU Level of Service				H				
Analysis Period (min)			15										
c Critical Lane Group													

Queues

13: EB I-10 Ramps & California

11/25/2013



Lane Group	EBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	773	788	506	253	625
v/c Ratio	2.09	0.39	0.55	0.84	0.28
Control Delay	523.2	19.8	4.6	57.9	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.4
Total Delay	523.2	19.8	4.6	57.9	6.8
Queue Length 50th (ft)	~671	110	0	140	66
Queue Length 95th (ft)	#894	166	70	203	90
Internal Link Dist (ft)	1294	46			276
Turn Bay Length (ft)					
Base Capacity (vph)	369	2028	925	589	2254
Starvation Cap Reductn	0	0	0	0	1091
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	2.09	0.39	0.55	0.43	0.54


















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.

HCM Signalized Intersection Capacity Analysis

13: EB I-10 Ramps & California

11/25/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	266	7	477	0	0	0	0	764	491	245	606	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800	
Total Lost time (s)		6.0						6.5	6.5	5.5	6.5		
Lane Util. Factor		1.00						0.91	1.00	1.00	0.95		
Frt		0.91						1.00	0.85	1.00	1.00		
Flt Protected		0.98						1.00	1.00	0.95	1.00		
Satd. Flow (prot)		1585						4818	1500	1583	3353		
Flt Permitted		0.98						1.00	1.00	0.95	1.00		
Satd. Flow (perm)		1585						4818	1500	1583	3353		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	274	7	492	0	0	0	0	788	506	253	625	0	
RTOR Reduction (vph)	0	70	0	0	0	0	0	0	293	0	0	0	
Lane Group Flow (vph)	0	703	0	0	0	0	0	788	213	253	625	0	
Turn Type	Perm	NA						NA	Perm	Prot	NA		
Protected Phases		4						2		1	6		
Permitted Phases	4								2				
Actuated Green, G (s)		19.0						39.9	39.9	19.1	62.5		
Effective Green, g (s)		17.0						37.9	37.9	17.1	60.5		
Actuated g/C Ratio		0.19						0.42	0.42	0.19	0.67		
Clearance Time (s)		4.0						4.5	4.5	3.5	4.5		
Vehicle Extension (s)		2.0						2.0	2.0	2.0	2.0		
Lane Grp Cap (vph)		299						2029	632	301	2254		
v/s Ratio Prot								c0.16		c0.16	0.19		
v/s Ratio Perm		0.44							0.14				
v/c Ratio		2.35						0.39	0.34	0.84	0.28		
Uniform Delay, d1		36.5						18.0	17.6	35.1	5.9		
Progression Factor		1.00						1.00	1.00	1.00	1.00		
Incremental Delay, d2		618.7						0.6	1.4	18.0	0.3		
Delay (s)		655.2						18.6	19.0	53.1	6.2		
Level of Service		F						B	B	D	A		
Approach Delay (s)		655.2			0.0			18.8			19.7		
Approach LOS		F			A			B			B		
Intersection Summary													
HCM Average Control Delay			186.1									HCM Level of Service	F
HCM Volume to Capacity ratio			0.96										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	18.0
Intersection Capacity Utilization			109.2%									ICU Level of Service	H
Analysis Period (min)			15										
c Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis

14: California & Shopping Center

11/25/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑↑↑		↔	↑↑
Volume (veh/h)	2	152	1124	40	302	784
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	2	157	1159	41	311	808
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			652			447
pX, platoon unblocked						
vC, conflicting volume	2206	407			1200	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2206	407			1200	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	88	74			46	
cM capacity (veh/h)	17	594			577	

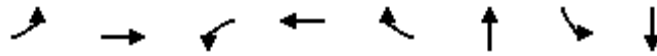
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	159	464	464	273	311	404	404
Volume Left	2	0	0	0	311	0	0
Volume Right	157	0	0	41	0	0	0
cSH	415	1700	1700	1700	577	1700	1700
Volume to Capacity	0.38	0.27	0.27	0.16	0.54	0.24	0.24
Queue Length 95th (ft)	44	0	0	0	80	0	0
Control Delay (s)	19.0	0.0	0.0	0.0	18.3	0.0	0.0
Lane LOS	C				C		
Approach Delay (s)	19.0	0.0			5.1		
Approach LOS	C						

Intersection Summary			
Average Delay		3.5	
Intersection Capacity Utilization		62.6%	ICU Level of Service B
Analysis Period (min)		15	

Queues

15: California/California & W Redlands

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	174	650	107	459	488	463	325	430
v/c Ratio	1.05	1.21	0.78	0.97	1.01	0.96	0.80	0.97
Control Delay	139.2	154.1	93.6	89.2	62.9	77.7	61.9	82.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	139.2	154.1	93.6	89.2	62.9	77.7	61.9	82.9
Queue Length 50th (ft)	~168	~375	91	211	~194	384	265	362
Queue Length 95th (ft)	#318	#512	#171	#327	#414	#587	#412	#578
Internal Link Dist (ft)		1468		1180		268		572
Turn Bay Length (ft)	90		150		100			
Base Capacity (vph)	166	538	166	475	484	524	414	454
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.05	1.21	0.64	0.97	1.01	0.88	0.79	0.95

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.

HCM Signalized Intersection Capacity Analysis

15: California/California & W Redlands

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	169	491	140	104	445	473	41	372	36	315	313	104
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1800	1800	1800	1700	1800	1800
Total Lost time (s)	6.5	7.7		6.5	7.7	7.7		7.2		7.2	7.2	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85		0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1583	3242		1583	3353	1500		1738		1583	1699	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (perm)	1583	3242		1583	3353	1500		1738		1583	1699	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	174	506	144	107	459	488	42	384	37	325	323	107
RTOR Reduction (vph)	0	19	0	0	0	271	0	2	0	0	9	0
Lane Group Flow (vph)	174	631	0	107	459	217	0	461	0	325	421	0
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases						6						
Actuated Green, G (s)	15.5	22.7		13.2	20.4	20.4		37.8		35.0	35.0	
Effective Green, g (s)	13.5	20.7		11.2	18.4	18.4		35.8		33.0	33.0	
Actuated g/C Ratio	0.10	0.16		0.09	0.14	0.14		0.28		0.26	0.26	
Clearance Time (s)	4.5	5.7		4.5	5.7	5.7		5.2		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	165	519		137	477	213		481		404	434	
v/s Ratio Prot	c0.11	c0.19		0.07	0.14			c0.27		0.21	c0.25	
v/s Ratio Perm						0.14						
v/c Ratio	1.05	1.22		0.78	0.96	1.02		0.96		0.80	0.97	
Uniform Delay, d1	57.9	54.3		57.8	55.1	55.5		46.0		45.1	47.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	85.3	113.5		24.5	31.5	66.6		30.2		11.1	35.3	
Delay (s)	143.2	167.8		82.3	86.6	122.0		76.2		56.2	83.0	
Level of Service	F	F		F	F	F		E		E	F	
Approach Delay (s)		162.6			102.6			76.2			71.5	
Approach LOS		F			F			E			E	

Intersection Summary

HCM Average Control Delay	107.0	HCM Level of Service	F
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	129.3	Sum of lost time (s)	20.9
Intersection Capacity Utilization	98.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues

16: Alabama St & WB I-10 Ramps

11/25/2013



Lane Group	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	719	395	1093	1226
v/c Ratio	0.95	0.89	0.51	1.24
Control Delay	58.7	30.2	4.8	149.2
Queue Delay	0.0	0.1	1.4	0.0
Total Delay	58.7	30.3	6.1	149.2
Queue Length 50th (ft)	217	184	48	~508
Queue Length 95th (ft)	#335	m127	m83	#725
Internal Link Dist (ft)	765		376	271
Turn Bay Length (ft)				
Base Capacity (vph)	765	570	2124	986
Starvation Cap Reductn	0	5	768	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.94	0.70	0.81	1.24


















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.

HCM Signalized Intersection Capacity Analysis

16: Alabama St & WB I-10 Ramps

11/25/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	166	311	220	383	1060	0	0	799	390
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800
Total Lost time (s)					6.5		6.0	8.0			8.0	
Lane Util. Factor					0.95		1.00	0.95			0.95	
Flt					0.95		1.00	1.00			0.95	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					3157		1583	3353			3188	
Flt Permitted					0.99		0.95	1.00			1.00	
Satd. Flow (perm)					3157		1583	3353			3188	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	171	321	227	395	1093	0	0	824	402
RTOR Reduction (vph)	0	0	0	0	55	0	0	0	0	0	53	0
Lane Group Flow (vph)	0	0	0	0	664	0	395	1093	0	0	1173	0
Turn Type				Perm	NA		Prot	NA			NA	
Protected Phases					4		1	6			2	
Permitted Phases				4								
Actuated Green, G (s)					24.1		30.1	65.4			31.3	
Effective Green, g (s)					22.1		28.1	63.4			29.3	
Actuated g/C Ratio					0.22		0.28	0.63			0.29	
Clearance Time (s)					4.5		4.0	6.0			6.0	
Vehicle Extension (s)					3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)					698		445	2126			934	
v/s Ratio Prot							c0.25	0.33			c0.37	
v/s Ratio Perm					0.21							
v/c Ratio					0.95		0.89	0.51			1.26	
Uniform Delay, d1					38.4		34.4	9.9			35.4	
Progression Factor					1.00		0.64	0.44			1.00	
Incremental Delay, d2					22.9		7.0	0.3			123.9	
Delay (s)					61.3		29.2	4.7			159.3	
Level of Service					E		C	A			F	
Approach Delay (s)		0.0			61.3			11.2			159.3	
Approach LOS		A			E			B			F	
Intersection Summary												
HCM Average Control Delay			74.6		HCM Level of Service						E	
HCM Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			100.0		Sum of lost time (s)					20.5		
Intersection Capacity Utilization			100.5%		ICU Level of Service					G		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

17: EB I-10 Ramps & Alabama St

11/25/2013



Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	906	1396	227	779
v/c Ratio	0.93	0.99	1.79	0.40
Control Delay	44.1	51.8	382.0	21.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	44.1	51.8	382.0	21.5
Queue Length 50th (ft)	237	~506	~224	250
Queue Length 95th (ft)	#349	#646	m#179	m202
Internal Link Dist (ft)	622	505		376
Turn Bay Length (ft)				
Base Capacity (vph)	1050	1406	127	1931
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.86	0.99	1.79	0.40

















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.

HCM Signalized Intersection Capacity Analysis

17: EB I-10 Ramps & Alabama St

11/25/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	385	7	487	0	0	0	0	1063	291	220	756	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800	
Total Lost time (s)		7.0						8.0		6.0	7.0		
Lane Util. Factor		0.95						0.95		1.00	0.95		
Frt		0.92						0.97		1.00	1.00		
Flt Protected		0.98						1.00		0.95	1.00		
Satd. Flow (prot)		3008						3245		1583	3353		
Flt Permitted		0.98						1.00		0.95	1.00		
Satd. Flow (perm)		3008						3245		1583	3353		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	397	7	502	0	0	0	0	1096	300	227	779	0	
RTOR Reduction (vph)	0	122	0	0	0	0	0	24	0	0	0	0	
Lane Group Flow (vph)	0	784	0	0	0	0	0	1372	0	227	779	0	
Turn Type	Perm	NA						NA		Prot	NA		
Protected Phases		8						6		5	2		
Permitted Phases	8												
Actuated Green, G (s)		30.4						44.6		10.0	59.6		
Effective Green, g (s)		28.4						42.6		8.0	57.6		
Actuated g/C Ratio		0.28						0.43		0.08	0.58		
Clearance Time (s)		5.0						6.0		4.0	5.0		
Vehicle Extension (s)		2.0						2.0		2.0	2.0		
Lane Grp Cap (vph)		854						1382		127	1931		
v/s Ratio Prot								c0.42		c0.14	0.23		
v/s Ratio Perm		0.26											
v/c Ratio		0.92						0.99		1.79	0.40		
Uniform Delay, d1		34.7						28.6		46.0	11.7		
Progression Factor		1.00						1.00		0.68	1.74		
Incremental Delay, d2		14.3						22.6		357.2	0.1		
Delay (s)		49.0						51.2		388.7	20.4		
Level of Service		D						D		F	C		
Approach Delay (s)		49.0			0.0			51.2			103.5		
Approach LOS		D			A			D			F		
Intersection Summary													
HCM Average Control Delay			66.5									HCM Level of Service	E
HCM Volume to Capacity ratio			1.05										
Actuated Cycle Length (s)			100.0									Sum of lost time (s)	21.0
Intersection Capacity Utilization			100.5%									ICU Level of Service	G
Analysis Period (min)			15										
c	Critical Lane Group												

Queues

18: Alabama St & Industrial Park

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	107	105	67	391	52	1061	301	840	129
v/c Ratio	1.01	0.23	0.23	0.64	0.46	0.95	0.94	0.54	0.18
Control Delay	127.5	20.6	29.2	13.8	52.2	47.5	74.0	18.9	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	127.5	20.6	29.2	13.8	52.2	47.5	74.0	18.9	9.5
Queue Length 50th (ft)	~63	32	30	46	29	300	170	170	23
Queue Length 95th (ft)	#169	75	66	143	64	#433	#330	242	59
Internal Link Dist (ft)		298		379		236		505	
Turn Bay Length (ft)	100		50		150		215		55
Base Capacity (vph)	106	451	295	610	374	1267	321	1557	726
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.01	0.23	0.23	0.64	0.14	0.84	0.94	0.54	0.18

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.

HCM Signalized Intersection Capacity Analysis

18: Alabama St & Industrial Park

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	103	62	38	64	57	319	50	934	84	289	806	124
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.2	6.2		6.2	6.2		6.0	6.2		6.0	6.2	6.2
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.94		1.00	0.87		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1583	1664		1583	1540		1583	3311		1583	3353	1500
Flt Permitted	0.25	1.00		0.69	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	414	1664		1149	1540		1583	3311		1583	3353	1500
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	107	65	40	67	59	332	52	973	88	301	840	129
RTOR Reduction (vph)	0	24	0	0	215	0	0	7	0	0	0	29
Lane Group Flow (vph)	107	81	0	67	176	0	52	1054	0	301	840	100
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4								2
Actuated Green, G (s)	24.8	24.8		24.8	24.8		8.4	31.7		20.0	43.3	43.3
Effective Green, g (s)	22.8	22.8		22.8	22.8		6.4	29.7		18.0	41.3	41.3
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.07	0.33		0.20	0.46	0.46
Clearance Time (s)	4.2	4.2		4.2	4.2		4.0	4.2		4.0	4.2	4.2
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)	106	427		295	395		114	1106		321	1558	697
v/s Ratio Prot		0.05			0.11		0.03	c0.32		c0.19	0.25	
v/s Ratio Perm	c0.26			0.06								0.07
v/c Ratio	1.01	0.19		0.23	0.45		0.46	0.95		0.94	0.54	0.14
Uniform Delay, d1	33.1	25.8		26.1	27.7		39.6	28.9		34.9	17.0	13.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	90.0	0.2		0.4	0.8		2.9	16.8		33.9	0.4	0.1
Delay (s)	123.0	26.1		26.5	28.6		42.5	45.8		68.8	17.4	13.7
Level of Service	F	C		C	C		D	D		E	B	B
Approach Delay (s)		75.0			28.2			45.6			29.2	
Approach LOS		E			C			D			C	

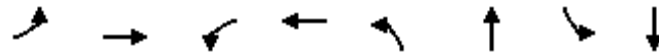
Intersection Summary

HCM Average Control Delay	38.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	88.9	Sum of lost time (s)	18.4
Intersection Capacity Utilization	98.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues

19: Alabama St & W Redlands

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	283	757	116	642	119	716	148	736
v/c Ratio	1.14	0.93	0.47	0.77	0.39	1.10	0.48	1.13
Control Delay	143.6	62.4	52.4	42.6	46.1	111.1	48.6	116.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	143.6	62.4	52.4	42.6	46.1	111.1	48.6	116.7
Queue Length 50th (ft)	~256	293	82	209	81	~330	102	~336
Queue Length 95th (ft)	#430	#404	143	278	140	#454	170	#462
Internal Link Dist (ft)		1247		345		380		164
Turn Bay Length (ft)	240		290		115		75	
Base Capacity (vph)	249	853	249	876	307	648	307	654
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.14	0.89	0.47	0.73	0.39	1.10	0.48	1.13

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

19: Alabama St & W Redlands

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	269	643	76	110	392	218	113	587	93	141	524	175
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	5.5	6.9		5.5	6.9		6.2	6.2		6.2	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.95		1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3300		1583	3174		1583	3284		1583	3227	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	3300		1583	3174		1583	3284		1583	3227	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	283	677	80	116	413	229	119	618	98	148	552	184
RTOR Reduction (vph)	0	8	0	0	64	0	0	10	0	0	27	0
Lane Group Flow (vph)	283	749	0	116	578	0	119	706	0	148	709	0
Turn Type	Prot	NA		Prot	NA		custom	NA		custom	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases							3			4		
Actuated Green, G (s)	20.5	30.6		20.5	30.6		24.8	24.8		24.8	24.8	
Effective Green, g (s)	18.5	28.6		18.5	28.6		22.8	22.8		22.8	22.8	
Actuated g/C Ratio	0.16	0.24		0.16	0.24		0.19	0.19		0.19	0.19	
Clearance Time (s)	3.5	4.9		3.5	4.9		4.2	4.2		4.2	4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	249	803		249	773		307	637		307	626	
v/s Ratio Prot	c0.18	c0.23		0.07	0.18		0.08	c0.21		0.09	c0.22	
v/s Ratio Perm												
v/c Ratio	1.14	0.93		0.47	0.75		0.39	1.11		0.48	1.13	
Uniform Delay, d1	49.5	43.5		45.0	41.1		41.3	47.4		42.1	47.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	98.8	17.6		6.1	4.0		3.7	68.9		5.3	78.1	
Delay (s)	148.3	61.1		51.2	45.1		44.9	116.2		47.4	125.5	
Level of Service	F	E		D	D		D	F		D	F	
Approach Delay (s)		84.8			46.0			106.1			112.4	
Approach LOS		F			D			F			F	

Intersection Summary

HCM Average Control Delay	88.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	117.5	Sum of lost time (s)	24.8
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

20: Tennessee & Redlands

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	279	760	43	489	666	683
v/c Ratio	0.96	0.83	0.44	0.81	1.11	0.93
Control Delay	85.2	42.6	60.2	40.1	109.6	60.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.2	42.6	60.2	40.1	109.6	60.3
Queue Length 50th (ft)	179	236	27	114	-258	227
Queue Length 95th (ft)	#367	322	64	172	#406	#373
Internal Link Dist (ft)		2241		737	458	48
Turn Bay Length (ft)	145		140			
Base Capacity (vph)	292	1002	292	1045	600	731
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.76	0.15	0.47	1.11	0.93

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.

HCM Signalized Intersection Capacity Analysis

20: Tennessee & Redlands

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	262	635	79	40	274	186	63	518	45	102	512	27
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.5	6.9		5.5	6.9			6.9			6.9	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frt	1.00	0.98		1.00	0.94			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1583	3297		1583	3149			3300			3305	
Flt Permitted	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (perm)	1583	3297		1583	3149			3300			3305	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	279	676	84	43	291	198	67	551	48	109	545	29
RTOR Reduction (vph)	0	8	0	0	120	0	0	5	0	0	2	0
Lane Group Flow (vph)	279	752	0	43	369	0	0	661	0	0	681	0
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases												
Actuated Green, G (s)	20.5	29.7		8.2	17.4			20.1			24.1	
Effective Green, g (s)	18.5	27.7		6.2	15.4			18.1			22.1	
Actuated g/C Ratio	0.18	0.28		0.06	0.15			0.18			0.22	
Clearance Time (s)	3.5	4.9		3.5	4.9			4.9			4.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	292	911		98	483			596			728	
v/s Ratio Prot	c0.18	c0.23		0.03	0.12			c0.20			c0.21	
v/s Ratio Perm												
v/c Ratio	0.96	0.83		0.44	0.76			1.11			0.93	
Uniform Delay, d1	40.5	34.0		45.4	40.7			41.1			38.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	40.4	6.2		3.1	7.0			70.5			19.1	
Delay (s)	80.9	40.2		48.5	47.7			111.6			57.5	
Level of Service	F	D		D	D			F			E	
Approach Delay (s)		51.1			47.8			111.6			57.5	
Approach LOS		D			D			F			E	

Intersection Summary

HCM Average Control Delay	65.8	HCM Level of Service	E
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	100.3	Sum of lost time (s)	19.3
Intersection Capacity Utilization	89.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

21: Texas & Stuart

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	3	10	52	20	15	18	16	457	24	16	278	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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	0.91
Hourly flow rate (vph)	3	11	57	22	16	20	18	502	26	18	305	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	662	911	159	801	904	264	319			529		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	662	911	159	801	904	264	319			529		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	96	93	91	94	97	99			98		
cM capacity (veh/h)	315	264	858	243	267	734	1238			1035		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	71	58	269	277	170	166
Volume Left	3	22	18	0	18	0
Volume Right	57	20	0	26	0	13
cSH	602	325	1238	1700	1035	1700
Volume to Capacity	0.12	0.18	0.01	0.16	0.02	0.10
Queue Length 95th (ft)	10	16	1	0	1	0
Control Delay (s)	11.8	18.5	0.6	0.0	1.0	0.0
Lane LOS	B	C	A		A	
Approach Delay (s)	11.8	18.5	0.3		0.5	
Approach LOS	B	C				

Intersection Summary		
Average Delay		2.2
Intersection Capacity Utilization	46.3%	ICU Level of Service
Analysis Period (min)		15
		A

HCM Unsignalized Intersection Capacity Analysis

22: Texas & Oriental

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	4	1	3	16	1	9	1	463	10	5	279	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	5	1	3	19	1	10	1	538	12	6	324	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	619	888	162	724	883	275	324			550		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	619	888	162	724	883	275	324			550		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	94	100	99	100			99		
cM capacity (veh/h)	365	279	854	309	281	722	1232			1016		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	9	30	270	281	168	162
Volume Left	5	19	1	0	6	0
Volume Right	3	10	0	12	0	0
cSH	443	384	1232	1700	1016	1700
Volume to Capacity	0.02	0.08	0.00	0.17	0.01	0.10
Queue Length 95th (ft)	2	6	0	0	0	0
Control Delay (s)	13.3	15.2	0.0	0.0	0.3	0.0
Lane LOS	B	C	A		A	
Approach Delay (s)	13.3	15.2	0.0		0.2	
Approach LOS	B	C				

Intersection Summary		
Average Delay		0.7
Intersection Capacity Utilization	24.6%	ICU Level of Service
Analysis Period (min)	15	A

Queues

23: Eureka & EB I-10 off/Pearl

11/25/2013



Lane Group	EBT	EBR	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	832	495	38	17	132	247	63
v/c Ratio	1.19	0.58	0.40	0.08	0.24	0.39	0.13
Control Delay	128.7	7.2	47.6	14.8	30.9	6.6	30.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	128.7	7.2	47.6	14.8	30.9	6.6	30.7
Queue Length 50th (ft)	~611	31	21	0	65	0	30
Queue Length 95th (ft)	#838	117	50	18	126	64	69
Internal Link Dist (ft)	447				545		418
Turn Bay Length (ft)				75			
Base Capacity (vph)	698	848	140	314	540	630	498
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.19	0.58	0.27	0.05	0.24	0.39	0.13

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

23: Eureka & EB I-10 off/Pearl

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖		↗		↕	↗		↕	
Volume (vph)	170	612	465	36	0	16	0	124	232	15	44	0
Ideal Flow (vphpl)	1800	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		7.0	7.0	6.0		6.0		7.0	7.0		7.0	
Lane Util. Factor		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.99	1.00	0.95		1.00		1.00	1.00		0.99	
Satd. Flow (prot)		1746	1500	1583		1500		1765	1500		1743	
Flt Permitted		0.99	1.00	0.42		1.00		1.00	1.00		0.92	
Satd. Flow (perm)		1746	1500	702		1500		1765	1500		1627	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	181	651	495	38	0	17	0	132	247	16	47	0
RTOR Reduction (vph)	0	0	248	0	0	15	0	0	176	0	0	0
Lane Group Flow (vph)	0	832	247	38	0	2	0	132	72	0	63	0
Turn Type	Perm	NA	Perm	custom		custom		NA	Perm	Perm	NA	
Protected Phases		4						2				6
Permitted Phases	4		4	3		3			2	6		
Actuated Green, G (s)		40.0	40.0	11.5		11.5		29.5	29.5		29.5	
Effective Green, g (s)		38.0	38.0	9.5		9.5		27.5	27.5		27.5	
Actuated g/C Ratio		0.40	0.40	0.10		0.10		0.29	0.29		0.29	
Clearance Time (s)		5.0	5.0	4.0		4.0		5.0	5.0		5.0	
Vehicle Extension (s)		2.0	2.0	2.0		2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)		698	600	70		150		511	434		471	
v/s Ratio Prot								c0.07				
v/s Ratio Perm		0.48	0.16	c0.05		0.00			0.05		0.04	
v/c Ratio		1.19	0.41	0.54		0.01		0.26	0.16		0.13	
Uniform Delay, d1		28.5	20.5	40.7		38.5		25.9	25.2		24.9	
Progression Factor		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Incremental Delay, d2		100.2	0.2	4.5		0.0		1.2	0.8		0.6	
Delay (s)		128.7	20.6	45.2		38.5		27.1	26.0		25.5	
Level of Service		F	C	D		D		C	C		C	
Approach Delay (s)		88.4			43.2			26.4			25.5	
Approach LOS		F			D			C			C	

Intersection Summary

HCM Average Control Delay	72.0	HCM Level of Service	E
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

24: Eureka & Stuart

11/25/2013



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	50	74	17	441	43	560
v/c Ratio	0.41	0.65	0.03	0.16	0.06	0.20
Control Delay	54.9	78.6	2.6	2.3	2.7	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.9	78.6	2.6	2.3	2.7	2.6
Queue Length 50th (ft)	32	58	2	26	5	37
Queue Length 95th (ft)	70	103	7	46	14	64
Internal Link Dist (ft)	380	399		136		545
Turn Bay Length (ft)			20		20	
Base Capacity (vph)	706	679	614	2679	685	2769
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.11	0.03	0.16	0.06	0.20

Intersection Summary

HCM Signalized Intersection Capacity Analysis

24: Eureka & Stuart

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (vph)	13	21	10	38	21	6	15	296	92	38	465	28
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		0.99			1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		0.99			0.99		1.00	1.00		0.99	1.00	
Frt		0.97			0.99		1.00	0.96		1.00	0.99	
Flt Protected		0.99			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1668			1675		1583	3209		1573	3324	
Flt Permitted		0.90			0.85		0.44	1.00		0.50	1.00	
Satd. Flow (perm)		1516			1466		737	3209		822	3324	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	15	24	11	43	24	7	17	336	105	43	528	32
RTOR Reduction (vph)	0	10	0	0	5	0	0	7	0	0	1	0
Lane Group Flow (vph)	0	40	0	0	69	0	17	434	0	43	559	0
Confl. Peds. (#/hr)	9		6	6		9			3	3		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		11.7			11.7		110.3	110.3		110.3	110.3	
Effective Green, g (s)		9.7			9.7		108.3	108.3		108.3	108.3	
Actuated g/C Ratio		0.07			0.07		0.83	0.83		0.83	0.83	
Clearance Time (s)		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	
Lane Grp Cap (vph)		113			109		614	2673		685	2769	
v/s Ratio Prot								0.14			c0.17	
v/s Ratio Perm		0.03			c0.05		0.02			0.05		
v/c Ratio		0.35			0.64		0.03	0.16		0.06	0.20	
Uniform Delay, d1		57.2			58.4		1.9	2.1		1.9	2.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.9			11.6		0.1	0.1		0.2	0.2	
Delay (s)		59.1			70.0		1.9	2.2		2.1	2.3	
Level of Service		E			E		A	A		A	A	
Approach Delay (s)		59.1			70.0			2.2			2.3	
Approach LOS		E			E			A			A	

Intersection Summary

HCM Average Control Delay	8.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	41.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
25: Eureka & Oriental

11/25/2013



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	31	31	8	455	35	615
v/c Ratio	0.15	0.14	0.02	0.27	0.08	0.36
Control Delay	12.1	10.2	4.6	5.3	5.1	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.1	10.2	4.6	5.3	5.1	5.9
Queue Length 50th (ft)	3	2	1	21	3	31
Queue Length 95th (ft)	16	14	4	34	10	47
Internal Link Dist (ft)	432	448		184		93
Turn Bay Length (ft)			25		40	
Base Capacity (vph)	722	788	371	1768	432	1774
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.04	0.02	0.26	0.08	0.35

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 25: Eureka & Oriental

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (vph)	14	1	12	5	3	18	7	365	22	30	504	19
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.2			6.2		6.2	6.2		6.2	6.2	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		0.99			0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			0.91		1.00	0.99		1.00	0.99	
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1590			1556		1583	3319		1578	3332	
Flt Permitted		0.82			0.92		0.42	1.00		0.49	1.00	
Satd. Flow (perm)		1340			1452		698	3319		813	3332	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	16	1	14	6	4	21	8	429	26	35	593	22
RTOR Reduction (vph)	0	12	0	0	18	0	0	7	0	0	4	0
Lane Group Flow (vph)	0	19	0	0	13	0	8	448	0	35	611	0
Confl. Peds. (#/hr)	8		2	2		8	1		6	6		1
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			5			7				3
Permitted Phases	1			5			7			3		
Actuated Green, G (s)		7.0			7.0		20.0	20.0		20.0	20.0	
Effective Green, g (s)		5.0			5.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio		0.14			0.14		0.51	0.51		0.51	0.51	
Clearance Time (s)		4.2			4.2		4.2	4.2		4.2	4.2	
Vehicle Extension (s)		2.5			2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		189			205		355	1688		413	1694	
v/s Ratio Prot								0.14				c0.18
v/s Ratio Perm		c0.01			0.01		0.01			0.04		
v/c Ratio		0.10			0.06		0.02	0.27		0.08	0.36	
Uniform Delay, d1		13.2			13.2		4.3	4.9		4.5	5.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.1		0.0	0.1		0.1	0.1	
Delay (s)		13.4			13.3		4.3	5.0		4.5	5.3	
Level of Service		B			B		A	A		A	A	
Approach Delay (s)		13.4			13.3			5.0			5.3	
Approach LOS		B			B			A			A	

Intersection Summary

HCM Average Control Delay	5.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	35.4	Sum of lost time (s)	12.4
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

26: Eureka & Redlands

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	76	823	52	467	352	582
v/c Ratio	0.48	0.78	0.38	0.46	0.39	0.73
Control Delay	41.0	26.4	39.9	20.0	19.3	28.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.0	26.4	39.9	20.0	19.3	28.1
Queue Length 50th (ft)	31	162	21	79	52	106
Queue Length 95th (ft)	74	225	56	121	103	#198
Internal Link Dist (ft)		660		354	209	138
Turn Bay Length (ft)	35		40			
Base Capacity (vph)	444	1549	444	1539	1005	893
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.53	0.12	0.30	0.35	0.65

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

26: Eureka & Redlands

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	66	666	50	45	353	53	28	224	55	122	346	38
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7	6.6		5.7	6.6			6.2			6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.97			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1583	3314		1583	3281			3236			3268	
Flt Permitted	0.95	1.00		0.95	1.00			0.87			0.77	
Satd. Flow (perm)	1583	3314		1583	3281			2825			2540	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	76	766	57	52	406	61	32	257	63	140	398	44
RTOR Reduction (vph)	0	6	0	0	14	0	0	19	0	0	6	0
Lane Group Flow (vph)	76	817	0	52	453	0	0	333	0	0	576	0
Confl. Peds. (#/hr)	2		7	7		2	4		9	9		4
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			4	
Permitted Phases							4			4		
Actuated Green, G (s)	8.8	23.4		7.8	22.4			22.9			22.9	
Effective Green, g (s)	6.8	21.4		5.8	20.4			20.9			20.9	
Actuated g/C Ratio	0.10	0.32		0.09	0.31			0.31			0.31	
Clearance Time (s)	3.7	4.6		3.7	4.6			4.2			4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	162	1065		138	1005			887			797	
v/s Ratio Prot	c0.05	c0.25		0.03	0.14							
v/s Ratio Perm								0.12			c0.23	
v/c Ratio	0.47	0.77		0.38	0.45			0.38			0.72	
Uniform Delay, d1	28.2	20.4		28.7	18.6			17.8			20.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.1	3.4		1.7	0.3			0.3			3.3	
Delay (s)	30.3	23.7		30.4	18.9			18.0			23.5	
Level of Service	C	C		C	B			B			C	
Approach Delay (s)		24.3			20.1			18.0			23.5	
Approach LOS		C			C			B			C	

Intersection Summary

HCM Average Control Delay	22.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	66.6	Sum of lost time (s)	11.9
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues
27: Orange & Colton

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	158	566	152	240	109	64	404	87	505
v/c Ratio	0.31	0.65	0.50	0.27	0.13	0.35	0.48	0.42	0.62
Control Delay	10.1	13.8	16.7	8.6	2.7	20.4	13.9	21.7	18.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.1	13.8	16.7	8.6	2.7	20.4	13.9	21.7	18.9
Queue Length 50th (ft)	22	95	24	33	0	15	38	20	62
Queue Length 95th (ft)	66	#238	#102	83	20	41	68	52	99
Internal Link Dist (ft)		502		260			472		133
Turn Bay Length (ft)	50		65		65	50		75	
Base Capacity (vph)	515	871	307	895	814	546	2344	615	2382
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.65	0.50	0.27	0.13	0.12	0.17	0.14	0.21

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

27: Orange & Colton

11/25/2013



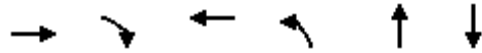
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↑	↗	↖	↕		↖	↕	
Volume (vph)	155	396	159	149	235	107	63	301	95	85	452	43
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1689		1583	1765	1500	1583	3232		1583	3309	
Flt Permitted	0.61	1.00		0.36	1.00	1.00	0.46	1.00		0.51	1.00	
Satd. Flow (perm)	1016	1689		605	1765	1500	760	3232		857	3309	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	158	404	162	152	240	109	64	307	97	87	461	44
RTOR Reduction (vph)	0	15	0	0	0	54	0	64	0	0	15	0
Lane Group Flow (vph)	158	551	0	152	240	55	64	340	0	87	490	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	26.1	26.1		26.1	26.1	26.1	13.4	13.4		13.4	13.4	
Effective Green, g (s)	24.1	24.1		24.1	24.1	24.1	11.4	11.4		11.4	11.4	
Actuated g/C Ratio	0.51	0.51		0.51	0.51	0.51	0.24	0.24		0.24	0.24	
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	3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	515	857		307	896	761	182	776		206	794	
v/s Ratio Prot		c0.33			0.14			0.11			c0.15	
v/s Ratio Perm	0.16			0.25		0.04	0.08			0.10		
v/c Ratio	0.31	0.64		0.50	0.27	0.07	0.35	0.44		0.42	0.62	
Uniform Delay, d1	6.8	8.6		7.7	6.7	6.0	15.0	15.3		15.3	16.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	1.7		1.3	0.2	0.0	1.4	0.5		1.7	1.5	
Delay (s)	7.2	10.2		9.0	6.8	6.0	16.4	15.8		16.9	17.6	
Level of Service	A	B		A	A	A	B	B		B	B	
Approach Delay (s)		9.5			7.3			15.9			17.5	
Approach LOS		A			A			B			B	

Intersection Summary

HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	47.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues
28: Pearl & Orange

11/25/2013



Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	674	229	338	21	1007	438
v/c Ratio	1.45	0.38	1.02	0.06	0.70	0.35
Control Delay	236.6	15.2	77.7	10.2	17.1	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	236.6	15.2	77.7	10.2	17.1	12.4
Queue Length 50th (ft)	~394	52	~131	5	155	56
Queue Length 95th (ft)	#616	115	#295	16	214	85
Internal Link Dist (ft)	445		279		526	472
Turn Bay Length (ft)		20		75		
Base Capacity (vph)	465	597	330	445	1784	1562
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.45	0.38	1.02	0.05	0.56	0.28

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

28: Pearl & Orange

11/25/2013



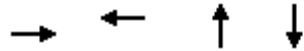
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↖	↕			↕	↖
Volume (vph)	261	379	218	47	42	233	20	883	74	25	384	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95			0.95	
Frt		1.00	0.85		0.90		1.00	0.99			1.00	
Flt Protected		0.98	1.00		0.99		0.95	1.00			1.00	
Satd. Flow (prot)		1729	1500		1581		1583	3314			3334	
Flt Permitted		0.70	1.00		0.46		0.50	1.00			0.87	
Satd. Flow (perm)		1230	1500		733		830	3314			2913	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	275	399	229	49	44	245	21	929	78	26	404	8
RTOR Reduction (vph)	0	0	30	0	53	0	0	10	0	0	2	0
Lane Group Flow (vph)	0	674	199	0	285	0	21	997	0	0	436	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4			2			2		
Actuated Green, G (s)		26.3	26.3		26.3		29.7	29.7			29.7	
Effective Green, g (s)		24.3	24.3		24.3		27.7	27.7			27.7	
Actuated g/C Ratio		0.38	0.38		0.38		0.43	0.43			0.43	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.5	3.5			3.5	
Lane Grp Cap (vph)		467	570		278		359	1434			1261	
v/s Ratio Prot								c0.30				
v/s Ratio Perm		c0.55	0.13		0.39		0.03				0.15	
v/c Ratio		1.44	0.35		1.02		0.06	0.70			0.35	
Uniform Delay, d1		19.9	14.2		19.9		10.6	14.7			12.1	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		211.3	0.4		60.3		0.1	1.5			0.2	
Delay (s)		231.2	14.6		80.1		10.6	16.3			12.3	
Level of Service		F	B		F		B	B			B	
Approach Delay (s)		176.2			80.1			16.2			12.3	
Approach LOS		F			F			B			B	

Intersection Summary

HCM Average Control Delay	76.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	64.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	102.9%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues
29: Orange & Stuart

11/25/2013



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	210	267	969	618
v/c Ratio	0.55	0.73	0.73	0.54
Control Delay	19.7	28.9	12.7	10.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	19.7	28.9	12.7	10.7
Queue Length 50th (ft)	35	47	90	55
Queue Length 95th (ft)	#114	#175	138	87
Internal Link Dist (ft)	305	198	150	526
Turn Bay Length (ft)				
Base Capacity (vph)	464	444	2269	1985
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.45	0.60	0.43	0.31

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

29: Orange & Stuart

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	72	77	44	128	47	71	8	739	144	50	509	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.2			6.2			6.2			6.2	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frbp, ped/bikes		0.99			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.97			0.96			0.98			1.00	
Flt Protected		0.98			0.97			1.00			1.00	
Satd. Flow (prot)		1660			1627			3248			3326	
Flt Permitted		0.81			0.77			0.95			0.81	
Satd. Flow (perm)		1369			1291			3082			2715	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	84	48	139	51	77	9	803	157	54	553	11
RTOR Reduction (vph)	0	19	0	0	26	0	0	37	0	0	3	0
Lane Group Flow (vph)	0	191	0	0	241	0	0	932	0	0	615	0
Confl. Peds. (#/hr)	33		35	35		33	12		21	21		12
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		12.9			12.9			19.3			19.3	
Effective Green, g (s)		10.9			10.9			17.3			17.3	
Actuated g/C Ratio		0.27			0.27			0.43			0.43	
Clearance Time (s)		4.2			4.2			4.2			4.2	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		368			347			1313			1157	
v/s Ratio Prot												
v/s Ratio Perm		0.14			0.19			0.30			0.23	
v/c Ratio		0.52			0.70			0.71			0.53	
Uniform Delay, d1		12.6			13.4			9.6			8.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.2			6.0			1.8			0.5	
Delay (s)		13.9			19.3			11.4			9.1	
Level of Service		B			B			B			A	
Approach Delay (s)		13.9			19.3			11.4			9.1	
Approach LOS		B			B			B			A	

Intersection Summary

HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	40.6	Sum of lost time (s)	12.4
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

30: Orange & Oriental

11/25/2013

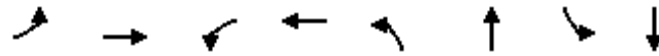


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	42	20	10	833	647	30
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	44	21	11	877	681	32
Pedestrians	16			24	1	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	1			2	0	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				464	395	
pX, platoon unblocked	0.88					
vC, conflicting volume	1173	396	729			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	931	396	729			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	81	96	99			
cM capacity (veh/h)	228	583	859			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	65	303	585	454	259	
Volume Left	44	11	0	0	0	
Volume Right	21	0	0	0	32	
cSH	284	859	1700	1700	1700	
Volume to Capacity	0.23	0.01	0.34	0.27	0.15	
Queue Length 95th (ft)	22	1	0	0	0	
Control Delay (s)	21.4	0.5	0.0	0.0	0.0	
Lane LOS	C	A				
Approach Delay (s)	21.4	0.2		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay	0.9					
Intersection Capacity Utilization	47.8%			ICU Level of Service	A	
Analysis Period (min)	15					

Queues

31: Orange & Redlands

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	190	633	53	572	65	489	153	490
v/c Ratio	0.67	0.63	0.44	0.77	0.49	0.74	0.67	0.58
Control Delay	50.6	30.2	56.2	33.5	56.5	42.1	54.8	31.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.6	30.2	56.2	33.5	56.5	42.1	54.8	31.6
Queue Length 50th (ft)	99	152	29	121	36	136	83	121
Queue Length 95th (ft)	#241	267	78	214	91	228	176	206
Internal Link Dist (ft)		387		273		223		384
Turn Bay Length (ft)	60		60		75		60	
Base Capacity (vph)	345	1497	345	1479	345	1508	345	1480
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.42	0.15	0.39	0.19	0.32	0.44	0.33

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

31: Orange & Redlands

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	184	529	85	51	308	246	63	432	43	148	380	95
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	5.5	6.2		5.5	6.2		5.5	6.2		5.5	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	0.98		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.93		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3266		1583	3081		1583	3295		1583	3224	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	3266		1583	3081		1583	3295		1583	3224	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	190	545	88	53	318	254	65	445	44	153	392	98
RTOR Reduction (vph)	0	9	0	0	116	0	0	6	0	0	16	0
Lane Group Flow (vph)	190	624	0	53	456	0	65	483	0	153	474	0
Confl. Peds. (#/hr)	16		15	15		16	26		23	23		26
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	18.0	29.4		8.9	20.3		9.6	19.7		14.9	25.0	
Effective Green, g (s)	16.0	27.4		6.9	18.3		7.6	17.7		12.9	23.0	
Actuated g/C Ratio	0.18	0.31		0.08	0.21		0.09	0.20		0.15	0.26	
Clearance Time (s)	3.5	4.2		3.5	4.2		3.5	4.2		3.5	4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	287	1013		124	639		136	660		231	840	
v/s Ratio Prot	c0.12	c0.19		0.03	c0.15		0.04	c0.15		c0.10	c0.15	
v/s Ratio Perm												
v/c Ratio	0.66	0.62		0.43	0.71		0.48	0.73		0.66	0.56	
Uniform Delay, d1	33.6	26.0		38.8	32.6		38.5	33.1		35.6	28.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.6	1.1		2.4	3.8		2.6	4.2		7.0	0.9	
Delay (s)	39.3	27.1		41.2	36.4		41.1	37.3		42.6	29.2	
Level of Service	D	C		D	D		D	D		D	C	
Approach Delay (s)		29.9			36.8			37.7			32.4	
Approach LOS		C			D			D			C	

Intersection Summary

HCM Average Control Delay	33.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	88.3	Sum of lost time (s)	35.8
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

32: 6th St & WB I-10 Ramp

11/25/2013





















Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↖	↗			↑			↖	↗
Volume (veh/h)	0	0	0	198	10	167	0	317	0	0	388	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	208	11	176	0	334	0	0	408	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	923	742	408	742	742	334	408			334		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	923	742	408	742	742	334	408			334		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	37	97	75	100			100		
cM capacity (veh/h)	184	344	643	332	344	708	1150			1226		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	208	186	334	408
Volume Left	208	0	0	0
Volume Right	0	176	0	0
cSH	332	668	1700	1700
Volume to Capacity	0.63	0.28	0.20	0.24
Queue Length 95th (ft)	101	28	0	0
Control Delay (s)	32.6	12.5	0.0	0.0
Lane LOS	D	B		
Approach Delay (s)	23.1		0.0	0.0
Approach LOS	C			

Intersection Summary			
Average Delay		8.0	
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
 33: 6th St & EB I-10 Ramp

11/25/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	128	206	176	0	0	0	190	169	120	235	247	108
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	132	212	181	0	0	0	196	174	124	242	255	111
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2						
Volume Total (vph)	344	181	196	298	242	366						
Volume Left (vph)	132	0	196	0	242	0						
Volume Right (vph)	0	181	0	124	0	111						
Hadj (s)	0.23	-0.67	0.53	-0.26	0.53	-0.18						
Departure Headway (s)	7.6	6.7	7.9	7.1	7.7	7.0						
Degree Utilization, x	0.73	0.34	0.43	0.59	0.52	0.71						
Capacity (veh/h)	456	514	432	485	453	498						
Control Delay (s)	27.5	12.0	15.6	18.6	17.7	24.4						
Approach Delay (s)	22.1		17.4		21.7							
Approach LOS	C		C		C							
Intersection Summary												
Delay			20.5									
HCM Level of Service			C									
Intersection Capacity Utilization			61.3%	ICU Level of Service								B
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

34: 6th St & Stuart

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (veh/h)	23	17	46	18	9	55	60	465	20	36	326	35
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	24	18	47	19	9	57	62	479	21	37	336	36
Pedestrians		2			2			4			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1097	1056	192	918	1064	494	374			502		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1097	1056	192	918	1064	494	374			502		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	82	91	94	90	95	89	95			96		
cM capacity (veh/h)	134	204	813	185	202	519	1179			1057		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	89	85	62	500	37	224	148
Volume Left	24	19	62	0	37	0	0
Volume Right	47	57	0	21	0	0	36
cSH	276	331	1179	1700	1057	1700	1700
Volume to Capacity	0.32	0.26	0.05	0.29	0.04	0.13	0.09
Queue Length 95th (ft)	34	25	4	0	3	0	0
Control Delay (s)	24.1	19.6	8.2	0.0	8.5	0.0	0.0
Lane LOS	C	C	A		A		
Approach Delay (s)	24.1	19.6	0.9		0.8		
Approach LOS	C	C					

Intersection Summary

Average Delay	4.0
Intersection Capacity Utilization	49.0%
ICU Level of Service	A
Analysis Period (min)	15

Queues

35: Redlands Blvd & Citrus Ave

11/25/2013



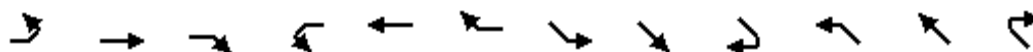
Lane Group	EBT	WBT	SET	SER	NWT
Lane Group Flow (vph)	615	359	631	104	398
v/c Ratio	0.74	0.70	0.69	0.17	0.44
Control Delay	32.7	34.9	26.4	8.6	20.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	32.7	34.9	26.4	8.6	20.6
Queue Length 50th (ft)	136	73	143	11	77
Queue Length 95th (ft)	238	132	224	45	128
Internal Link Dist (ft)	399	463	375		430
Turn Bay Length (ft)				100	
Base Capacity (vph)	968	1609	1228	780	1196
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.64	0.22	0.51	0.13	0.33

Intersection Summary

HCM Signalized Intersection Capacity Analysis

35: Redlands Blvd & Citrus Ave

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕↕			↕↕			↕↕	↗		↕↕	
Volume (vph)	126	292	184	48	188	116	155	464	102	71	266	54
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.2			6.2	6.2		6.2	
Lane Util. Factor		0.95			0.95			0.95	1.00		0.95	
Frt		0.95			0.95			1.00	0.85		0.98	
Flt Protected		0.99			0.99			0.99	1.00		0.99	
Satd. Flow (prot)		3166			3166			3311	1500		3254	
Flt Permitted		0.99			0.99			0.74	1.00		0.73	
Satd. Flow (perm)		3166			3166			2474	1500		2392	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	129	298	188	49	192	118	158	473	104	72	271	55
RTOR Reduction (vph)	0	39	0	0	64	0	0	0	44	0	10	0
Lane Group Flow (vph)	0	576	0	0	295	0	0	631	60	0	388	0
Turn Type	Split	NA		Split	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	4	4		1	1			2			2	
Permitted Phases							2		2	2		
Actuated Green, G (s)		22.2			13.5			32.0	32.0		32.0	
Effective Green, g (s)		20.2			11.5			30.0	30.0		30.0	
Actuated g/C Ratio		0.25			0.14			0.37	0.37		0.37	
Clearance Time (s)		4.0			4.2			4.2	4.2		4.2	
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		798			455			927	562		896	
v/s Ratio Prot		c0.18			c0.09							
v/s Ratio Perm								c0.26	0.04		0.16	
v/c Ratio		0.72			0.65			0.68	0.11		0.43	
Uniform Delay, d1		27.4			32.4			21.0	16.3		18.7	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		3.2			3.2			2.1	0.1		0.3	
Delay (s)		30.6			35.6			23.1	16.4		19.0	
Level of Service		C			D			C	B		B	
Approach Delay (s)		30.6			35.6			22.2			19.0	
Approach LOS		C			D			C			B	

Intersection Summary

HCM Average Control Delay	26.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	80.1	Sum of lost time (s)	18.4
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

36: Stuart & Church

11/25/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	63	29	11	296	262	18
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	65	30	11	305	270	19
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	607	279	289			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	607	279	289			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	96	99			
cM capacity (veh/h)	455	759	1273			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	95	316	289			
Volume Left	65	11	0			
Volume Right	30	0	19			
cSH	521	1273	1700			
Volume to Capacity	0.18	0.01	0.17			
Queue Length 95th (ft)	16	1	0			
Control Delay (s)	13.4	0.4	0.0			
Lane LOS	B	A				
Approach Delay (s)	13.4	0.4	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization		38.1%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
 37: Universtiy & WB I-10 Ramp/E Central

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↔			↔	
Volume (veh/h)	0	0	0	2	22	16	308	603	42	10	181	427
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	0	2	23	16	318	622	43	10	187	440
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1401	1727	313	1392	1926	332	627				665	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1401	1727	313	1392	1926	332	627				665	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	97	48	98	67				99	
cM capacity (veh/h)	43	58	682	75	43	663	951				920	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	41	628	354	104	534
Volume Left	2	318	0	10	0
Volume Right	16	0	43	0	440
cSH	72	951	1700	920	1700
Volume to Capacity	0.57	0.33	0.21	0.01	0.31
Queue Length 95th (ft)	62	37	0	1	0
Control Delay (s)	108.3	7.6	0.0	1.0	0.0
Lane LOS	F	A		A	
Approach Delay (s)	108.3	4.8		0.2	
Approach LOS	F				

Intersection Summary	
Average Delay	5.6
Intersection Capacity Utilization	61.9%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

38: Universtiy & EB I-10 Ramp

11/25/2013

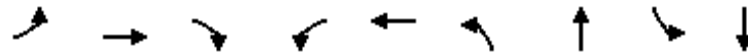


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	448	578	0	507	197	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	453	584	0	512	199	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	12					
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	455	99	199			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	455	99	199			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	15	38	100			
cM capacity (veh/h)	534	937	1371			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	1036	256	256	99	99	
Volume Left	453	0	0	0	0	
Volume Right	584	0	0	0	0	
cSH	1222	1700	1700	1700	1700	
Volume to Capacity	0.85	0.15	0.15	0.06	0.06	
Queue Length 95th (ft)	282	0	0	0	0	
Control Delay (s)	25.3	0.0	0.0	0.0	0.0	
Lane LOS	D					
Approach Delay (s)	25.3	0.0		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay	15.0					
Intersection Capacity Utilization	50.2%			ICU Level of Service	A	
Analysis Period (min)	15					

Queues

39: Tippecanoe & Harriman PI

11/25/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	166	8	408	46	15	139	1125	11	1411
v/c Ratio	0.66	0.02	0.63	0.18	0.05	0.93	0.54	0.05	0.35
Control Delay	36.3	19.0	19.3	21.8	12.7	77.3	7.0	6.4	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.3	19.0	19.3	21.8	12.7	77.3	7.0	6.4	4.7
Queue Length 50th (ft)	59	3	51	15	1	50	78	1	43
Queue Length 95th (ft)	114	12	93	38	14	#119	119	m2	m83
Internal Link Dist (ft)		629			689		499		773
Turn Bay Length (ft)	280		170	150		260		225	
Base Capacity (vph)	307	434	758	308	395	150	2102	238	4057
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.02	0.54	0.15	0.04	0.93	0.54	0.05	0.35

Intersection Summary

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

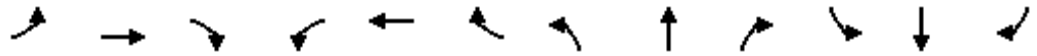
Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

39: Tippecanoe & Harriman PI

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗↘	↖	↗		↖	↖↗↘		↖	↖↗↘	
Volume (vph)	158	8	388	44	4	10	264	915	22	10	1170	170
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
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	0.88	1.00	1.00		0.86	0.86		1.00	0.86	
Frt	1.00	1.00	0.85	1.00	0.89		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.99		0.95	1.00	
Satd. Flow (prot)	1583	1765	2640	1583	1571		1362	4511		1583	5955	
Flt Permitted	0.75	1.00	1.00	0.75	1.00		0.16	0.69		0.21	1.00	
Satd. Flow (perm)	1246	1765	2640	1254	1571		222	3111		351	5955	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	166	8	408	46	4	11	278	963	23	11	1232	179
RTOR Reduction (vph)	0	0	114	0	9	0	0	3	0	0	35	0
Lane Group Flow (vph)	166	8	294	46	6	0	139	1122	0	11	1376	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	13.1	13.1	13.1	13.1	13.1		43.9	43.9		43.9	43.9	
Effective Green, g (s)	13.1	13.1	13.1	13.1	13.1		43.9	43.9		43.9	43.9	
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20		0.68	0.68		0.68	0.68	
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)	251	356	532	253	317		150	2101		237	4022	
v/s Ratio Prot		0.00			0.00							0.23
v/s Ratio Perm	c0.13		0.11	0.04			c0.63	0.36		0.03		
v/c Ratio	0.66	0.02	0.55	0.18	0.02		0.93	0.53		0.05	0.34	
Uniform Delay, d1	23.9	20.8	23.3	21.5	20.8		9.2	5.4		3.5	4.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.27	1.02	
Incremental Delay, d2	6.4	0.0	1.2	0.3	0.0		56.1	1.0		0.2	0.2	
Delay (s)	30.3	20.8	24.6	21.9	20.8		65.3	6.3		4.7	4.7	
Level of Service	C	C	C	C	C		E	A		A	A	
Approach Delay (s)		26.1			21.6			12.8			4.7	
Approach LOS		C			C			B			A	

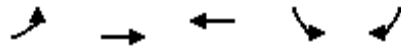
Intersection Summary

HCM Average Control Delay	11.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues

1: Mill St & S Sierra Way

11/25/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	74	746	828	181	85
v/c Ratio	0.22	0.38	0.42	0.37	0.34
Control Delay	7.8	6.2	6.4	11.5	10.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	6.2	6.4	11.5	10.0
Queue Length 50th (ft)	7	40	46	10	3
Queue Length 95th (ft)	26	76	86	27	28
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	343	2031	2021	1498	675
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.22	0.37	0.41	0.12	0.13

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St & S Sierra Way

11/25/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	68	686	727	35	100	144
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.94	0.85
Flt Protected	0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	1583	3353	3330		3125	1365
Flt Permitted	0.34	1.00	1.00		0.97	1.00
Satd. Flow (perm)	566	3353	3330		3125	1365
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	74	746	790	38	109	157
RTOR Reduction (vph)	0	0	6	0	63	63
Lane Group Flow (vph)	74	746	822	0	118	22
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	20.8	20.8	20.8		5.5	5.5
Effective Green, g (s)	18.8	18.8	18.8		3.5	3.5
Actuated g/C Ratio	0.53	0.53	0.53		0.10	0.10
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	301	1786	1773		310	135
v/s Ratio Prot		0.22	c0.25		c0.04	
v/s Ratio Perm	0.13					0.02
v/c Ratio	0.25	0.42	0.46		0.38	0.16
Uniform Delay, d1	4.4	5.0	5.1		14.9	14.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.4	0.2	0.2		0.8	0.6
Delay (s)	4.9	5.1	5.3		15.7	15.1
Level of Service	A	A	A		B	B
Approach Delay (s)		5.1	5.3		15.5	
Approach LOS		A	A		B	

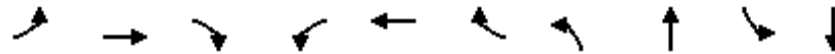
Intersection Summary

HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	35.3	Sum of lost time (s)	13.0
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

11/25/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	229	356	289	151	348	110	282	1082	116	1139
v/c Ratio	0.65	0.58	0.57	0.48	0.71	0.35	0.81	0.66	0.43	0.84
Control Delay	29.2	37.0	8.5	24.4	44.7	9.8	45.9	30.6	36.7	39.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.2	37.0	8.5	24.4	44.7	9.8	45.9	30.6	36.7	39.5
Queue Length 50th (ft)	95	97	0	59	101	0	132	200	52	225
Queue Length 95th (ft)	135	135	63	91	137	42	#289	#328	106	#378
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	382	857	598	379	782	434	363	1637	295	1351
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	0.60	0.42	0.48	0.40	0.45	0.25	0.78	0.66	0.39	0.84

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	206	320	260	136	313	99	254	887	86	104	831	194
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0		5.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3353	1500	1583	3353	1500	1583	4754		1583	4681	
Flt Permitted	0.37	1.00	1.00	0.54	1.00	1.00	0.26	1.00		0.25	1.00	
Satd. Flow (perm)	625	3353	1500	898	3353	1500	439	4754		420	4681	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	229	356	289	151	348	110	282	986	96	116	923	216
RTOR Reduction (vph)	0	0	236	0	0	94	0	11	0	0	38	0
Lane Group Flow (vph)	229	356	53	151	348	16	282	1071	0	116	1101	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	32.8	18.5	18.5	26.4	15.1	15.1	32.2	32.2		29.2	27.2	
Effective Green, g (s)	29.2	16.5	16.5	22.4	13.1	13.1	30.2	30.2		27.2	25.2	
Actuated g/C Ratio	0.32	0.18	0.18	0.25	0.15	0.15	0.34	0.34		0.30	0.28	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	338	615	275	294	488	218	338	1595		256	1311	
v/s Ratio Prot	c0.10	0.11		0.05	0.10		c0.14	0.23		0.05	c0.24	
v/s Ratio Perm	c0.12		0.04	0.07		0.01	0.14			0.09		
v/c Ratio	0.68	0.58	0.19	0.51	0.71	0.07	0.83	0.67		0.45	0.84	
Uniform Delay, d1	24.2	33.6	31.1	28.1	36.7	33.2	25.0	25.6		28.1	30.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.3	1.3	0.3	1.5	4.9	0.1	16.1	2.3		1.3	4.9	
Delay (s)	29.5	34.9	31.5	29.6	41.6	33.4	41.1	27.9		29.4	35.4	
Level of Service	C	C	C	C	D	C	D	C		C	D	
Approach Delay (s)		32.4			37.1			30.6			34.8	
Approach LOS		C			D			C			C	

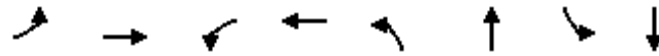
Intersection Summary

HCM Average Control Delay	33.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Waterman & E Orange Show

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	257	731	133	505	238	972	140	1288
v/c Ratio	0.88	1.02	0.60	0.87	0.87	0.88	0.66	1.31
Control Delay	55.4	73.6	32.4	54.4	52.8	40.9	31.4	176.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.4	73.6	32.4	54.4	52.8	40.9	31.4	176.7
Queue Length 50th (ft)	115	220	55	156	96	293	47	~553
Queue Length 95th (ft)	#248	#379	96	#230	#238	#455	91	#677
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	299	719	291	636	288	1109	289	983
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	1.02	0.46	0.79	0.83	0.88	0.48	1.31

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	229	453	198	118	390	60	212	743	122	125	888	258
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	7.0		6.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3200		1583	3286		1583	3282		1583	3240	
Flt Permitted	0.23	1.00		0.24	1.00		0.13	1.00		0.14	1.00	
Satd. Flow (perm)	380	3200		407	3286		210	3282		239	3240	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	257	509	222	133	438	67	238	835	137	140	998	290
RTOR Reduction (vph)	0	48	0	0	12	0	0	13	0	0	27	0
Lane Group Flow (vph)	257	683	0	133	493	0	238	959	0	140	1261	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	36.5	22.0		29.3	18.4		47.9	33.8		40.5	30.1	
Effective Green, g (s)	32.5	20.0		25.3	16.4		43.9	31.8		36.5	28.1	
Actuated g/C Ratio	0.34	0.21		0.27	0.17		0.46	0.33		0.38	0.30	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	288	673		218	567		272	1097		210	957	
v/s Ratio Prot	c0.12	c0.21		0.06	0.15		c0.11	c0.29		0.06	c0.39	
v/s Ratio Perm	0.19			0.11			0.29			0.20		
v/c Ratio	0.89	1.01		0.61	0.87		0.88	0.87		0.67	1.32	
Uniform Delay, d1	25.4	37.5		28.5	38.3		23.4	29.8		21.3	33.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	27.3	38.4		5.0	13.3		25.3	7.9		7.8	150.5	
Delay (s)	52.7	75.9		33.5	51.6		48.7	37.7		29.1	184.0	
Level of Service	D	E		C	D		D	D		C	F	
Approach Delay (s)		69.9			47.8			39.9			168.8	
Approach LOS		E			D			D			F	

Intersection Summary

HCM Average Control Delay	91.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.29		
Actuated Cycle Length (s)	95.1	Sum of lost time (s)	33.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

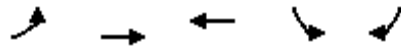
11/25/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	2	6	18	1075	1201	3
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)	2	7	20	1168	1305	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					745	
pX, platoon unblocked	0.79	0.79	0.79			
vC, conflicting volume	1930	654	1309			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1649	36	863			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	97			
cM capacity (veh/h)	69	814	613			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	9	20	584	584	870	438
Volume Left	2	20	0	0	0	0
Volume Right	7	0	0	0	0	3
cSH	220	613	1700	1700	1700	1700
Volume to Capacity	0.04	0.03	0.34	0.34	0.51	0.26
Queue Length 95th (ft)	3	2	0	0	0	0
Control Delay (s)	22.1	11.1	0.0	0.0	0.0	0.0
Lane LOS	C	B				
Approach Delay (s)	22.1	0.2			0.0	
Approach LOS	C					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			45.1%		ICU Level of Service	A
Analysis Period (min)			15			

Queues
1: Mill St

12/23/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	65	470	406	111	50
v/c Ratio	0.13	0.24	0.21	0.24	0.21
Control Delay	6.3	5.7	5.3	11.6	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	5.7	5.3	11.6	7.5
Queue Length 50th (ft)	6	22	17	5	0
Queue Length 95th (ft)	18	40	33	20	17
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	632	2477	2453	2149	933
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.10	0.19	0.17	0.05	0.05

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St

12/23/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑↑	↑↑		↵↵	↵
Volume (vph)	56	404	321	28	76	63
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.97	0.85
Flt Protected	0.95	1.00	1.00		0.96	1.00
Satd. Flow (prot)	1615	3420	3378		3254	1392
Flt Permitted	0.51	1.00	1.00		0.96	1.00
Satd. Flow (perm)	873	3420	3378		3254	1392
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	65	470	373	33	88	73
RTOR Reduction (vph)	0	0	9	0	21	45
Lane Group Flow (vph)	65	470	397	0	90	5
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	18.9	18.9	18.9		5.3	5.3
Effective Green, g (s)	16.9	16.9	16.9		3.3	3.3
Actuated g/C Ratio	0.51	0.51	0.51		0.10	0.10
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	444	1741	1720		323	138
v/s Ratio Prot		c0.14	0.12		c0.03	
v/s Ratio Perm	0.07					0.00
v/c Ratio	0.15	0.27	0.23		0.28	0.04
Uniform Delay, d1	4.3	4.6	4.5		13.8	13.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.1	0.1		0.5	0.1
Delay (s)	4.5	4.7	4.6		14.3	13.6
Level of Service	A	A	A		B	B
Approach Delay (s)		4.7	4.6		14.1	
Approach LOS		A	A		B	

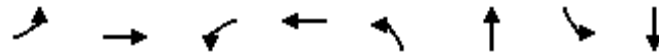
Intersection Summary

HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	33.2	Sum of lost time (s)	13.0
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

2: Waterman Ave & 9th St

12/23/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	51	251	92	298	50	541	73	761
v/c Ratio	0.22	0.30	0.37	0.35	0.24	0.46	0.28	0.65
Control Delay	15.5	11.0	18.1	11.3	11.7	10.2	11.7	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.5	11.0	18.1	11.3	11.7	10.2	11.7	12.8
Queue Length 50th (ft)	8	16	15	19	6	37	10	59
Queue Length 95th (ft)	33	46	53	53	26	77	34	116
Internal Link Dist (ft)		852		841		893		996
Turn Bay Length (ft)	130		100		50		75	
Base Capacity (vph)	508	1761	534	1775	357	1961	443	1969
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.14	0.17	0.17	0.14	0.28	0.16	0.39

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: Waterman Ave & 9th St

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	182	49	85	218	56	46	444	53	67	657	43
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	7.5	7.5		7.4	7.4		7.5	7.5		7.5	7.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.97		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3312		1615	3315		1615	3365		1615	3388	
Flt Permitted	0.57	1.00		0.60	1.00		0.36	1.00		0.45	1.00	
Satd. Flow (perm)	969	3312		1014	3315		617	3365		766	3388	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	51	198	53	92	237	61	50	483	58	73	714	47
RTOR Reduction (vph)	0	40	0	0	46	0	0	18	0	0	9	0
Lane Group Flow (vph)	51	211	0	92	252	0	50	523	0	73	752	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	11.1	11.1		11.2	11.2		14.8	14.8		14.8	14.8	
Effective Green, g (s)	9.1	9.1		9.2	9.2		12.8	12.8		12.8	12.8	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.35	0.35		0.35	0.35	
Clearance Time (s)	5.5	5.5		5.4	5.4		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	239	817		253	827		214	1167		266	1175	
v/s Ratio Prot		0.06			0.08			0.16			c0.22	
v/s Ratio Perm	0.05			c0.09			0.08			0.10		
v/c Ratio	0.21	0.26		0.36	0.30		0.23	0.45		0.27	0.64	
Uniform Delay, d1	11.1	11.2		11.4	11.3		8.6	9.3		8.7	10.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.2		0.9	0.2		0.6	0.3		0.6	1.2	
Delay (s)	11.5	11.4		12.3	11.5		9.1	9.6		9.3	11.3	
Level of Service	B	B		B	B		A	A		A	B	
Approach Delay (s)		11.4			11.7			9.6			11.1	
Approach LOS		B			B			A			B	

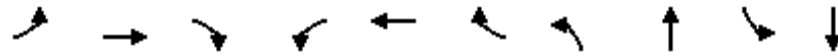
Intersection Summary

HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	36.9	Sum of lost time (s)	14.9
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

12/23/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	93	314	129	119	234	67	83	613	85	709
v/c Ratio	0.32	0.61	0.38	0.42	0.44	0.23	0.27	0.34	0.26	0.36
Control Delay	18.4	30.7	8.4	20.9	26.9	8.7	21.8	16.6	16.5	15.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.4	30.7	8.4	20.9	26.9	8.7	21.8	16.6	16.5	15.5
Queue Length 50th (ft)	25	63	0	32	44	0	23	65	22	76
Queue Length 95th (ft)	52	91	38	65	70	27	55	99	50	107
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	290	894	495	284	894	450	305	1815	325	1977
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	0.35	0.26	0.42	0.26	0.15	0.27	0.34	0.26	0.36

Intersection Summary

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	88	298	123	113	222	64	79	499	84	81	608	66
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0		5.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3420	1530	1615	3420	1530	1615	4808		1615	4842	
Flt Permitted	0.61	1.00	1.00	0.54	1.00	1.00	0.37	1.00		0.31	1.00	
Satd. Flow (perm)	1030	3420	1530	916	3420	1530	630	4808		526	4842	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	93	314	129	119	234	67	83	525	88	85	640	69
RTOR Reduction (vph)	0	0	110	0	0	57	0	31	0	0	17	0
Lane Group Flow (vph)	93	314	19	119	234	10	83	582	0	85	692	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	17.2	11.7	11.7	18.0	12.1	12.1	26.9	24.9		27.1	27.1	
Effective Green, g (s)	13.2	9.7	9.7	14.0	10.1	10.1	24.9	22.9		25.1	25.1	
Actuated g/C Ratio	0.20	0.15	0.15	0.22	0.16	0.16	0.38	0.35		0.39	0.39	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	241	510	228	239	531	238	276	1694		279	1870	
v/s Ratio Prot	0.02	c0.09		c0.03	0.07		c0.01	c0.12		0.02	c0.14	
v/s Ratio Perm	0.06		0.01	0.08		0.01	0.10			0.10		
v/c Ratio	0.39	0.62	0.08	0.50	0.44	0.04	0.30	0.34		0.30	0.37	
Uniform Delay, d1	21.9	25.9	23.8	21.6	24.9	23.3	14.2	15.5		13.1	14.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	2.2	0.2	1.6	0.6	0.1	0.6	0.6		0.6	0.6	
Delay (s)	22.9	28.1	24.0	23.2	25.5	23.4	14.9	16.1		13.8	14.9	
Level of Service	C	C	C	C	C	C	B	B		B	B	
Approach Delay (s)		26.2			24.5			15.9			14.7	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	26.0
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Waterman & E Orange Show

12/23/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	137	548	100	326	83	715	58	793
v/c Ratio	0.38	0.71	0.37	0.51	0.32	0.60	0.20	0.76
Control Delay	21.3	26.5	21.9	30.9	15.7	23.5	14.2	29.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.3	26.5	21.9	30.9	15.7	23.5	14.2	29.5
Queue Length 50th (ft)	44	90	31	70	21	151	14	177
Queue Length 95th (ft)	89	155	68	122	48	229	37	264
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	479	1045	423	981	425	1563	472	1523
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.52	0.24	0.33	0.20	0.46	0.12	0.52

Intersection Summary

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	118	274	197	86	233	47	71	571	44	50	608	74
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	7.0		6.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.94		1.00	0.97		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3206		1615	3333		1615	3383		1615	3364	
Flt Permitted	0.52	1.00		0.34	1.00		0.21	1.00		0.33	1.00	
Satd. Flow (perm)	891	3206		577	3333		353	3383		554	3364	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	137	319	229	100	271	55	83	664	51	58	707	86
RTOR Reduction (vph)	0	131	0	0	17	0	0	5	0	0	9	0
Lane Group Flow (vph)	137	417	0	100	309	0	83	710	0	58	784	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	24.3	16.5		22.7	15.7		33.5	27.2		28.9	24.9	
Effective Green, g (s)	20.3	14.5		18.7	13.7		29.5	25.2		24.9	22.9	
Actuated g/C Ratio	0.28	0.20		0.26	0.19		0.41	0.35		0.34	0.31	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	307	639		220	628		218	1173		219	1060	
v/s Ratio Prot	c0.04	c0.13		0.03	0.09		c0.02	0.21		0.01	c0.23	
v/s Ratio Perm	0.09			0.09			0.13			0.08		
v/c Ratio	0.45	0.65		0.45	0.49		0.38	0.61		0.26	0.74	
Uniform Delay, d1	20.6	26.8		21.5	26.4		14.4	19.6		16.4	22.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	2.4		1.5	0.6		1.1	0.9		0.7	2.7	
Delay (s)	21.7	29.2		23.0	27.0		15.5	20.5		17.0	25.0	
Level of Service	C	C		C	C		B	C		B	C	
Approach Delay (s)		27.7			26.0			20.0			24.4	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	24.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	72.7	Sum of lost time (s)	19.0
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

12/23/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	4	3	4	686	889	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	4	3	4	762	988	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					87	
pX, platoon unblocked	0.98	0.98	0.98			
vC, conflicting volume	1379	496	991			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1347	445	951			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	99			
cM capacity (veh/h)	141	555	716			

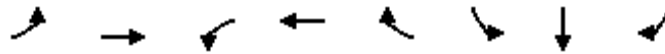
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	8	4	381	381	659	333
Volume Left	4	4	0	0	0	0
Volume Right	3	0	0	0	0	3
cSH	207	716	1700	1700	1700	1700
Volume to Capacity	0.04	0.01	0.22	0.22	0.39	0.20
Queue Length 95th (ft)	3	0	0	0	0	0
Control Delay (s)	23.0	10.1	0.0	0.0	0.0	0.0
Lane LOS	C	B				
Approach Delay (s)	23.0	0.1			0.0	
Approach LOS	C					

Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			36.0%	ICU Level of Service		A
Analysis Period (min)			15			

Queues

6: Waterman & Washington

12/23/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	SBL	SBT	SBR
Lane Group Flow (vph)	649	1285	13	655	446	283	282	228
v/c Ratio	1.17	0.71	0.08	0.63	0.57	0.58	0.54	0.35
Control Delay	127.9	20.8	24.3	30.3	6.5	26.2	25.1	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	127.9	20.8	24.3	30.3	6.5	26.2	25.1	3.9
Queue Length 50th (ft)	~203	236	4	149	0	121	118	0
Queue Length 95th (ft)	#264	#445	18	#248	49	146	143	28
Internal Link Dist (ft)		433		239			537	
Turn Bay Length (ft)	225		100		200	125		
Base Capacity (vph)	553	1799	157	1046	778	671	711	798
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.17	0.71	0.08	0.63	0.57	0.42	0.40	0.29






















Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

6: Waterman & Washington

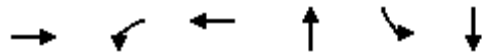
12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	532	1052	2	11	537	366	0	0	0	454	9	187
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1800	1800	1800	1700	1800	1800
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0				5.0	5.0	5.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00				0.95	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00				0.95	0.95	1.00
Satd. Flow (prot)	2949	3419		1615	3420	1530				1534	1632	1530
Flt Permitted	0.95	1.00		0.19	1.00	1.00				0.95	0.95	1.00
Satd. Flow (perm)	2949	3419		329	3420	1530				1534	1624	1530
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	649	1283	2	13	655	446	0	0	0	554	11	228
RTOR Reduction (vph)	0	0	0	0	0	327	0	0	0	0	0	155
Lane Group Flow (vph)	649	1285	0	13	655	119	0	0	0	283	282	73
Turn Type	Prot	NA		pm+pt	NA	Perm	Perm			Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases				6		6	8			4		4
Actuated Green, G (s)	18.2	38.9		21.3	21.3	21.3				25.5	25.5	25.5
Effective Green, g (s)	18.2	38.9		21.3	21.3	21.3				25.5	25.5	25.5
Actuated g/C Ratio	0.23	0.49		0.27	0.27	0.27				0.32	0.32	0.32
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0				5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0				3.0	3.0	3.0
Lane Grp Cap (vph)	671	1662		97	911	407				489	518	488
v/s Ratio Prot	c0.22	c0.38		0.00	c0.19							
v/s Ratio Perm				0.03		0.08				c0.18	0.17	0.05
v/c Ratio	0.97	0.77		0.13	0.72	0.29				0.58	0.54	0.15
Uniform Delay, d1	30.6	16.9		23.5	26.6	23.3				22.8	22.5	19.5
Progression Factor	1.00	1.00		1.00	1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	26.5	3.6		0.6	4.9	1.8				1.7	1.2	0.1
Delay (s)	57.1	20.5		24.1	31.5	25.2				24.4	23.6	19.6
Level of Service	E	C		C	C	C				C	C	B
Approach Delay (s)		32.8			28.9			0.0			22.8	
Approach LOS		C			C			A			C	
Intersection Summary												
HCM Average Control Delay			29.6				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			80.0				Sum of lost time (s)		21.0			
Intersection Capacity Utilization			60.7%				ICU Level of Service			B		
Analysis Period (min)			15									
c	Critical Lane Group											

Queues

7: S Tippecanoe & E Victoria

12/23/2013



Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	4	73	39	610	24	963
v/c Ratio	0.02	0.50	0.19	0.26	0.05	0.39
Control Delay	18.3	35.8	10.9	6.2	4.0	5.4
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0
Total Delay	18.3	35.8	10.9	6.4	4.0	5.4
Queue Length 50th (ft)	1	25	0	37	2	70
Queue Length 95th (ft)	7	53	20	100	9	115
Internal Link Dist (ft)	87		770	198		507
Turn Bay Length (ft)		100			115	
Base Capacity (vph)	383	342	438	2342	499	2454
Starvation Cap Reductn	0	0	0	946	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.21	0.09	0.44	0.05	0.39

Intersection Summary

HCM Signalized Intersection Capacity Analysis

7: S Tippecanoe & E Victoria

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↖	↗		↖	↕		↖	↕	
Volume (vph)	2	0	2	62	1	32	0	501	18	20	817	2
Ideal Flow (vphpl)	1800	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.0		6.0	6.0			7.5		6.0	7.5	
Lane Util. Factor		1.00		1.00	1.00			0.95		1.00	0.95	
Frt		0.93		1.00	0.85			0.99		1.00	1.00	
Flt Protected		0.98		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1638		1615	1537			3402		1615	3419	
Flt Permitted		0.85		0.76	1.00			1.00		0.37	1.00	
Satd. Flow (perm)		1430		1284	1537			3402		628	3419	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	2	0	2	73	1	38	0	589	21	24	961	2
RTOR Reduction (vph)	0	2	0	0	34	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	2	0	73	5	0	0	607	0	24	963	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.7		7.7	7.7			37.8		42.8	42.8	
Effective Green, g (s)		5.7		5.7	5.7			35.8		40.8	40.8	
Actuated g/C Ratio		0.10		0.10	0.10			0.60		0.68	0.68	
Clearance Time (s)		4.0		4.0	4.0			5.5		4.0	5.5	
Vehicle Extension (s)		3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		136		122	146			2030		427	2325	
v/s Ratio Prot					0.00			0.18			c0.28	
v/s Ratio Perm		0.00		c0.06						0.04		
v/c Ratio		0.02		0.60	0.03			0.30		0.06	0.41	
Uniform Delay, d1		24.6		26.1	24.6			5.9		3.2	4.3	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.0		7.7	0.1			0.4		0.1	0.5	
Delay (s)		24.7		33.7	24.7			6.3		3.2	4.8	
Level of Service		C		C	C			A		A	A	
Approach Delay (s)		24.7			30.6			6.3			4.8	
Approach LOS		C			C			A			A	

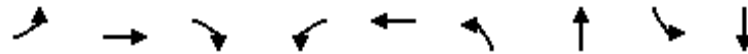
Intersection Summary

HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

12/23/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	44	50	71	58	200	272	538	58	640
v/c Ratio	0.30	0.25	0.24	0.31	0.68	0.66	0.17	0.19	0.32
Control Delay	26.1	23.6	8.1	25.5	29.8	31.3	8.4	16.6	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.1	23.6	8.1	25.5	29.8	31.3	8.4	16.6	13.3
Queue Length 50th (ft)	14	16	0	19	54	49	31	13	52
Queue Length 95th (ft)	37	40	26	43	100	88	56	44	94
Internal Link Dist (ft)		517			1151		772		1167
Turn Bay Length (ft)	210			85		260		100	
Base Capacity (vph)	245	338	436	307	459	498	3180	307	2000
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.15	0.16	0.19	0.44	0.55	0.17	0.19	0.32

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗		↖↗	↖↗↘		↖	↖↗↘	
Volume (vph)	63	27	67	55	123	67	258	489	22	55	542	66
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1600	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		0.97	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	0.98	
Flt Protected	0.95	0.98	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1534	1673	1530	1615	1704		2949	4882		1615	4835	
Flt Permitted	0.61	0.79	1.00	0.72	1.00		0.95	1.00		0.44	1.00	
Satd. Flow (perm)	978	1351	1530	1229	1704		2949	4882		750	4835	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	66	28	71	58	129	71	272	515	23	58	571	69
RTOR Reduction (vph)	0	0	60	0	37	0	0	6	0	0	21	0
Lane Group Flow (vph)	44	50	11	58	163	0	272	532	0	58	619	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)	11.0	11.0	11.0	11.0	11.0		10.4	41.0		26.6	26.6	
Effective Green, g (s)	9.0	9.0	9.0	9.0	9.0		8.4	39.0		24.6	24.6	
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15		0.14	0.65		0.41	0.41	
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	203	230	184	256		413	3173		308	1982	
v/s Ratio Prot					c0.10		c0.09	0.11			c0.13	
v/s Ratio Perm	0.04	0.04	0.01	0.05						0.08		
v/c Ratio	0.30	0.25	0.05	0.32	0.64		0.66	0.17		0.19	0.31	
Uniform Delay, d1	22.7	22.5	21.8	22.8	24.0		24.4	4.1		11.3	12.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.98	1.79		1.00	1.00	
Incremental Delay, d2	1.1	0.6	0.1	1.0	5.1		3.7	0.1		1.4	0.4	
Delay (s)	23.8	23.1	21.9	23.7	29.0		27.7	7.5		12.7	12.4	
Level of Service	C	C	C	C	C		C	A		B	B	
Approach Delay (s)		22.8			27.8			14.3			12.4	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

9: Anderson/Tippecanoe/Tippecanoe & WB I-10 Ramps

12/23/2013



Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	280	281	338	337	644	509	362
v/c Ratio	0.88	0.83	0.67	0.70	0.33	0.29	0.47
Control Delay	52.5	44.7	14.2	20.2	10.2	20.6	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.5	44.7	14.2	20.2	10.2	20.6	11.9
Queue Length 50th (ft)	100	98	30	85	75	65	0
Queue Length 95th (ft)	#216	#209	102	m#163	m118	91	105
Internal Link Dist (ft)		949			347	499	
Turn Bay Length (ft)	225		175				
Base Capacity (vph)	358	381	539	492	1970	1736	775
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.74	0.63	0.68	0.33	0.29	0.47

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.

HCM Signalized Intersection Capacity Analysis

9: Anderson/Tippecanoe/Tippecanoe & WB I-10 Ramps

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↖	↖	↖	↖	↕			↕	↖
Volume (vph)	0	0	0	517	10	318	317	605	0	0	478	340
Ideal Flow (vphpl)	1800	1800	1800	1700	1800	1800	1700	1800	1800	1800	1800	1800
Total Lost time (s)				6.0	6.0	6.0	6.0	7.0			7.0	7.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.91	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1534	1632	1530	1615	3420			4914	1530
Flt Permitted				0.95	0.95	1.00	0.35	1.00			1.00	1.00
Satd. Flow (perm)				1534	1632	1530	602	3420			4914	1530
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	550	11	338	337	644	0	0	509	362
RTOR Reduction (vph)	0	0	0	0	0	188	0	0	0	0	0	234
Lane Group Flow (vph)	0	0	0	280	281	150	337	644	0	0	509	128
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					6
Actuated Green, G (s)				14.4	14.4	14.4	36.6	36.6			23.2	23.2
Effective Green, g (s)				12.4	12.4	12.4	34.6	34.6			21.2	21.2
Actuated g/C Ratio				0.21	0.21	0.21	0.58	0.58			0.35	0.35
Clearance Time (s)				4.0	4.0	4.0	4.0	5.0			5.0	5.0
Vehicle Extension (s)				2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)				317	337	316	472	1972			1736	541
v/s Ratio Prot							c0.09	0.19			0.10	
v/s Ratio Perm				c0.18	0.17	0.10	c0.32					0.08
v/c Ratio				0.88	0.83	0.47	0.71	0.33			0.29	0.24
Uniform Delay, d1				23.1	22.8	20.9	7.3	6.6			14.0	13.7
Progression Factor				1.00	1.00	1.00	1.74	1.38			1.35	4.15
Incremental Delay, d2				23.3	15.4	0.4	3.2	0.3			0.4	1.0
Delay (s)				46.4	38.2	21.3	15.9	9.5			19.4	57.8
Level of Service				D	D	C	B	A			B	E
Approach Delay (s)		0.0			34.4			11.7			35.3	
Approach LOS		A			C			B			D	

Intersection Summary

HCM Average Control Delay	26.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

12/23/2013



Lane Group	EBL	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	335	356	834	115	874
v/c Ratio	0.89	0.80	0.60	0.41	0.48
Control Delay	48.1	29.4	16.4	13.6	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	48.1	29.4	16.4	13.6	11.0
Queue Length 50th (ft)	116	83	121	25	100
Queue Length 95th (ft)	#236	#198	178	m41	127
Internal Link Dist (ft)		1164	1201		347
Turn Bay Length (ft)	275				
Base Capacity (vph)	435	495	1382	285	1836
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.77	0.72	0.60	0.40	0.48

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.

HCM Signalized Intersection Capacity Analysis

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	331	0	284	0	0	0	0	554	189	102	778	0
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	6.0						7.0		6.0	7.0	
Lane Util. Factor	0.95	0.95						0.95		1.00	0.95	
Frt	1.00	0.87						0.96		1.00	1.00	
Flt Protected	0.95	0.99						1.00		0.95	1.00	
Satd. Flow (prot)	1534	1473						3290		1615	3420	
Flt Permitted	0.95	0.99						1.00		0.21	1.00	
Satd. Flow (perm)	1534	1473						3290		365	3420	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	372	0	319	0	0	0	0	622	212	115	874	0
RTOR Reduction (vph)	0	81	0	0	0	0	0	51	0	0	0	0
Lane Group Flow (vph)	335	275	0	0	0	0	0	783	0	115	874	0
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)	16.8	16.8						25.5		34.2	34.2	
Effective Green, g (s)	14.8	14.8						23.5		32.2	32.2	
Actuated g/C Ratio	0.25	0.25						0.39		0.54	0.54	
Clearance Time (s)	4.0	4.0						5.0		4.0	5.0	
Vehicle Extension (s)	2.0	2.0						2.0		2.0	2.0	
Lane Grp Cap (vph)	378	363						1289		252	1835	
v/s Ratio Prot								c0.24		0.02	c0.26	
v/s Ratio Perm	c0.22	0.19								0.22		
v/c Ratio	0.89	0.76						0.61		0.46	0.48	
Uniform Delay, d1	21.8	20.9						14.6		8.1	8.7	
Progression Factor	1.00	1.00						1.00		1.29	1.08	
Incremental Delay, d2	20.7	7.8						2.1		0.4	0.8	
Delay (s)	42.5	28.7						16.7		11.0	10.1	
Level of Service	D	C						B		B	B	
Approach Delay (s)		35.4			0.0			16.7			10.2	
Approach LOS		D			A			B			B	

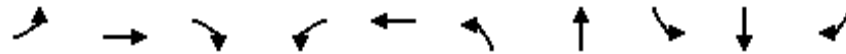
Intersection Summary

HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

11: Anderson & Academy

12/23/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	324	166	267	98	332	212	544	32	1193	451
v/c Ratio	0.86	0.33	0.47	0.40	0.69	0.93	0.34	0.08	0.93	0.53
Control Delay	42.8	23.3	10.0	22.2	34.7	63.8	13.1	9.3	36.4	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.8	23.3	10.0	22.2	34.7	63.8	13.1	9.3	36.4	4.3
Queue Length 50th (ft)	107	58	24	28	67	48	65	6	254	0
Queue Length 95th (ft)	#182	98	66	52	96	#149	108	17	#326	36
Internal Link Dist (ft)		21			32		1375		514	
Turn Bay Length (ft)	75			100		100		100		
Base Capacity (vph)	376	498	565	246	500	227	1607	378	1277	854
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	0.86	0.33	0.47	0.40	0.66	0.93	0.34	0.08	0.93	0.53

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

11: Anderson & Academy

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	266	136	219	80	233	39	174	431	15	26	978	370
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	4.0	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	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1615	1800	1530	1615	3346		1615	3403		1615	3420	1530
Flt Permitted	0.30	1.00	1.00	0.65	1.00		0.12	1.00		0.45	1.00	1.00
Satd. Flow (perm)	504	1800	1530	1108	3346		210	3403		763	3420	1530
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	324	166	267	98	284	48	212	526	18	32	1193	451
RTOR Reduction (vph)	0	0	144	0	20	0	0	3	0	0	0	275
Lane Group Flow (vph)	324	166	123	98	312	0	212	541	0	32	1193	176
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)	26.5	19.3	19.3	13.7	10.5		38.4	32.8		30.0	28.4	28.4
Effective Green, g (s)	26.5	19.3	19.3	13.7	10.5		38.4	32.8		30.0	28.4	28.4
Actuated g/C Ratio	0.36	0.26	0.26	0.19	0.14		0.53	0.45		0.41	0.39	0.39
Clearance Time (s)	4.0	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	3.0
Lane Grp Cap (vph)	366	477	405	230	482		226	1531		333	1332	596
v/s Ratio Prot	c0.15	0.09		0.02	0.09		c0.08	0.16		0.00	0.35	
v/s Ratio Perm	c0.18		0.08	0.06			c0.42			0.04		0.11
v/c Ratio	0.89	0.35	0.30	0.43	0.65		0.94	0.35		0.10	0.90	0.29
Uniform Delay, d1	18.9	21.7	21.4	25.6	29.5		14.9	13.1		12.9	20.9	15.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	21.6	0.4	0.4	1.3	3.0		42.5	0.1		0.1	8.1	0.3
Delay (s)	40.6	22.1	21.9	26.9	32.5		57.3	13.3		13.0	29.0	15.6
Level of Service	D	C	C	C	C		E	B		B	C	B
Approach Delay (s)		29.9			31.2			25.6			25.1	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	72.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

12: California & WB I-10 Ramps

12/23/2013



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	456	374	506	695	180	168
v/c Ratio	1.04	0.58	0.98	0.86	0.06	0.16
Control Delay	88.2	7.3	40.5	45.0	6.3	1.5
Queue Delay	0.0	0.0	18.5	0.0	0.0	0.0
Total Delay	88.2	7.3	59.0	45.0	6.3	1.5
Queue Length 50th (ft)	~283	0	296	221	12	0
Queue Length 95th (ft)	#467	72	m285	m197	20	21
Internal Link Dist (ft)	1118			276	113	
Turn Bay Length (ft)						
Base Capacity (vph)	439	644	520	812	3112	1031
Starvation Cap Reductn	0	0	35	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.04	0.58	1.04	0.86	0.06	0.16

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.

HCM Signalized Intersection Capacity Analysis

12: California & WB I-10 Ramps

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↶	↷	↶	↷			↶	↷
Volume (vph)	0	0	0	420	17	359	486	667	0	0	173	161
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800
Total Lost time (s)					5.0	7.0	6.0	6.0			5.0	5.0
Lane Util. Factor					1.00	1.00	1.00	0.95			0.91	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1718	1530	1615	3420			4914	1530
Flt Permitted					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)					1718	1530	1615	3420			4914	1530
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	438	18	374	506	695	0	0	180	168
RTOR Reduction (vph)	0	0	0	0	0	287	0	0	0	0	0	62
Lane Group Flow (vph)	0	0	0	0	456	87	506	695	0	0	180	106
Turn Type				Perm	NA	Perm	Prot	NA			NA	Perm
Protected Phases					8		5!	6			2!	
Permitted Phases				8		8						2
Actuated Green, G (s)					23.0	23.0	30.6	23.4			59.0	59.0
Effective Green, g (s)					23.0	21.0	28.6	21.4			57.0	57.0
Actuated g/C Ratio					0.26	0.23	0.32	0.24			0.63	0.63
Clearance Time (s)					5.0	5.0	4.0	4.0			3.0	3.0
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					439	357	513	813			3112	969
v/s Ratio Prot							c0.31	c0.20			0.04	
v/s Ratio Perm					0.27	0.06						0.07
v/c Ratio					1.04	0.24	0.99	0.85			0.06	0.11
Uniform Delay, d1					33.5	28.0	30.5	32.8			6.3	6.5
Progression Factor					1.00	1.00	0.97	1.31			1.00	1.00
Incremental Delay, d2					53.4	0.1	9.0	1.2			0.0	0.2
Delay (s)					86.9	28.2	38.7	44.3			6.3	6.7
Level of Service					F	C	D	D			A	A
Approach Delay (s)		0.0			60.4			41.9			6.5	
Approach LOS		A			E			D			A	

Intersection Summary

HCM Average Control Delay	43.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

Queues

13: EB I-10 Ramps & California

12/23/2013



Lane Group	EBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	895	683	311	57	541
v/c Ratio	2.56	0.21	0.28	0.13	0.24
Control Delay	731.4	5.8	1.3	2.9	2.8
Queue Delay	0.0	62.6	6.4	0.0	0.0
Total Delay	731.4	68.4	7.7	2.9	2.8
Queue Length 50th (ft)	~851	47	0	2	12
Queue Length 95th (ft)	#1084	62	24	m8	m38
Internal Link Dist (ft)	1294	46			276
Turn Bay Length (ft)					
Base Capacity (vph)	349	3303	1130	436	2299
Starvation Cap Reductn	0	2695	756	0	0
Spillback Cap Reductn	3	329	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	2.59	1.12	0.83	0.13	0.24


















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.

HCM Signalized Intersection Capacity Analysis

13: EB I-10 Ramps & California

12/23/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	432	1	426	0	0	0	0	656	299	55	519	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800	
Total Lost time (s)		6.0						6.5	6.5	6.5	6.5		
Lane Util. Factor		1.00						0.91	1.00	1.00	0.95		
Frt		0.93						1.00	0.85	1.00	1.00		
Flt Protected		0.98						1.00	1.00	0.95	1.00		
Satd. Flow (prot)		1638						4914	1530	1615	3420		
Flt Permitted		0.98						1.00	1.00	0.38	1.00		
Satd. Flow (perm)		1638						4914	1530	647	3420		
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	450	1	444	0	0	0	0	683	311	57	541	0	
RTOR Reduction (vph)	0	40	0	0	0	0	0	0	102	0	0	0	
Lane Group Flow (vph)	0	855	0	0	0	0	0	683	209	57	541	0	
Turn Type	Perm	NA						NA	Perm	Perm	NA		
Protected Phases		4						2			6		
Permitted Phases	4								2	6			
Actuated Green, G (s)		19.0						62.5	62.5	62.5	62.5		
Effective Green, g (s)		17.0						60.5	60.5	60.5	60.5		
Actuated g/C Ratio		0.19						0.67	0.67	0.67	0.67		
Clearance Time (s)		4.0						4.5	4.5	4.5	4.5		
Vehicle Extension (s)		2.0						2.0	2.0	2.0	2.0		
Lane Grp Cap (vph)		309						3303	1029	435	2299		
v/s Ratio Prot								0.14			c0.16		
v/s Ratio Perm		0.52							0.14	0.09			
v/c Ratio		2.77						0.21	0.20	0.13	0.24		
Uniform Delay, d1		36.5						5.6	5.6	5.3	5.7		
Progression Factor		1.00						1.00	1.00	0.46	0.46		
Incremental Delay, d2		804.5						0.1	0.4	0.4	0.2		
Delay (s)		841.0						5.8	6.0	2.8	2.8		
Level of Service		F						A	A	A	A		
Approach Delay (s)		841.0			0.0			5.8			2.8		
Approach LOS		F			A			A			A		
Intersection Summary													
HCM Average Control Delay			305.7									HCM Level of Service	F
HCM Volume to Capacity ratio			0.79										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	12.5
Intersection Capacity Utilization			93.3%									ICU Level of Service	F
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

14: California & Shopping Center

12/23/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	1	70	784	18	176	652
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1	78	871	20	196	724
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)			652		321	
pX, platoon unblocked	0.98					
vC, conflicting volume	1634	300			891	
vC1, stage 1 conf vol	881					
vC2, stage 2 conf vol	753					
vCu, unblocked vol	1609	300			891	
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 %	100	89			75	
cM capacity (veh/h)	250	702			769	

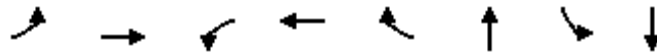
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	79	348	348	194	196	362	362
Volume Left	1	0	0	0	196	0	0
Volume Right	78	0	0	20	0	0	0
cSH	684	1700	1700	1700	769	1700	1700
Volume to Capacity	0.12	0.20	0.20	0.11	0.25	0.21	0.21
Queue Length 95th (ft)	10	0	0	0	25	0	0
Control Delay (s)	10.9	0.0	0.0	0.0	11.3	0.0	0.0
Lane LOS	B				B		
Approach Delay (s)	10.9	0.0			2.4		
Approach LOS	B						

Intersection Summary			
Average Delay		1.6	
Intersection Capacity Utilization	41.9%		ICU Level of Service A
Analysis Period (min)		15	

Queues

15: California/California & W Redlands

12/23/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	102	356	46	294	319	518	305	396
v/c Ratio	0.57	0.67	0.22	0.58	0.64	0.65	0.73	0.42
Control Delay	37.3	23.7	22.0	33.8	10.2	17.6	27.0	12.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.3	23.7	22.0	33.8	10.2	17.6	27.0	12.0
Queue Length 50th (ft)	35	46	15	65	0	152	96	93
Queue Length 95th (ft)	71	86	38	102	64	296	#260	179
Internal Link Dist (ft)		1468		1180		268		572
Turn Bay Length (ft)	90		150		100			
Base Capacity (vph)	180	1253	205	1310	783	799	419	939
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.28	0.22	0.22	0.41	0.65	0.73	0.42

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

15: California/California & W Redlands

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗↘		↖	↗↘	↗		↕		↖	↗	
Volume (vph)	98	198	144	44	282	306	101	382	14	293	303	77
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1800	1800	1800	1700	1800	1800
Total Lost time (s)	6.5	7.7		6.5	7.7	7.7		7.2		7.2	7.2	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00		1.00	1.00	
Frt	1.00	0.94		1.00	1.00	0.85		1.00		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	1.00	
Satd. Flow (prot)	1615	3204		1615	3420	1530		1775		1615	1745	
Flt Permitted	0.57	1.00		0.46	1.00	1.00		0.84		0.46	1.00	
Satd. Flow (perm)	972	3204		779	3420	1530		1498		787	1745	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	102	206	150	46	294	319	105	398	15	305	316	80
RTOR Reduction (vph)	0	131	0	0	0	272	0	1	0	0	8	0
Lane Group Flow (vph)	102	225	0	46	294	47	0	517	0	305	388	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	15.0	11.1		18.2	12.7	12.7		40.9		40.9	40.9	
Effective Green, g (s)	11.0	9.1		14.2	10.7	10.7		38.9		38.9	38.9	
Actuated g/C Ratio	0.15	0.12		0.19	0.15	0.15		0.53		0.53	0.53	
Clearance Time (s)	4.5	5.7		4.5	5.7	5.7		5.2		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	163	400		192	502	225		799		420	931	
v/s Ratio Prot	c0.02	0.07		0.01	c0.09						0.22	
v/s Ratio Perm	0.08			0.04		0.03		0.35		c0.39		
v/c Ratio	0.63	0.56		0.24	0.59	0.21		0.65		0.73	0.42	
Uniform Delay, d1	28.4	30.0		24.3	29.0	27.4		12.1		12.9	10.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	7.3	1.8		0.6	1.7	0.5		1.8		6.1	0.3	
Delay (s)	35.7	31.8		25.0	30.8	27.8		13.9		19.1	10.5	
Level of Service	D	C		C	C	C		B		B	B	
Approach Delay (s)		32.7			28.9			13.9			14.2	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	72.9	Sum of lost time (s)	13.7
Intersection Capacity Utilization	87.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

16: Alabama St & WB I-10 Ramps

12/23/2013



Lane Group	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	829	384	489	515
v/c Ratio	0.89	0.83	0.28	0.56
Control Delay	33.6	29.3	10.1	20.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	33.6	29.3	10.1	20.5
Queue Length 50th (ft)	147	88	56	78
Queue Length 95th (ft)	#245	#209	84	124
Internal Link Dist (ft)	765		376	271
Turn Bay Length (ft)				
Base Capacity (vph)	975	463	1726	916
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.85	0.83	0.28	0.56


















Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

16: Alabama St & WB I-10 Ramps

12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	248	309	197	349	445	0	0	338	131
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800
Total Lost time (s)					6.5		6.0	8.0			8.0	
Lane Util. Factor					0.95		1.00	0.95			0.95	
Flt					0.96		1.00	1.00			0.96	
Flt Protected					0.98		0.95	1.00			1.00	
Satd. Flow (prot)					3233		1615	3420			3277	
Flt Permitted					0.98		0.33	1.00			1.00	
Satd. Flow (perm)					3233		563	3420			3277	
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	0.91
Adj. Flow (vph)	0	0	0	273	340	216	384	489	0	0	371	144
RTOR Reduction (vph)	0	0	0	0	55	0	0	0	0	0	61	0
Lane Group Flow (vph)	0	0	0	0	774	0	384	489	0	0	454	0
Turn Type				Perm	NA		pm+pt	NA			NA	
Protected Phases					4		1	6			2	
Permitted Phases				4			6					
Actuated Green, G (s)					19.7		34.8	34.8			19.0	
Effective Green, g (s)					17.7		32.8	32.8			17.0	
Actuated g/C Ratio					0.27		0.50	0.50			0.26	
Clearance Time (s)					4.5		4.0	6.0			6.0	
Vehicle Extension (s)					3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)					880		443	1726			857	
v/s Ratio Prot							c0.13	0.14			0.14	
v/s Ratio Perm					0.24		c0.31					
v/c Ratio					0.88		0.87	0.28			0.53	
Uniform Delay, d1					22.6		11.3	9.3			20.6	
Progression Factor					1.00		1.00	1.00			1.00	
Incremental Delay, d2					10.0		16.2	0.4			2.3	
Delay (s)					32.6		27.4	9.7			22.9	
Level of Service					C		C	A			C	
Approach Delay (s)		0.0			32.6			17.5			22.9	
Approach LOS		A			C			B			C	
Intersection Summary												
HCM Average Control Delay			24.4		HCM Level of Service						C	
HCM Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			65.0		Sum of lost time (s)					12.5		
Intersection Capacity Utilization			76.3%		ICU Level of Service					D		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

17: EB I-10 Ramps & Alabama St

12/23/2013



















Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	690	809	55	615
v/c Ratio	0.85	0.53	0.18	0.32
Control Delay	26.0	14.9	8.2	8.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.0	14.9	8.2	8.4
Queue Length 50th (ft)	84	113	8	57
Queue Length 95th (ft)	131	179	23	95
Internal Link Dist (ft)	622	505		376
Turn Bay Length (ft)				
Base Capacity (vph)	972	1527	307	1907
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.71	0.53	0.18	0.32

Intersection Summary

HCM Signalized Intersection Capacity Analysis

17: EB I-10 Ramps & Alabama St

12/23/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	233	2	379	0	0	0	0	599	121	49	547	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800	
Total Lost time (s)		7.0						8.0		6.0	7.0		
Lane Util. Factor		0.95						0.95		1.00	0.95		
Frt		0.91						0.97		1.00	1.00		
Flt Protected		0.98						1.00		0.95	1.00		
Satd. Flow (prot)		3045						3334		1615	3420		
Flt Permitted		0.98						1.00		0.25	1.00		
Satd. Flow (perm)		3045						3334		431	3420		
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	
Adj. Flow (vph)	262	2	426	0	0	0	0	673	136	55	615	0	
RTOR Reduction (vph)	0	173	0	0	0	0	0	24	0	0	0	0	
Lane Group Flow (vph)	0	517	0	0	0	0	0	785	0	55	615	0	
Turn Type	Perm	NA						NA		pm+pt	NA		
Protected Phases		8						6		5	2		
Permitted Phases	8									2			
Actuated Green, G (s)		14.5						27.5		35.5	35.5		
Effective Green, g (s)		12.5						25.5		33.5	33.5		
Actuated g/C Ratio		0.21						0.42		0.56	0.56		
Clearance Time (s)		5.0						6.0		4.0	5.0		
Vehicle Extension (s)		2.0						2.0		2.0	2.0		
Lane Grp Cap (vph)		634						1417		260	1910		
v/s Ratio Prot								c0.24		0.00	c0.18		
v/s Ratio Perm		0.17								0.11			
v/c Ratio		0.81						0.55		0.21	0.32		
Uniform Delay, d1		22.6						13.0		6.8	7.1		
Progression Factor		1.00						1.00		1.00	1.00		
Incremental Delay, d2		7.5						1.6		0.1	0.4		
Delay (s)		30.2						14.5		6.9	7.6		
Level of Service		C						B		A	A		
Approach Delay (s)		30.2			0.0			14.5			7.5		
Approach LOS		C			A			B			A		
Intersection Summary													
HCM Average Control Delay			17.3									HCM Level of Service	B
HCM Volume to Capacity ratio			0.68										
Actuated Cycle Length (s)			60.0									Sum of lost time (s)	22.0
Intersection Capacity Utilization			76.3%									ICU Level of Service	D
Analysis Period (min)			15										
c	Critical Lane Group												

Queues

18: Alabama St & Industrial Park

12/23/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	53	43	17	67	22	688	76	813	117
v/c Ratio	0.20	0.16	0.07	0.24	0.42	0.61	0.49	0.60	0.18
Control Delay	17.3	10.2	16.0	10.1	56.6	12.9	36.1	11.3	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.3	10.2	16.0	10.1	56.6	12.9	36.1	11.3	5.2
Queue Length 50th (ft)	11	2	3	3	5	64	17	72	6
Queue Length 95th (ft)	33	21	16	27	#36	113	#71	126	29
Internal Link Dist (ft)		298		379		236		505	
Turn Bay Length (ft)	100		50		150		215		55
Base Capacity (vph)	1266	1198	1266	1203	52	1600	156	1827	851
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.04	0.01	0.06	0.42	0.43	0.49	0.44	0.14

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

18: Alabama St & Industrial Park

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	49	10	29	16	16	46	20	608	25	70	748	108
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.2	6.2		6.2	6.2		6.0	6.2		6.0	6.2	6.2
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.89		1.00	0.89		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1615	1599		1615	1599		1615	3400		1615	3420	1530
Flt Permitted	1.00	1.00		1.00	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1700	1599		1700	1599		1615	3400		1615	3420	1530
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	53	11	32	17	17	50	22	661	27	76	813	117
RTOR Reduction (vph)	0	30	0	0	47	0	0	4	0	0	0	45
Lane Group Flow (vph)	53	13	0	17	20	0	22	684	0	76	813	72
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4								2
Actuated Green, G (s)	4.0	4.0		4.0	4.0		3.3	13.5		5.5	15.7	15.7
Effective Green, g (s)	2.0	2.0		2.0	2.0		1.3	11.5		3.5	13.7	13.7
Actuated g/C Ratio	0.06	0.06		0.06	0.06		0.04	0.32		0.10	0.39	0.39
Clearance Time (s)	4.2	4.2		4.2	4.2		4.0	4.2		4.0	4.2	4.2
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)	96	90		96	90		59	1105		160	1324	592
v/s Ratio Prot		0.01			0.01		0.01	0.20		c0.05	c0.24	
v/s Ratio Perm	c0.03			0.01								0.05
v/c Ratio	0.55	0.14		0.18	0.22		0.37	0.62		0.47	0.61	0.12
Uniform Delay, d1	16.3	15.9		15.9	16.0		16.7	10.1		15.1	8.7	7.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.7	0.7		0.9	1.2		3.9	1.0		2.2	0.9	0.1
Delay (s)	23.0	16.6		16.8	17.2		20.6	11.1		17.3	9.6	7.1
Level of Service	C	B		B	B		C	B		B	A	A
Approach Delay (s)		20.1			17.1			11.4			9.9	
Approach LOS		C			B			B			A	

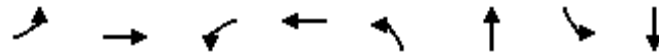
Intersection Summary

HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	35.4	Sum of lost time (s)	12.2
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

19: Alabama St & W Redlands

12/23/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	154	305	76	406	91	510	84	732
v/c Ratio	0.53	0.37	0.26	0.67	0.61	0.64	0.30	0.51
Control Delay	20.7	18.5	14.1	23.5	42.7	23.3	13.9	12.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1
Total Delay	20.7	18.5	14.1	23.5	42.7	23.3	13.9	13.3
Queue Length 50th (ft)	34	43	16	55	26	75	16	74
Queue Length 95th (ft)	68	75	38	93	#95	131	43	135
Internal Link Dist (ft)		1247		345		380		164
Turn Bay Length (ft)	240		290		115		75	
Base Capacity (vph)	291	1170	295	1200	148	797	280	1427
Starvation Cap Reductn	0	0	0	0	0	0	0	430
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	0.53	0.26	0.26	0.34	0.61	0.64	0.30	0.73

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

19: Alabama St & W Redlands

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	139	232	42	68	279	86	82	410	49	76	478	181
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	5.5	6.9		6.0	6.9		6.2	6.2		6.2	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.96		1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3341		1615	3299		1615	3366		1615	3279	
Flt Permitted	0.43	1.00		0.57	1.00		0.37	1.00		0.28	1.00	
Satd. Flow (perm)	733	3341		962	3299		635	3366		471	3279	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	154	258	47	76	310	96	91	456	54	84	531	201
RTOR Reduction (vph)	0	25	0	0	52	0	0	13	0	0	56	0
Lane Group Flow (vph)	154	280	0	76	354	0	91	497	0	84	676	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	21.2	15.1		16.5	13.0		14.9	14.9		25.1	25.1	
Effective Green, g (s)	17.2	13.1		12.5	11.0		12.9	12.9		23.1	23.1	
Actuated g/C Ratio	0.30	0.23		0.22	0.19		0.23	0.23		0.41	0.41	
Clearance Time (s)	3.5	4.9		4.0	4.9		4.2	4.2		4.2	4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	286	771		229	639		144	764		272	1334	
v/s Ratio Prot	c0.04	0.08		0.01	0.11			c0.15		0.02	c0.21	
v/s Ratio Perm	c0.12			0.06			0.14			0.10		
v/c Ratio	0.54	0.36		0.33	0.55		0.63	0.65		0.31	0.51	
Uniform Delay, d1	15.3	18.3		18.2	20.7		19.8	19.9		11.1	12.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	0.3		0.9	1.0		19.2	4.3		2.9	1.4	
Delay (s)	17.3	18.6		19.0	21.7		39.0	24.2		14.1	14.0	
Level of Service	B	B		B	C		D	C		B	B	
Approach Delay (s)		18.2			21.3			26.4			14.0	
Approach LOS		B			C			C			B	

Intersection Summary

HCM Average Control Delay	19.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	56.8	Sum of lost time (s)	17.9
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues

20: Tennessee & Redlands

12/23/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	14	153	40	289	715	771
v/c Ratio	0.07	0.38	0.13	0.31	0.54	0.71
Control Delay	23.1	21.5	14.1	12.3	12.4	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	126.7
Total Delay	23.1	21.5	14.1	12.3	12.4	143.0
Queue Length 50th (ft)	4	19	9	28	81	97
Queue Length 95th (ft)	17	41	26	52	128	160
Internal Link Dist (ft)		2241		737	458	48
Turn Bay Length (ft)	145		140			
Base Capacity (vph)	698	1378	310	2079	1479	1211
Starvation Cap Reductn	0	0	0	0	0	606
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.11	0.13	0.14	0.48	1.27

Intersection Summary

HCM Signalized Intersection Capacity Analysis

20: Tennessee & Redlands

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Volume (vph)	12	105	30	35	195	64	48	567	19	128	544	17
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.9	6.9		5.5	6.9			6.9			6.9	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frt	1.00	0.97		1.00	0.97			1.00			1.00	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1615	3306		1615	3301			3394			3378	
Flt Permitted	1.00	1.00		0.43	1.00			0.85			0.70	
Satd. Flow (perm)	1700	3306		723	3301			2897			2374	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.95	0.95	0.88	0.95	0.95	0.88	0.95
Adj. Flow (vph)	14	119	34	40	222	67	51	644	20	135	618	18
RTOR Reduction (vph)	0	31	0	0	48	0	0	3	0	0	2	0
Lane Group Flow (vph)	14	122	0	40	241	0	0	712	0	0	769	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		6		5	2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	5.9	5.9		17.0	17.0			25.5			25.5	
Effective Green, g (s)	3.9	3.9		15.0	15.0			23.5			23.5	
Actuated g/C Ratio	0.07	0.07		0.29	0.29			0.45			0.45	
Clearance Time (s)	4.9	4.9		3.5	4.9			4.9			4.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	127	247		303	947			1302			1067	
v/s Ratio Prot		c0.04		0.01	c0.07							
v/s Ratio Perm	0.01			0.02				0.25			c0.32	
v/c Ratio	0.11	0.49		0.13	0.25			0.55			0.72	
Uniform Delay, d1	22.6	23.2		13.9	14.3			10.5			11.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.4	1.5		0.2	0.1			0.5			2.4	
Delay (s)	23.0	24.8		14.1	14.5			11.0			14.1	
Level of Service	C	C		B	B			B			B	
Approach Delay (s)		24.6			14.4			11.0			14.1	
Approach LOS		C			B			B			B	

Intersection Summary

HCM Average Control Delay	13.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	52.3	Sum of lost time (s)	20.7
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

21: Texas & Stuart

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	26	4	30	16	31	13	58	281	19	27	392	85
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	31	5	35	19	36	15	68	331	22	32	461	100
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								193				
pX, platoon unblocked	0.99	0.99		0.99	0.99	0.99				0.99		
vC, conflicting volume	910	1064	281	810	1103	176	561			353		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	893	1048	281	792	1087	153	561			331		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	98	95	92	81	98	93			97		
cM capacity (veh/h)	187	207	723	244	196	865	1020			1229		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	71	71	234	188	262	331
Volume Left	31	19	68	0	32	0
Volume Right	35	15	0	22	0	100
cSH	300	252	1020	1700	1229	1700
Volume to Capacity	0.24	0.28	0.07	0.11	0.03	0.19
Queue Length 95th (ft)	22	28	5	0	2	0
Control Delay (s)	20.7	24.8	3.0	0.0	1.2	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	20.7	24.8	1.7		0.5	
Approach LOS	C	C				

Intersection Summary		
Average Delay		3.7
Intersection Capacity Utilization	46.8%	ICU Level of Service
Analysis Period (min)		15
		A

HCM Unsignalized Intersection Capacity Analysis

22: Texas & Oriental

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕			↕	
Volume (veh/h)	35	17	29	62	3	35	2	562	16	5	406	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	39	19	32	69	3	39	2	624	18	6	451	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												212
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99		0.99					
vC, conflicting volume	822	1111	228	916	1104	321	456			642		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	805	1097	206	900	1090	321	436			642		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	85	91	96	67	98	94	100			99		
cM capacity (veh/h)	255	212	800	209	214	681	1126			952		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	90	111	314	330	231	230
Volume Left	39	69	2	0	6	0
Volume Right	32	39	0	18	0	4
cSH	319	276	1126	1700	952	1700
Volume to Capacity	0.28	0.40	0.00	0.19	0.01	0.14
Queue Length 95th (ft)	28	46	0	0	0	0
Control Delay (s)	20.7	26.6	0.1	0.0	0.3	0.0
Lane LOS	C	D	A		A	
Approach Delay (s)	20.7	26.6	0.0		0.1	
Approach LOS	C	D				

Intersection Summary		
Average Delay		3.7
Intersection Capacity Utilization	34.2%	ICU Level of Service
Analysis Period (min)		15
		A

Queues

23: Eureka & EB I-10 off/Pearl

12/23/2013



Lane Group	EBT	EBR	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	561	534	47	11	36	73	54
v/c Ratio	0.84	0.59	0.38	0.02	0.05	0.11	0.07
Control Delay	29.6	4.1	21.8	5.7	14.5	5.1	14.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.6	4.1	21.8	5.7	14.5	5.1	14.7
Queue Length 50th (ft)	190	0	12	0	9	0	13
Queue Length 95th (ft)	270	47	32	7	27	24	37
Internal Link Dist (ft)	447				545		418
Turn Bay Length (ft)				75			
Base Capacity (vph)	824	994	203	712	736	669	726
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.54	0.23	0.02	0.05	0.11	0.07

Intersection Summary

HCM Signalized Intersection Capacity Analysis

23: Eureka & EB I-10 off/Pearl

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖		↗		↕	↗		↕	
Volume (vph)	84	444	502	44	0	10	0	34	69	5	46	0
Ideal Flow (vphpl)	1800	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		7.0	7.0	6.0		7.0		7.0	7.0		7.0	
Lane Util. Factor		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.99	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1786	1530	1615		1530		1800	1530		1792	
Flt Permitted		0.99	1.00	0.25		1.00		1.00	1.00		0.99	
Satd. Flow (perm)		1786	1530	426		1530		1800	1530		1774	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	89	472	534	47	0	11	0	36	73	5	49	0
RTOR Reduction (vph)	0	0	334	0	0	7	0	0	43	0	0	0
Lane Group Flow (vph)	0	561	200	47	0	4	0	36	30	0	54	0
Turn Type	Perm	NA	Perm	custom		custom		NA	Perm	Perm	NA	
Protected Phases		8						2				6
Permitted Phases	8		8	3		8			2	6		
Actuated Green, G (s)		26.4	26.4	27.4		26.4		28.6	28.6		28.6	
Effective Green, g (s)		24.4	24.4	25.4		24.4		26.6	26.6		26.6	
Actuated g/C Ratio		0.38	0.38	0.39		0.38		0.41	0.41		0.41	
Clearance Time (s)		5.0	5.0	4.0		5.0		5.0	5.0		5.0	
Vehicle Extension (s)		2.0	2.0	2.0		2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)		670	574	166		574		737	626		726	
v/s Ratio Prot								0.02				
v/s Ratio Perm		0.31	0.13	0.11		0.00			0.02		c0.03	
v/c Ratio		0.84	0.35	0.28		0.01		0.05	0.05		0.07	
Uniform Delay, d1		18.5	14.6	13.6		12.7		11.6	11.6		11.7	
Progression Factor		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Incremental Delay, d2		8.6	0.1	0.3		0.0		0.1	0.1		0.2	
Delay (s)		27.1	14.7	13.9		12.7		11.7	11.7		11.9	
Level of Service		C	B	B		B		B	B		B	
Approach Delay (s)		21.1			13.7			11.7			11.9	
Approach LOS		C			B			B			B	

Intersection Summary

HCM Average Control Delay	19.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

24: Eureka & Stuart

12/23/2013



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	34	19	9	93	26	617
v/c Ratio	0.14	0.08	0.03	0.08	0.06	0.51
Control Delay	11.4	10.5	5.2	5.1	5.4	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.4	10.5	5.2	5.1	5.4	7.6
Queue Length 50th (ft)	3	2	1	3	2	25
Queue Length 95th (ft)	16	11	4	9	8	48
Internal Link Dist (ft)	380	399		136		545
Turn Bay Length (ft)			20		20	
Base Capacity (vph)	846	842	426	1918	665	1917
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.02	0.02	0.05	0.04	0.32

Intersection Summary

HCM Signalized Intersection Capacity Analysis

24: Eureka & Stuart

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (vph)	14	14	2	7	7	3	8	79	4	23	501	48
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.98		1.00	0.99		1.00	0.99	
Flt Protected		0.98			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1743			1721		1615	3395		1614	3375	
Flt Permitted		0.84			0.85		0.44	1.00		0.69	1.00	
Satd. Flow (perm)		1499			1490		756	3395		1178	3375	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	16	16	2	8	8	3	9	89	4	26	563	54
RTOR Reduction (vph)	0	2	0	0	3	0	0	3	0	0	18	0
Lane Group Flow (vph)	0	32	0	0	17	0	9	90	0	26	599	0
Confl. Peds. (#/hr)	1		2	2		1			1	1		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.2			6.2		11.0	11.0		11.0	11.0	
Effective Green, g (s)		4.2			4.2		9.0	9.0		9.0	9.0	
Actuated g/C Ratio		0.17			0.17		0.36	0.36		0.36	0.36	
Clearance Time (s)		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	
Lane Grp Cap (vph)		250			248		270	1213		421	1205	
v/s Ratio Prot								0.03			c0.18	
v/s Ratio Perm		c0.02			0.01		0.01			0.02		
v/c Ratio		0.13			0.07		0.03	0.07		0.06	0.50	
Uniform Delay, d1		8.9			8.8		5.3	5.3		5.3	6.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.1		0.1	0.0		0.1	0.3	
Delay (s)		9.2			9.0		5.3	5.4		5.4	6.7	
Level of Service		A			A		A	A		A	A	
Approach Delay (s)		9.2			9.0			5.4			6.6	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	25.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	30.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

25: Eureka & Oriental

12/23/2013



Lane Group	EBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	14	6	98	9	568
v/c Ratio	0.07	0.02	0.06	0.02	0.33
Control Delay	11.8	4.6	4.5	4.4	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.6
Total Delay	11.8	4.6	4.5	4.4	6.0
Queue Length 50th (ft)	1	1	4	1	26
Queue Length 95th (ft)	10	3	10	4	44
Internal Link Dist (ft)	432		184		93
Turn Bay Length (ft)		25		40	
Base Capacity (vph)	323	417	1909	656	1900
Starvation Cap Reductn	0	0	0	0	886
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.04	0.01	0.05	0.01	0.56

Intersection Summary

HCM Signalized Intersection Capacity Analysis

25: Eureka & Oriental

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (vph)	5	2	5	0	0	0	5	86	1	8	462	44
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.2					6.2	6.2		6.2	6.2	
Lane Util. Factor		1.00					1.00	0.95		1.00	0.95	
Frbp, ped/bikes		0.99					1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99					1.00	1.00		1.00	1.00	
Frt		0.94					1.00	1.00		1.00	0.99	
Flt Protected		0.98					0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1641					1614	3414		1614	3369	
Flt Permitted		0.86					0.44	1.00		0.69	1.00	
Satd. Flow (perm)		1444					745	3414		1173	3369	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	6	2	6	0	0	0	6	97	1	9	519	49
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	17	0
Lane Group Flow (vph)	0	9	0	0	0	0	6	98	0	9	551	0
Confl. Peds. (#/hr)	6		1	1		6	2		1	1		2
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	
Protected Phases		1			5			7				3
Permitted Phases	1			5			7			3		
Actuated Green, G (s)		7.0					20.0	20.0		20.0	20.0	
Effective Green, g (s)		5.0					18.0	18.0		18.0	18.0	
Actuated g/C Ratio		0.14					0.51	0.51		0.51	0.51	
Clearance Time (s)		4.2					4.2	4.2		4.2	4.2	
Vehicle Extension (s)		2.5					2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		204					379	1736		596	1713	
v/s Ratio Prot								0.03			c0.16	
v/s Ratio Perm		c0.01					0.01			0.01		
v/c Ratio		0.04					0.02	0.06		0.02	0.32	
Uniform Delay, d1		13.1					4.3	4.4		4.3	5.1	
Progression Factor		1.00					1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1					0.0	0.0		0.0	0.1	
Delay (s)		13.2					4.3	4.4		4.3	5.2	
Level of Service		B					A	A		A	A	
Approach Delay (s)		13.2			0.0			4.4			5.2	
Approach LOS		B			A			A			A	

Intersection Summary

HCM Average Control Delay	5.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	35.4	Sum of lost time (s)	12.4
Intersection Capacity Utilization	32.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

26: Eureka & Redlands

12/23/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	10	173	12	387	121	457
v/c Ratio	0.03	0.21	0.03	0.47	0.14	0.50
Control Delay	9.4	9.4	9.5	11.5	6.9	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.4	9.4	9.5	11.5	6.9	9.3
Queue Length 50th (ft)	1	8	1	22	5	22
Queue Length 95th (ft)	8	27	9	57	17	53
Internal Link Dist (ft)		660		354	209	138
Turn Bay Length (ft)	35		40			
Base Capacity (vph)	1394	2925	1389	2935	2428	2427
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.06	0.01	0.13	0.05	0.19

Intersection Summary

HCM Signalized Intersection Capacity Analysis

26: Eureka & Redlands

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Volume (vph)	9	149	10	11	340	16	12	83	17	58	278	85
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.6	6.6		6.6	6.6			6.2			6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.98			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1614	3384		1611	3395			3320			3285	
Flt Permitted	0.95	1.00		0.95	1.00			0.88			0.89	
Satd. Flow (perm)	1614	3384		1611	3395			2953			2945	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	162	11	12	370	17	13	90	18	63	302	92
RTOR Reduction (vph)	0	8	0	0	7	0	0	13	0	0	42	0
Lane Group Flow (vph)	10	165	0	12	380	0	0	108	0	0	415	0
Confl. Peds. (#/hr)	3		7	7		3	2		1	1		2
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			4	
Permitted Phases	6			2			4			4		
Actuated Green, G (s)	8.9	8.9		8.9	8.9			10.5			10.5	
Effective Green, g (s)	6.9	6.9		6.9	6.9			8.5			8.5	
Actuated g/C Ratio	0.24	0.24		0.24	0.24			0.30			0.30	
Clearance Time (s)	4.6	4.6		4.6	4.6			4.2			4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	395	828		394	831			890			888	
v/s Ratio Prot		0.05			c0.11							
v/s Ratio Perm	0.01			0.01				0.04			c0.14	
v/c Ratio	0.03	0.20		0.03	0.46			0.12			0.47	
Uniform Delay, d1	8.1	8.5		8.1	9.1			7.1			8.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	0.1		0.0	0.4			0.1			0.4	
Delay (s)	8.1	8.6		8.1	9.5			7.2			8.4	
Level of Service	A	A		A	A			A			A	
Approach Delay (s)		8.5			9.4			7.2			8.4	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	28.2	Sum of lost time (s)	12.8
Intersection Capacity Utilization	37.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
27: Orange & Colton

12/23/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	57	202	221	262	92	14	245	86	675
v/c Ratio	0.22	0.39	0.74	0.53	0.19	0.04	0.14	0.16	0.38
Control Delay	15.8	12.8	33.8	20.7	4.1	11.2	8.3	11.4	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.8	12.8	33.8	20.7	4.1	11.2	8.3	11.4	10.6
Queue Length 50th (ft)	16	41	72	79	0	2	18	15	67
Queue Length 95th (ft)	32	68	110	108	21	14	47	50	139
Internal Link Dist (ft)		502		260			472		133
Turn Bay Length (ft)	50		65		65	50		75	
Base Capacity (vph)	403	771	465	780	715	340	1766	534	1773
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.26	0.48	0.34	0.13	0.04	0.14	0.16	0.38

Intersection Summary

HCM Signalized Intersection Capacity Analysis

27: Orange & Colton

12/23/2013



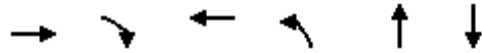
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	51	118	64	199	236	83	13	187	33	77	548	59
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	1705		1615	1800	1530	1615	3343		1615	3370	
Flt Permitted	0.55	1.00		0.63	1.00	1.00	0.38	1.00		0.60	1.00	
Satd. Flow (perm)	930	1705		1073	1800	1530	649	3343		1019	3370	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	57	131	71	221	262	92	14	208	37	86	609	66
RTOR Reduction (vph)	0	41	0	0	0	67	0	18	0	0	10	0
Lane Group Flow (vph)	57	161	0	221	262	25	14	227	0	86	665	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	18.6	18.6		18.6	18.6	18.6	33.4	33.4		33.4	33.4	
Effective Green, g (s)	16.6	16.6		16.6	16.6	16.6	31.4	31.4		31.4	31.4	
Actuated g/C Ratio	0.28	0.28		0.28	0.28	0.28	0.52	0.52		0.52	0.52	
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	3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	257	472		297	498	423	340	1750		533	1764	
v/s Ratio Prot		0.09			0.15			0.07			c0.20	
v/s Ratio Perm	0.06			c0.21		0.02	0.02			0.08		
v/c Ratio	0.22	0.34		0.74	0.53	0.06	0.04	0.13		0.16	0.38	
Uniform Delay, d1	16.7	17.3		19.8	18.4	16.0	7.0	7.3		7.4	8.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.4		9.7	1.0	0.1	0.2	0.2		0.6	0.6	
Delay (s)	17.2	17.8		29.5	19.4	16.0	7.2	7.5		8.1	9.1	
Level of Service	B	B		C	B	B	A	A		A	A	
Approach Delay (s)		17.6			22.7			7.5			9.0	
Approach LOS		B			C			A			A	

Intersection Summary

HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
28: Pearl & Orange

12/23/2013



Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	465	112	305	2	718	317
v/c Ratio	0.82	0.17	0.45	0.01	0.66	0.31
Control Delay	26.4	6.2	10.4	12.5	17.8	13.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.4	6.2	10.4	12.5	17.8	13.5
Queue Length 50th (ft)	117	10	48	0	96	36
Queue Length 95th (ft)	#257	33	99	4	153	65
Internal Link Dist (ft)	445		279		526	472
Turn Bay Length (ft)		20		75		
Base Capacity (vph)	782	886	902	387	1386	1286
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.13	0.34	0.01	0.52	0.25

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

28: Pearl & Orange

12/23/2013



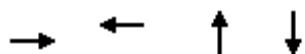
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↔		↖	↕			↕	
Volume (vph)	169	268	105	16	40	230	2	664	11	9	274	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95			0.95	
Frt		1.00	0.85		0.89		1.00	1.00			0.99	
Flt Protected		0.98	1.00		1.00		0.95	1.00			1.00	
Satd. Flow (prot)		1766	1530		1600		1615	3411			3389	
Flt Permitted		0.77	1.00		0.97		0.56	1.00			0.93	
Satd. Flow (perm)		1387	1530		1552		951	3411			3152	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	180	285	112	17	43	245	2	706	12	10	291	16
RTOR Reduction (vph)	0	0	30	0	36	0	0	2	0	0	7	0
Lane Group Flow (vph)	0	465	82	0	269	0	2	716	0	0	310	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4		4	4		2	2			2	
Permitted Phases	4		4	4			2			2		
Actuated Green, G (s)		21.4	21.4		21.4		17.1	17.1			17.1	
Effective Green, g (s)		19.4	19.4		19.4		15.1	15.1			15.1	
Actuated g/C Ratio		0.42	0.42		0.42		0.32	0.32			0.32	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.5	3.5			3.5	
Lane Grp Cap (vph)		579	638		648		309	1108			1024	
v/s Ratio Prot								c0.21				
v/s Ratio Perm		c0.34	0.05		0.17		0.00				0.10	
v/c Ratio		0.80	0.13		0.42		0.01	0.65			0.30	
Uniform Delay, d1		11.9	8.3		9.6		10.6	13.4			11.8	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		7.9	0.1		0.4		0.0	1.4			0.2	
Delay (s)		19.8	8.4		10.0		10.6	14.8			12.0	
Level of Service		B	A		A		B	B			B	
Approach Delay (s)		17.6			10.0			14.8			12.0	
Approach LOS		B			A			B			B	

Intersection Summary

HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	46.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues
29: Orange & Stuart

12/23/2013



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	28	67	725	348
v/c Ratio	0.10	0.25	0.61	0.29
Control Delay	8.7	10.6	9.2	6.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	8.7	10.6	9.2	6.7
Queue Length 50th (ft)	1	5	35	15
Queue Length 95th (ft)	13	25	71	33
Internal Link Dist (ft)	305	198	150	526
Turn Bay Length (ft)				
Base Capacity (vph)	1147	1096	2574	2582
Starvation Cap Reductn	0	0	38	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.02	0.06	0.29	0.13
Intersection Summary				

HCM Signalized Intersection Capacity Analysis
 29: Orange & Stuart

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	7	5	15	32	8	24	5	633	51	3	322	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.2			6.2			6.2			6.2	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frbp, ped/bikes		0.99			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.92			0.95			0.99			1.00	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1628			1658			3375			3408	
Flt Permitted		0.89			0.83			0.95			0.95	
Satd. Flow (perm)		1473			1403			3213			3231	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	7	5	16	34	8	25	5	666	54	3	339	6
RTOR Reduction (vph)	0	13	0	0	21	0	0	11	0	0	3	0
Lane Group Flow (vph)	0	15	0	0	46	0	0	714	0	0	345	0
Confl. Peds. (#/hr)	4		2	2		4	3		2	2		3
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.8			6.8			12.2			12.2	
Effective Green, g (s)		4.8			4.8			10.2			10.2	
Actuated g/C Ratio		0.18			0.18			0.37			0.37	
Clearance Time (s)		4.2			4.2			4.2			4.2	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		258			246			1196			1203	
v/s Ratio Prot												
v/s Ratio Perm		0.01			0.03			0.22			0.11	
v/c Ratio		0.06			0.19			0.60			0.29	
Uniform Delay, d1		9.4			9.6			6.9			6.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.4			0.8			0.1	
Delay (s)		9.5			10.0			7.7			6.2	
Level of Service		A			B			A			A	
Approach Delay (s)		9.5			10.0			7.7			6.2	
Approach LOS		A			B			A			A	

Intersection Summary

HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	27.4	Sum of lost time (s)	12.4
Intersection Capacity Utilization	43.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

30: Orange & Oriental

12/23/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	1	667	364	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	1	702	383	1
Pedestrians	2			1		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	4.0			4.0		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				464	165	
pX, platoon unblocked	0.96	0.99	0.99			
vC, conflicting volume	739	195	386			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	616	178	370			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	409	834	1190			

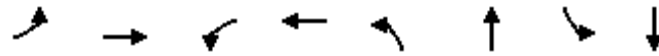
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	0	235	468	255	129
Volume Left	0	1	0	0	0
Volume Right	0	0	0	0	1
cSH	1700	1190	1700	1700	1700
Volume to Capacity	0.00	0.00	0.28	0.15	0.08
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	A			
Approach Delay (s)	0.0	0.0		0.0	
Approach LOS	A				

Intersection Summary					
Average Delay			0.0		
Intersection Capacity Utilization		30.5%		ICU Level of Service	A
Analysis Period (min)		15			

Queues

31: Orange & Redlands

12/23/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	46	149	16	326	35	587	48	324
v/c Ratio	0.19	0.21	0.06	0.43	0.12	0.54	0.19	0.30
Control Delay	11.6	8.3	10.3	8.3	7.6	9.5	8.8	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.6	8.3	10.3	8.3	7.6	9.5	8.8	6.8
Queue Length 50th (ft)	5	6	2	12	3	30	4	13
Queue Length 95th (ft)	22	21	10	36	14	64	18	33
Internal Link Dist (ft)		387		273		223		384
Turn Bay Length (ft)	60		60		75		60	
Base Capacity (vph)	812	2250	812	2231	715	2580	598	2545
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.07	0.02	0.15	0.05	0.23	0.08	0.13

Intersection Summary

HCM Signalized Intersection Capacity Analysis

31: Orange & Redlands

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	42	101	36	15	193	107	32	524	16	44	259	39
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.2	6.2		6.2	6.2		6.2	6.2		6.2	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.95		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3286		1615	3223		1614	3404		1615	3348	
Flt Permitted	0.70	1.00		0.70	1.00		0.56	1.00		0.47	1.00	
Satd. Flow (perm)	1193	3286		1193	3223		944	3404		791	3348	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	110	39	16	210	116	35	570	17	48	282	42
RTOR Reduction (vph)	0	31	0	0	91	0	0	5	0	0	26	0
Lane Group Flow (vph)	46	118	0	16	235	0	35	582	0	48	298	0
Confl. Peds. (#/hr)	1					1	3		1	1		3
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	7.7	7.7		7.7	7.7		10.6	10.6		10.6	10.6	
Effective Green, g (s)	5.7	5.7		5.7	5.7		8.6	8.6		8.6	8.6	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.32	0.32		0.32	0.32	
Clearance Time (s)	4.2	4.2		4.2	4.2		4.2	4.2		4.2	4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	255	702		255	688		304	1096		255	1078	
v/s Ratio Prot		0.04			c0.07			c0.17			0.09	
v/s Ratio Perm	0.04			0.01			0.04			0.06		
v/c Ratio	0.18	0.17		0.06	0.34		0.12	0.53		0.19	0.28	
Uniform Delay, d1	8.6	8.6		8.4	8.9		6.4	7.4		6.5	6.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.1		0.1	0.3		0.2	0.5		0.4	0.1	
Delay (s)	8.9	8.7		8.5	9.2		6.5	7.9		6.9	6.9	
Level of Service	A	A		A	A		A	A		A	A	
Approach Delay (s)		8.7			9.2			7.8			6.9	
Approach LOS		A			A			A			A	

















Intersection Summary

HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	26.7	Sum of lost time (s)	12.4
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



















HCM Unsignalized Intersection Capacity Analysis
 32: 6th St & WB I-10 Ramp

12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	182	17	189	0	148	0	0	285	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	0	0	186	17	193	0	151	0	0	291	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	643	442	291	442	442	151	291			151		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	643	442	291	442	442	151	291			151		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	65	97	79	100			100		
cM capacity (veh/h)	298	513	753	529	513	901	1283			1442		
Direction, Lane #	WB 1	WB 2	NB 1	SB 1								
Volume Total	186	210	151	291								
Volume Left	186	0	0	0								
Volume Right	0	193	0	0								
cSH	529	848	1700	1700								
Volume to Capacity	0.35	0.25	0.09	0.17								
Queue Length 95th (ft)	39	24	0	0								
Control Delay (s)	15.4	10.6	0.0	0.0								
Lane LOS	C	B										
Approach Delay (s)	12.9		0.0	0.0								
Approach LOS	B											
Intersection Summary												
Average Delay			6.1									
Intersection Capacity Utilization			35.8%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 33: 6th St & EB I-10 Ramp

12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	66	34	172	0	0	0	198	86	30	122	266	95
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	79	40	205	0	0	0	236	102	36	145	317	113
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2						
Volume Total (vph)	119	205	236	138	145	430						
Volume Left (vph)	79	0	236	0	145	0						
Volume Right (vph)	0	205	0	36	0	113						
Hadj (s)	0.33	-0.70	0.50	-0.18	0.50	-0.18						
Departure Headway (s)	7.2	6.2	6.8	6.2	6.6	5.9						
Degree Utilization, x	0.24	0.35	0.45	0.24	0.27	0.71						
Capacity (veh/h)	470	547	500	560	525	590						
Control Delay (s)	11.2	11.3	14.1	9.8	10.8	20.7						
Approach Delay (s)	11.2		12.5		18.2							
Approach LOS	B		B		C							
Intersection Summary												
Delay			14.7									
HCM Level of Service			B									
Intersection Capacity Utilization			48.9%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

34: 6th St & Stuart

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (veh/h)	4	6	11	14	7	58	9	238	6	75	320	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Hourly flow rate (vph)	5	8	14	18	9	75	12	309	8	97	416	16
Pedestrians		1						1			2	
Lane Width (ft)		12.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)								231				
pX, platoon unblocked	0.99	0.99		0.99	0.99	0.99				0.99		
vC, conflicting volume	1034	959	218	758	963	315	432			317		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1030	955	218	752	959	305	432			307		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	97	98	93	96	89	99			92		
cM capacity (veh/h)	152	236	792	268	234	690	1137			1255		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	27	103	12	317	97	277	154
Volume Left	5	18	12	0	97	0	0
Volume Right	14	75	0	8	0	0	16
cSH	320	475	1137	1700	1255	1700	1700
Volume to Capacity	0.09	0.22	0.01	0.19	0.08	0.16	0.09
Queue Length 95th (ft)	7	20	1	0	6	0	0
Control Delay (s)	17.3	14.6	8.2	0.0	8.1	0.0	0.0
Lane LOS	C	B	A		A		
Approach Delay (s)	17.3	14.6	0.3		1.5		
Approach LOS	C	B					

Intersection Summary

Average Delay	2.9
Intersection Capacity Utilization	35.4%
ICU Level of Service	A
Analysis Period (min)	15

Queues

35: Redlands Blvd & Citrus Ave

12/23/2013



Lane Group	EBT	WBT	SET	SER	NWT
Lane Group Flow (vph)	465	848	418	41	836
v/c Ratio	0.80	0.94	1.11dl	0.07	0.90
Control Delay	45.3	49.7	28.0	6.7	41.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	45.3	49.7	28.0	6.7	41.9
Queue Length 50th (ft)	132	235	103	0	243
Queue Length 95th (ft)	130	222	117	12	237
Internal Link Dist (ft)	399	463	375		430
Turn Bay Length (ft)				100	
Base Capacity (vph)	832	904	745	655	982
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.56	0.94	0.56	0.06	0.85

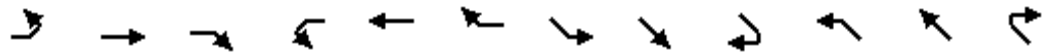
Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

35: Redlands Blvd & Citrus Ave

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕↕			↕↕			↕↕	↗		↕↕	
Volume (vph)	17	210	89	54	296	227	118	166	28	163	372	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.2			6.2	6.2		6.2	
Lane Util. Factor		0.95			0.95			0.95	1.00		0.95	
Frt		0.96			0.94			1.00	0.85		0.99	
Flt Protected		1.00			1.00			0.98	1.00		0.99	
Satd. Flow (prot)		3267			3203			3350	1530		3342	
Flt Permitted		1.00			1.00			0.53	1.00		0.70	
Satd. Flow (perm)		3267			3203			1806	1530		2370	
Peak-hour factor, PHF	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Adj. Flow (vph)	25	309	131	79	435	334	174	244	41	240	547	49
RTOR Reduction (vph)	0	43	0	0	100	0	0	0	25	0	4	0
Lane Group Flow (vph)	0	422	0	0	748	0	0	418	16	0	832	0
Turn Type	Split	NA		Split	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	4	4		1	1			2			2	
Permitted Phases							2		2	2		
Actuated Green, G (s)		17.9			26.2			39.6	39.6		39.6	
Effective Green, g (s)		15.9			24.2			37.6	37.6		37.6	
Actuated g/C Ratio		0.17			0.25			0.39	0.39		0.39	
Clearance Time (s)		4.0			4.2			4.2	4.2		4.2	
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		541			807			707	599		927	
v/s Ratio Prot		c0.13			c0.23							
v/s Ratio Perm								0.23	0.01		c0.35	
v/c Ratio		0.78			0.93			1.11dl	0.03		0.90	
Uniform Delay, d1		38.4			35.1			23.2	18.0		27.4	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		7.2			16.5			1.3	0.0		11.2	
Delay (s)		45.6			51.6			24.5	18.0		38.7	
Level of Service		D			D			C	B		D	
Approach Delay (s)		45.6			51.6			23.9			38.7	
Approach LOS		D			D			C			D	

Intersection Summary

HCM Average Control Delay	41.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	96.1	Sum of lost time (s)	18.4
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

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

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

36: Stuart & Church

12/23/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	24	38	37	264	285	51
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	30	48	47	334	361	65
Pedestrians					40	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					3	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				203		
pX, platoon unblocked	0.99					
vC, conflicting volume	861	393	425			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	854	393	425			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	93	96			
cM capacity (veh/h)	304	660	1145			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	78	381	425			
Volume Left	30	47	0			
Volume Right	48	0	65			
cSH	454	1145	1700			
Volume to Capacity	0.17	0.04	0.25			
Queue Length 95th (ft)	15	3	0			
Control Delay (s)	14.6	1.4	0.0			
Lane LOS	B	A				
Approach Delay (s)	14.6	1.4	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization			49.8%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 37: Universtiy & WB I-10 Ramp/E Central

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↔			↔	
Volume (veh/h)	0	0	0	0	7	25	429	380	20	6	133	885
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	8	27	466	413	22	7	145	962
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												563
pX, platoon unblocked	0.98	0.98	0.98	0.98	0.98		0.98					
vC, conflicting volume	1809	2006	553	1442	2476	217	1107			435		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1779	1981	492	1403	2463	217	1059			435		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	10	97	28			99		
cM capacity (veh/h)	5	17	515	41	8	793	649			1136		
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2							
Volume Total	35	673	228	79	1034							
Volume Left	0	466	0	7	0							
Volume Right	27	0	22	0	962							
cSH	37	649	1700	1136	1700							
Volume to Capacity	0.94	0.72	0.13	0.01	0.61							
Queue Length 95th (ft)	87	151	0	0	0							
Control Delay (s)	290.9	22.1	0.0	0.7	0.0							
Lane LOS	F	C		A								
Approach Delay (s)	290.9	16.5		0.1								
Approach LOS	F											
Intersection Summary												
Average Delay			12.2									
Intersection Capacity Utilization			72.8%		ICU Level of Service				C			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

38: Universtiy & EB I-10 Ramp

12/23/2013

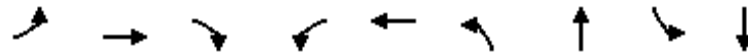


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	277	428	0	623	136	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	334	516	0	751	164	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	12					
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)	1022					
pX, platoon unblocked						
vC, conflicting volume	539	82	164			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	539	82	164			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	30	47	100			
cM capacity (veh/h)	477	968	1427			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	849	375	375	82	82	
Volume Left	334	0	0	0	0	
Volume Right	516	0	0	0	0	
cSH	1215	1700	1700	1700	1700	
Volume to Capacity	0.70	0.22	0.22	0.05	0.05	
Queue Length 95th (ft)	154	0	0	0	0	
Control Delay (s)	18.9	0.0	0.0	0.0	0.0	
Lane LOS	C					
Approach Delay (s)	18.9	0.0		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay	9.1					
Intersection Capacity Utilization	42.0%			ICU Level of Service	A	
Analysis Period (min)	15					

Queues

39: Tippecanoe & Harriman PI

12/23/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	37	5	196	23	11	100	871	8	689
v/c Ratio	0.24	0.02	0.41	0.15	0.05	0.25	0.31	0.02	0.15
Control Delay	26.8	22.0	7.0	24.7	15.7	5.0	3.7	1.6	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.8	22.0	7.0	24.7	15.7	5.0	3.7	1.6	1.0
Queue Length 50th (ft)	12	2	0	8	1	2	6	0	3
Queue Length 95th (ft)	35	9	26	25	13	m18	35	m2	14
Internal Link Dist (ft)		665			715		499		772
Turn Bay Length (ft)	280		170	150		260		225	
Base Capacity (vph)	361	510	861	363	460	395	2805	378	4576
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.01	0.23	0.06	0.02	0.25	0.31	0.02	0.15

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

39: Tippecanoe & Harriman PI

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗↘	↖	↗		↖	↖↗↘		↖	↗↘	
Volume (vph)	35	5	186	22	3	8	180	728	15	8	610	45
Ideal Flow (vphpl)	1700	1800	1700	1700	1800	1800	1700	1800	1800	1700	1800	1800
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	0.88	1.00	1.00		0.86	0.86		1.00	0.86	
Frt	1.00	1.00	0.85	1.00	0.89		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.99		0.95	1.00	
Satd. Flow (prot)	1615	1800	2543	1615	1604		1389	4608		1615	6129	
Flt Permitted	0.75	1.00	1.00	0.75	1.00		0.36	0.81		0.30	1.00	
Satd. Flow (perm)	1276	1800	2543	1283	1604		531	3763		506	6129	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	5	196	23	3	8	189	766	16	8	642	47
RTOR Reduction (vph)	0	0	172	0	7	0	0	2	0	0	11	0
Lane Group Flow (vph)	37	5	24	23	4	0	100	869	0	8	678	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	7.3	7.3	7.3	7.3	7.3		44.7	44.7		44.7	44.7	
Effective Green, g (s)	7.3	7.3	7.3	7.3	7.3		44.7	44.7		44.7	44.7	
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12		0.75	0.75		0.75	0.75	
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)	155	219	309	156	195		396	2803		377	4566	
v/s Ratio Prot		0.00			0.00							0.11
v/s Ratio Perm	c0.03		0.01	0.02			0.19	c0.23		0.02		
v/c Ratio	0.24	0.02	0.08	0.15	0.02		0.25	0.31		0.02	0.15	
Uniform Delay, d1	23.8	23.2	23.4	23.6	23.2		2.4	2.5		2.0	2.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.13	1.23		0.60	0.43	
Incremental Delay, d2	0.8	0.0	0.1	0.4	0.0		1.4	0.3		0.1	0.1	
Delay (s)	24.6	23.3	23.5	24.0	23.2		4.1	3.4		1.3	1.0	
Level of Service	C	C	C	C	C		A	A		A	A	
Approach Delay (s)		23.6			23.8			3.5			1.0	
Approach LOS		C			C			A			A	

Intersection Summary

HCM Average Control Delay	5.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

50: California & Rail













12/23/2013

	↑	↓
Lane Group	NBT	SBT
Lane Group Flow (vph)	1005	995
v/c Ratio	0.17	0.31
Control Delay	1.5	2.0
Queue Delay	0.8	21.1
Total Delay	2.4	23.1
Queue Length 50th (ft)	99	210
Queue Length 95th (ft)	98	208
Internal Link Dist (ft)	241	46
Turn Bay Length (ft)		
Base Capacity (vph)	5869	3241
Starvation Cap Reductn	4424	2266
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.70	1.02
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

50: California & Rail

12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑↑↑			↑↑	
Volume (vph)	0	0	0	0	0	0	0	955	0	0	945	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								2.0			2.0	
Lane Util. Factor								0.86			0.95	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								6192			3420	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								6192			3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	1005	0	0	995	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	1005	0	0	995	0
Turn Type								NA			NA	
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)								853.0			853.0	
Effective Green, g (s)								853.0			853.0	
Actuated g/C Ratio								0.95			0.95	
Clearance Time (s)								2.0			2.0	
Lane Grp Cap (vph)								5869			3241	
v/s Ratio Prot								0.16			c0.29	
v/s Ratio Perm												
v/c Ratio								0.17			0.31	
Uniform Delay, d1								1.5			1.7	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.1			0.2	
Delay (s)								1.5			2.0	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			1.5			2.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			1.8					HCM Level of Service			A	
HCM Volume to Capacity ratio			0.31									
Actuated Cycle Length (s)			900.0					Sum of lost time (s)			47.0	
Intersection Capacity Utilization			30.9%					ICU Level of Service			A	
Analysis Period (min)			15									
c Critical Lane Group												

Intersection Sign configuration not allowed in HCM analysis.

Queues

71: Alabama St & Rail













12/23/2013

	↑	↓
Lane Group	NBT	SBT
Lane Group Flow (vph)	668	774
v/c Ratio	0.21	0.24
Control Delay	1.7	1.8
Queue Delay	12.1	9.6
Total Delay	13.8	11.4
Queue Length 50th (ft)	124	150
Queue Length 95th (ft)	126	151
Internal Link Dist (ft)	164	236
Turn Bay Length (ft)		
Base Capacity (vph)	3241	3241
Starvation Cap Reductn	2549	2431
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.97	0.96
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

71: Alabama St & Rail

12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑↑			↑↑	
Volume (vph)	0	0	0	0	0	0	0	635	0	0	735	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								2.0			2.0	
Lane Util. Factor								0.95			0.95	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								3420			3420	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								3420			3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	668	0	0	774	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	668	0	0	774	0
Turn Type								NA			NA	
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)								853.0			853.0	
Effective Green, g (s)								853.0			853.0	
Actuated g/C Ratio								0.95			0.95	
Clearance Time (s)								2.0			2.0	
Lane Grp Cap (vph)								3241			3241	
v/s Ratio Prot								0.20			c0.23	
v/s Ratio Perm												
v/c Ratio								0.21			0.24	
Uniform Delay, d1								1.5			1.6	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.1			0.2	
Delay (s)								1.7			1.8	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			1.7			1.8	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			1.7					HCM Level of Service			A	
HCM Volume to Capacity ratio			0.24									
Actuated Cycle Length (s)			900.0					Sum of lost time (s)		47.0		
Intersection Capacity Utilization			24.8%					ICU Level of Service		A		
Analysis Period (min)			15									
c Critical Lane Group												

Intersection Sign configuration not allowed in HCM analysis.

Queues
82: Rail & Tennessee













12/23/2013

	↑	↓
Lane Group	NBT	SBT
Lane Group Flow (vph)	677	725
v/c Ratio	0.21	0.22
Control Delay	1.7	1.7
Queue Delay	22.0	0.0
Total Delay	23.7	1.7
Queue Length 50th (ft)	126	137
Queue Length 95th (ft)	128	140
Internal Link Dist (ft)	48	508
Turn Bay Length (ft)		
Base Capacity (vph)	3241	3241
Starvation Cap Reductn	2572	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.01	0.22
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

82: Rail & Tennessee

12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑↑			↑↑	
Volume (vph)	0	0	0	0	0	0	0	643	0	0	689	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								2.0			2.0	
Lane Util. Factor								0.95			0.95	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								3420			3420	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								3420			3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	677	0	0	725	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	677	0	0	725	0
Turn Type								NA			NA	
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)								853.0			853.0	
Effective Green, g (s)								853.0			853.0	
Actuated g/C Ratio								0.95			0.95	
Clearance Time (s)								2.0			2.0	
Lane Grp Cap (vph)								3241			3241	
v/s Ratio Prot								0.20			c0.21	
v/s Ratio Perm												
v/c Ratio								0.21			0.22	
Uniform Delay, d1								1.5			1.6	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.1			0.2	
Delay (s)								1.7			1.7	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			1.7			1.7	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			1.7					HCM Level of Service			A	
HCM Volume to Capacity ratio			0.22									
Actuated Cycle Length (s)			900.0					Sum of lost time (s)		47.0		
Intersection Capacity Utilization			23.4%					ICU Level of Service		A		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

85: E Orange Show & Rail

12/23/2013

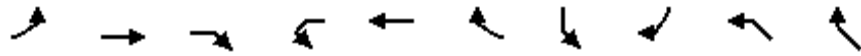


Lane Group	EBT	WBT
Lane Group Flow (vph)	620	398
v/c Ratio	0.19	0.12
Control Delay	1.6	1.5
Queue Delay	0.0	2.3
Total Delay	1.6	3.8
Queue Length 50th (ft)	113	67
Queue Length 95th (ft)	116	71
Internal Link Dist (ft)	346	622
Turn Bay Length (ft)		
Base Capacity (vph)	3241	3241
Starvation Cap Reductn	0	2680
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.19	0.71
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

85: E Orange Show & Rail

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations		↑↑			↑↑		↑			↑
Volume (vph)	0	589	0	0	378	0	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		2.0			2.0					
Lane Util. Factor		0.95			0.95					
Frt		1.00			1.00					
Flt Protected		1.00			1.00					
Satd. Flow (prot)		3420			3420					
Flt Permitted		1.00			1.00					
Satd. Flow (perm)		3420			3420					
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	620	0	0	398	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	620	0	0	398	0	0	0	0	0
Turn Type		NA			NA					Over
Protected Phases		4			4		2			2
Permitted Phases										
Actuated Green, G (s)		853.0			853.0					
Effective Green, g (s)		853.0			853.0					
Actuated g/C Ratio		0.95			0.95					
Clearance Time (s)		2.0			2.0					
Lane Grp Cap (vph)		3241			3241					
v/s Ratio Prot		c0.18			0.12					
v/s Ratio Perm										
v/c Ratio		0.19			0.12					
Uniform Delay, d1		1.5			1.4					
Progression Factor		1.00			1.00					
Incremental Delay, d2		0.1			0.1					
Delay (s)		1.6			1.5					
Level of Service		A			A					
Approach Delay (s)		1.6			1.5		0.0		0.0	
Approach LOS		A			A		A		A	

Intersection Summary

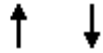
HCM Average Control Delay	1.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.19		
Actuated Cycle Length (s)	900.0	Sum of lost time (s)	47.0
Intersection Capacity Utilization	20.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

93: S Waterman/Waterman & Rail

12/23/2013















Lane Group	NBT	SBT
Lane Group Flow (vph)	733	939
v/c Ratio	0.23	0.29
Control Delay	1.7	1.9
Queue Delay	0.0	4.1
Total Delay	1.7	6.0
Queue Length 50th (ft)	140	194
Queue Length 95th (ft)	141	193
Internal Link Dist (ft)	7	578
Turn Bay Length (ft)		
Base Capacity (vph)	3241	3241
Starvation Cap Reductn	0	2194
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.23	0.90
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

93: S Waterman/Waterman & Rail

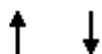
12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑↑			↑↑	
Volume (vph)	0	0	0	0	0	0	0	696	0	0	892	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								2.0			2.0	
Lane Util. Factor								0.95			0.95	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								3420			3420	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								3420			3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	733	0	0	939	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	733	0	0	939	0
Turn Type								NA			NA	
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)								853.0			853.0	
Effective Green, g (s)								853.0			853.0	
Actuated g/C Ratio								0.95			0.95	
Clearance Time (s)								2.0			2.0	
Lane Grp Cap (vph)								3241			3241	
v/s Ratio Prot								0.21			c0.27	
v/s Ratio Perm												
v/c Ratio								0.23			0.29	
Uniform Delay, d1								1.6			1.7	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.2			0.2	
Delay (s)								1.7			1.9	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			1.7			1.9	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			1.8					HCM Level of Service			A	
HCM Volume to Capacity ratio			0.29									
Actuated Cycle Length (s)			900.0					Sum of lost time (s)			47.0	
Intersection Capacity Utilization			29.4%					ICU Level of Service			A	
Analysis Period (min)			15									
c Critical Lane Group												

Queues

96: Texas & Rail

12/23/2013















Lane Group	NBT	SBT
Lane Group Flow (vph)	628	461
v/c Ratio	0.19	0.14
Control Delay	1.6	1.5
Queue Delay	0.0	0.0
Total Delay	1.6	1.5
Queue Length 50th (ft)	115	80
Queue Length 95th (ft)	117	83
Internal Link Dist (ft)	132	113
Turn Bay Length (ft)		
Base Capacity (vph)	3241	3241
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.19	0.14
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

96: Texas & Rail

12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑↑			↑↑	
Volume (vph)	0	0	0	0	0	0	0	597	0	0	438	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								2.0			2.0	
Lane Util. Factor								0.95			0.95	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								3420			3420	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								3420			3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	628	0	0	461	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	628	0	0	461	0
Turn Type								NA			NA	
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)								853.0			853.0	
Effective Green, g (s)								853.0			853.0	
Actuated g/C Ratio								0.95			0.95	
Clearance Time (s)								2.0			2.0	
Lane Grp Cap (vph)								3241			3241	
v/s Ratio Prot								c0.18			0.13	
v/s Ratio Perm												
v/c Ratio								0.19			0.14	
Uniform Delay, d1								1.5			1.4	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.1			0.1	
Delay (s)								1.6			1.5	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			1.6			1.5	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			1.6					HCM Level of Service			A	
HCM Volume to Capacity ratio			0.19									
Actuated Cycle Length (s)			900.0					Sum of lost time (s)			47.0	
Intersection Capacity Utilization			20.8%					ICU Level of Service			A	
Analysis Period (min)			15									
c Critical Lane Group												

Queues

101: Eureka & Rail













12/23/2013

	↑	↓
Lane Group	NBT	SBT
Lane Group Flow (vph)	96	537
v/c Ratio	0.03	0.17
Control Delay	1.3	1.6
Queue Delay	14.2	12.9
Total Delay	15.5	14.4
Queue Length 50th (ft)	14	95
Queue Length 95th (ft)	17	98
Internal Link Dist (ft)	93	136
Turn Bay Length (ft)		
Base Capacity (vph)	3241	3241
Starvation Cap Reductn	3119	2680
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.79	0.96
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

101: Eureka & Rail

12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑↑			↑↑	
Volume (vph)	0	0	0	0	0	0	0	91	0	0	510	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								2.0			2.0	
Lane Util. Factor								0.95			0.95	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								3420			3420	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								3420			3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	96	0	0	537	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	96	0	0	537	0
Turn Type								NA			NA	
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)								853.0			853.0	
Effective Green, g (s)								853.0			853.0	
Actuated g/C Ratio								0.95			0.95	
Clearance Time (s)								2.0			2.0	
Lane Grp Cap (vph)								3241			3241	
v/s Ratio Prot								0.03			c0.16	
v/s Ratio Perm												
v/c Ratio								0.03			0.17	
Uniform Delay, d1								1.3			1.5	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.0			0.1	
Delay (s)								1.3			1.6	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			1.3			1.6	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			1.5					HCM Level of Service			A	
HCM Volume to Capacity ratio			0.17									
Actuated Cycle Length (s)			900.0					Sum of lost time (s)		47.0		
Intersection Capacity Utilization			18.2%					ICU Level of Service		A		
Analysis Period (min)			15									
c Critical Lane Group												

Queues
119: Orange & Rail













12/23/2013

	↑	↓
Lane Group	NBT	SBT
Lane Group Flow (vph)	702	383
v/c Ratio	0.22	0.12
Control Delay	1.7	1.5
Queue Delay	3.7	10.3
Total Delay	5.4	11.7
Queue Length 50th (ft)	132	64
Queue Length 95th (ft)	134	68
Internal Link Dist (ft)	85	150
Turn Bay Length (ft)		
Base Capacity (vph)	3241	3241
Starvation Cap Reductn	2421	2820
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.86	0.91
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

119: Orange & Rail

12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑↑			↑↑	
Volume (vph)	0	0	0	0	0	0	0	667	0	0	364	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								2.0			2.0	
Lane Util. Factor								0.95			0.95	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								3420			3420	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								3420			3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	702	0	0	383	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	702	0	0	383	0
Turn Type								NA			NA	
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)								853.0			853.0	
Effective Green, g (s)								853.0			853.0	
Actuated g/C Ratio								0.95			0.95	
Clearance Time (s)								2.0			2.0	
Lane Grp Cap (vph)								3241			3241	
v/s Ratio Prot								c0.21			0.11	
v/s Ratio Perm												
v/c Ratio								0.22			0.12	
Uniform Delay, d1								1.5			1.4	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.2			0.1	
Delay (s)								1.7			1.5	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			1.7			1.5	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			1.6					HCM Level of Service			A	
HCM Volume to Capacity ratio			0.22									
Actuated Cycle Length (s)			900.0					Sum of lost time (s)		47.0		
Intersection Capacity Utilization			22.8%					ICU Level of Service		A		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

124: Rail & E Mill

12/23/2013



Lane Group	EBT	WBT
Lane Group Flow (vph)	505	421
v/c Ratio	0.16	0.13
Control Delay	1.5	1.5
Queue Delay	3.2	0.9
Total Delay	4.8	2.3
Queue Length 50th (ft)	88	72
Queue Length 95th (ft)	92	75
Internal Link Dist (ft)	521	1246
Turn Bay Length (ft)		
Base Capacity (vph)	3241	3241
Starvation Cap Reductn	2608	2483
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.80	0.56

Intersection Summary

HCM Signalized Intersection Capacity Analysis

124: Rail & E Mill

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑			↑			↑	
Volume (vph)	0	480	0	0	400	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		2.0			2.0							
Lane Util. Factor		0.95			0.95							
Frt		1.00			1.00							
Flt Protected		1.00			1.00							
Satd. Flow (prot)		3420			3420							
Flt Permitted		1.00			1.00							
Satd. Flow (perm)		3420			3420							
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	505	0	0	421	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	505	0	0	421	0	0	0	0	0	0	0
Turn Type		NA			NA							
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)		853.0			853.0							
Effective Green, g (s)		853.0			853.0							
Actuated g/C Ratio		0.95			0.95							
Clearance Time (s)		2.0			2.0							
Lane Grp Cap (vph)		3241			3241							
v/s Ratio Prot		c0.15			0.12							
v/s Ratio Perm												
v/c Ratio		0.16			0.13							
Uniform Delay, d1		1.4			1.4							
Progression Factor		1.00			1.00							
Incremental Delay, d2		0.1			0.1							
Delay (s)		1.5			1.5							
Level of Service		A			A							
Approach Delay (s)		1.5			1.5			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	1.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.16		
Actuated Cycle Length (s)	900.0	Sum of lost time (s)	47.0
Intersection Capacity Utilization	17.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

132: 6th St & Rail













12/23/2013

	↑	↓
Lane Group	NBT	SBT
Lane Group Flow (vph)	266	363
v/c Ratio	0.16	0.11
Control Delay	1.6	1.4
Queue Delay	0.0	0.0
Total Delay	1.6	1.4
Queue Length 50th (ft)	89	61
Queue Length 95th (ft)	98	64
Internal Link Dist (ft)	280	151
Turn Bay Length (ft)		
Base Capacity (vph)	1706	3241
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.16	0.11
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

132: 6th St & Rail

12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑			↑↑	
Volume (vph)	0	0	0	0	0	0	0	253	0	0	345	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								2.0			2.0	
Lane Util. Factor								1.00			0.95	
Flt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								1800			3420	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								1800			3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	266	0	0	363	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	266	0	0	363	0
Turn Type								NA			NA	
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)								853.0			853.0	
Effective Green, g (s)								853.0			853.0	
Actuated g/C Ratio								0.95			0.95	
Clearance Time (s)								2.0			2.0	
Lane Grp Cap (vph)								1706			3241	
v/s Ratio Prot								c0.15			0.11	
v/s Ratio Perm												
v/c Ratio								0.16			0.11	
Uniform Delay, d1								1.4			1.4	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.2			0.1	
Delay (s)								1.6			1.4	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			1.6			1.4	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			1.5					HCM Level of Service			A	
HCM Volume to Capacity ratio			0.16									
Actuated Cycle Length (s)			900.0					Sum of lost time (s)		47.0		
Intersection Capacity Utilization			17.4%					ICU Level of Service		A		
Analysis Period (min)			15									
c Critical Lane Group												

Queues
139: Church & Rail













12/23/2013

	↑	↓
Lane Group	NBT	SBT
Lane Group Flow (vph)	317	340
v/c Ratio	0.19	0.20
Control Delay	1.7	1.8
Queue Delay	0.0	0.0
Total Delay	1.7	1.8
Queue Length 50th (ft)	110	119
Queue Length 95th (ft)	118	129
Internal Link Dist (ft)	171	123
Turn Bay Length (ft)		
Base Capacity (vph)	1706	1706
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.19	0.20
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

139: Church & Rail

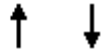
12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑			↑	
Volume (vph)	0	0	0	0	0	0	0	301	0	0	323	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								2.0			2.0	
Lane Util. Factor								1.00			1.00	
Flt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								1800			1800	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								1800			1800	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	317	0	0	340	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	317	0	0	340	0
Turn Type								NA			NA	
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)								853.0			853.0	
Effective Green, g (s)								853.0			853.0	
Actuated g/C Ratio								0.95			0.95	
Clearance Time (s)								2.0			2.0	
Lane Grp Cap (vph)								1706			1706	
v/s Ratio Prot								0.18			c0.19	
v/s Ratio Perm												
v/c Ratio								0.19			0.20	
Uniform Delay, d1								1.5			1.5	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.2			0.3	
Delay (s)								1.7			1.8	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			1.7			1.8	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			1.8					HCM Level of Service			A	
HCM Volume to Capacity ratio			0.20									
Actuated Cycle Length (s)			900.0					Sum of lost time (s)			47.0	
Intersection Capacity Utilization			21.3%					ICU Level of Service			A	
Analysis Period (min)			15									
c Critical Lane Group												

Queues

169: S Tippecanoe & Rail













12/23/2013



Lane Group	NBT	SBT
Lane Group Flow (vph)	546	927
v/c Ratio	0.17	0.29
Control Delay	1.6	1.9
Queue Delay	0.6	12.5
Total Delay	2.2	14.4
Queue Length 50th (ft)	97	190
Queue Length 95th (ft)	100	189
Internal Link Dist (ft)	69	198
Turn Bay Length (ft)		
Base Capacity (vph)	3241	3241
Starvation Cap Reductn	2250	2298
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.55	0.98
Intersection Summary		

HCM Signalized Intersection Capacity Analysis
 169: S Tippecanoe & Rail

12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑↑			↑↑	
Volume (vph)	0	0	0	0	0	0	0	519	0	0	881	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								2.0			2.0	
Lane Util. Factor								0.95			0.95	
Flt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								3420			3420	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								3420			3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	546	0	0	927	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	546	0	0	927	0
Turn Type								NA			NA	
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)								853.0			853.0	
Effective Green, g (s)								853.0			853.0	
Actuated g/C Ratio								0.95			0.95	
Clearance Time (s)								2.0			2.0	
Lane Grp Cap (vph)								3241			3241	
v/s Ratio Prot								0.16			c0.27	
v/s Ratio Perm												
v/c Ratio								0.17			0.29	
Uniform Delay, d1								1.5			1.7	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.1			0.2	
Delay (s)								1.6			1.9	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			1.6			1.9	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			1.8					HCM Level of Service			A	
HCM Volume to Capacity ratio			0.29									
Actuated Cycle Length (s)			900.0					Sum of lost time (s)		47.0		
Intersection Capacity Utilization			29.0%					ICU Level of Service		A		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

182: Universtiy & Rail













12/23/2013

	↑	↓
Lane Group	NBT	SBT
Lane Group Flow (vph)	426	1078
v/c Ratio	0.13	0.33
Control Delay	1.5	2.1
Queue Delay	0.0	0.0
Total Delay	1.5	2.1
Queue Length 50th (ft)	73	236
Queue Length 95th (ft)	76	232
Internal Link Dist (ft)	483	348
Turn Bay Length (ft)		
Base Capacity (vph)	3241	3241
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.13	0.33
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

182: Universtiy & Rail

12/23/2013













												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑↑			↑↑	
Volume (vph)	0	0	0	0	0	0	0	405	0	0	1024	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								2.0			2.0	
Lane Util. Factor								0.95			0.95	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								3420			3420	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								3420			3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	426	0	0	1078	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	426	0	0	1078	0
Turn Type								NA			NA	
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)								853.0			853.0	
Effective Green, g (s)								853.0			853.0	
Actuated g/C Ratio								0.95			0.95	
Clearance Time (s)								2.0			2.0	
Lane Grp Cap (vph)								3241			3241	
v/s Ratio Prot								0.12			c0.32	
v/s Ratio Perm												
v/c Ratio								0.13			0.33	
Uniform Delay, d1								1.4			1.8	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.1			0.3	
Delay (s)								1.5			2.1	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			1.5			2.1	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			1.9					HCM Level of Service			A	
HCM Volume to Capacity ratio			0.33									
Actuated Cycle Length (s)			900.0					Sum of lost time (s)		47.0		
Intersection Capacity Utilization			33.2%					ICU Level of Service		A		
Analysis Period (min)			15									
c Critical Lane Group												

Intersection Sign configuration not allowed in HCM analysis.

HCM Unsignalized Intersection Capacity Analysis

191: D St & Rail













12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑						↑↑			↑↑	
Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1029	900	1091	1029	900	1091	1636			1636		
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2							
Volume Total	0	0	0	0	0							
Volume Left	0	0	0	0	0							
Volume Right	0	0	0	0	0							
cSH	1700	1700	1700	1700	1700							
Volume to Capacity	0.00	0.00	0.00	0.00	0.00							
Queue Length 95th (ft)	0	0	0	0	0							
Control Delay (s)	0.0	0.0	0.0	0.0	0.0							
Lane LOS	A											
Approach Delay (s)	0.0	0.0		0.0								
Approach LOS	A											
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			0.0%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

195: Arrowhead & Rail

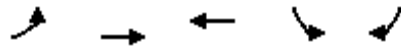
12/23/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑						↑↑			↑↑		
Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type							None						
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	0	0	0	0	0	0	0			0			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	0	0	0	0	0	0	0			0			
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1			
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2			
p0 queue free %	100	100	100	100	100	100	100			100			
cM capacity (veh/h)	1029	900	1091	1029	900	1091	1636			1636			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2								
Volume Total	0	0	0	0	0								
Volume Left	0	0	0	0	0								
Volume Right	0	0	0	0	0								
cSH	1700	1700	1700	1700	1700								
Volume to Capacity	0.00	0.00	0.00	0.00	0.00								
Queue Length 95th (ft)	0	0	0	0	0								
Control Delay (s)	0.0	0.0	0.0	0.0	0.0								
Lane LOS	A												
Approach Delay (s)	0.0	0.0	0.0										
Approach LOS	A												
Intersection Summary													
Average Delay			0.0										
Intersection Capacity Utilization			0.0%		ICU Level of Service				A				
Analysis Period (min)			15										

Intersection Sign configuration not allowed in HCM analysis.

Queues
1: Mill St

11/25/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	65	501	489	111	50
v/c Ratio	0.14	0.25	0.25	0.25	0.22
Control Delay	6.2	5.4	5.3	12.5	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.2	5.4	5.3	12.5	8.1
Queue Length 50th (ft)	6	24	22	6	0
Queue Length 95th (ft)	18	43	41	22	18
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	565	2396	2377	2072	901
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.12	0.21	0.21	0.05	0.06

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St

11/25/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↑		↰↰	↰
Volume (vph)	56	431	392	28	76	63
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.97	0.85
Flt Protected	0.95	1.00	1.00		0.96	1.00
Satd. Flow (prot)	1615	3420	3385		3254	1392
Flt Permitted	0.47	1.00	1.00		0.96	1.00
Satd. Flow (perm)	805	3420	3385		3254	1392
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	65	501	456	33	88	73
RTOR Reduction (vph)	0	0	8	0	21	45
Lane Group Flow (vph)	65	501	481	0	90	5
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	20.2	20.2	20.2		5.3	5.3
Effective Green, g (s)	18.2	18.2	18.2		3.3	3.3
Actuated g/C Ratio	0.53	0.53	0.53		0.10	0.10
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	425	1804	1786		311	133
v/s Ratio Prot		c0.15	0.14		c0.03	
v/s Ratio Perm	0.08					0.00
v/c Ratio	0.15	0.28	0.27		0.29	0.04
Uniform Delay, d1	4.2	4.5	4.5		14.5	14.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.1	0.1		0.5	0.1
Delay (s)	4.4	4.6	4.6		15.0	14.3
Level of Service	A	A	A		B	B
Approach Delay (s)		4.6	4.6		14.8	
Approach LOS		A	A		B	

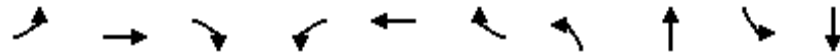
Intersection Summary

HCM Average Control Delay	5.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	34.5	Sum of lost time (s)	13.0
Intersection Capacity Utilization	41.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

11/25/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	98	327	139	119	234	67	123	621	85	776
v/c Ratio	0.34	0.62	0.39	0.43	0.44	0.23	0.40	0.34	0.27	0.40
Control Delay	19.4	30.6	8.2	21.9	26.8	8.5	24.5	16.3	16.9	15.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.4	30.6	8.2	21.9	26.8	8.5	24.5	16.3	16.9	15.8
Queue Length 50th (ft)	26	65	0	32	45	0	35	65	22	82
Queue Length 95th (ft)	54	94	39	64	70	27	76	100	52	120
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	285	894	503	274	894	450	310	1843	319	1956
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	0.34	0.37	0.28	0.43	0.26	0.15	0.40	0.34	0.27	0.40

Intersection Summary

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

11/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	93	311	132	113	222	64	117	505	85	81	640	97
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0		5.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3420	1530	1615	3420	1530	1615	4808		1615	4817	
Flt Permitted	0.61	1.00	1.00	0.55	1.00	1.00	0.35	1.00		0.31	1.00	
Satd. Flow (perm)	1030	3420	1530	933	3420	1530	588	4808		520	4817	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	98	327	139	119	234	67	123	532	89	85	674	102
RTOR Reduction (vph)	0	0	118	0	0	57	0	31	0	0	26	0
Lane Group Flow (vph)	98	327	21	119	234	10	123	590	0	85	750	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	17.2	12.0	12.0	17.4	12.1	12.1	27.3	25.3		26.8	26.8	
Effective Green, g (s)	13.2	10.0	10.0	13.4	10.1	10.1	25.3	23.3		24.8	24.8	
Actuated g/C Ratio	0.20	0.15	0.15	0.21	0.16	0.16	0.39	0.36		0.38	0.38	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	238	526	235	227	531	238	275	1723		273	1838	
v/s Ratio Prot	0.02	c0.10		c0.03	0.07		c0.02	0.12		0.02	c0.16	
v/s Ratio Perm	0.06		0.01	0.08		0.01	c0.15			0.10		
v/c Ratio	0.41	0.62	0.09	0.52	0.44	0.04	0.45	0.34		0.31	0.41	
Uniform Delay, d1	22.0	25.7	23.6	22.2	24.9	23.3	15.3	15.2		13.3	14.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	2.3	0.2	2.2	0.6	0.1	1.2	0.5		0.7	0.7	
Delay (s)	23.1	28.0	23.8	24.4	25.5	23.4	16.5	15.8		14.0	15.4	
Level of Service	C	C	C	C	C	C	B	B		B	B	
Approach Delay (s)		26.1			24.8			15.9			15.3	
Approach LOS		C			C			B			B	

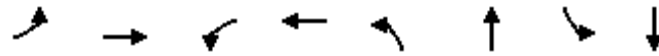
Intersection Summary

HCM Average Control Delay	19.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Waterman & E Orange Show

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	142	574	100	326	107	739	58	859
v/c Ratio	0.50	0.67	0.49	0.45	0.51	0.61	0.22	0.77
Control Delay	25.3	18.4	26.3	23.1	23.7	20.2	13.2	25.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.3	18.4	26.3	23.1	23.7	20.2	13.2	25.1
Queue Length 50th (ft)	40	65	27	55	22	128	12	153
Queue Length 95th (ft)	78	110	58	90	#60	200	33	237
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	284	1506	204	1444	208	1490	260	1444
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.38	0.49	0.23	0.51	0.50	0.22	0.59

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	122	287	206	86	233	47	92	592	44	50	617	122
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	7.0		6.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.94		1.00	0.97		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3206		1615	3333		1615	3385		1615	3335	
Flt Permitted	0.55	1.00		0.33	1.00		0.21	1.00		0.31	1.00	
Satd. Flow (perm)	943	3206		563	3333		353	3385		530	3335	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	142	334	240	100	271	55	107	688	51	58	717	142
RTOR Reduction (vph)	0	186	0	0	24	0	0	7	0	0	19	0
Lane Group Flow (vph)	142	388	0	100	302	0	107	732	0	58	840	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	18.5	14.9		18.5	14.9		27.5	23.9		25.5	22.9	
Effective Green, g (s)	14.5	12.9		14.5	12.9		23.5	21.9		21.5	20.9	
Actuated g/C Ratio	0.23	0.20		0.23	0.20		0.37	0.35		0.34	0.33	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	234	656		156	682		164	1177		191	1106	
v/s Ratio Prot	0.02	0.12		c0.02	0.09		c0.02	0.22		0.00	c0.25	
v/s Ratio Perm	0.12			c0.13			0.23			0.10		
v/c Ratio	0.61	0.59		0.64	0.44		0.65	0.62		0.30	0.76	
Uniform Delay, d1	21.1	22.7		21.8	21.9		17.0	17.1		16.1	18.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.4	1.4		8.7	0.5		9.0	1.0		0.9	3.0	
Delay (s)	25.5	24.1		30.5	22.4		25.9	18.1		17.0	21.8	
Level of Service	C	C		C	C		C	B		B	C	
Approach Delay (s)		24.4			24.3			19.1			21.5	
Approach LOS		C			C			B			C	

Intersection Summary

HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	63.0	Sum of lost time (s)	25.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

11/25/2013



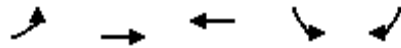
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	4	3	4	723	906	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	4	3	4	803	1007	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					87	
pX, platoon unblocked	0.98	0.98	0.98			
vC, conflicting volume	1419	505	1010			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1386	453	969			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	99			
cM capacity (veh/h)	133	548	705			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	8	4	402	402	671	339
Volume Left	4	4	0	0	0	0
Volume Right	3	0	0	0	0	3
cSH	197	705	1700	1700	1700	1700
Volume to Capacity	0.04	0.01	0.24	0.24	0.39	0.20
Queue Length 95th (ft)	3	0	0	0	0	0
Control Delay (s)	24.0	10.1	0.0	0.0	0.0	0.0
Lane LOS	C	B				
Approach Delay (s)	24.0	0.1			0.0	
Approach LOS	C					

Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			36.5%	ICU Level of Service		A
Analysis Period (min)			15			

Queues
1: Mill St

12/23/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	67	551	607	142	67
v/c Ratio	0.16	0.27	0.30	0.30	0.28
Control Delay	6.3	5.5	5.5	11.3	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	5.5	5.5	11.3	8.5
Queue Length 50th (ft)	6	27	30	6	0
Queue Length 95th (ft)	21	51	56	25	25
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	494	2358	2344	2027	901
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.14	0.23	0.26	0.07	0.07

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St

12/23/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↕	↑↑	↑↑		↕↕	↕
Volume (vph)	62	507	527	31	78	114
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.94	0.85
Flt Protected	0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	1615	3420	3391		3186	1392
Flt Permitted	0.42	1.00	1.00		0.97	1.00
Satd. Flow (perm)	718	3420	3391		3186	1392
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	551	573	34	85	124
RTOR Reduction (vph)	0	0	6	0	52	61
Lane Group Flow (vph)	67	551	601	0	90	6
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	20.3	20.3	20.3		5.3	5.3
Effective Green, g (s)	18.3	18.3	18.3		3.3	3.3
Actuated g/C Ratio	0.53	0.53	0.53		0.10	0.10
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	380	1809	1794		304	133
v/s Ratio Prot		0.16	c0.18		c0.03	
v/s Ratio Perm	0.09					0.00
v/c Ratio	0.18	0.30	0.33		0.30	0.05
Uniform Delay, d1	4.2	4.6	4.7		14.6	14.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.1	0.1		0.6	0.2
Delay (s)	4.5	4.7	4.8		15.1	14.4
Level of Service	A	A	A		B	B
Approach Delay (s)		4.6	4.8		14.9	
Approach LOS		A	A		B	

Intersection Summary

HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	34.6	Sum of lost time (s)	13.0
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

2: Waterman Ave & 9th St

12/23/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	130	366	131	336	97	1070	72	873
v/c Ratio	0.66	0.50	0.68	0.45	0.35	0.59	0.35	0.48
Control Delay	37.1	19.5	38.6	17.5	14.7	11.6	16.4	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	19.5	38.6	17.5	14.7	11.6	16.4	10.4
Queue Length 50th (ft)	44	54	45	45	17	114	13	86
Queue Length 95th (ft)	82	75	83	66	63	220	55	168
Internal Link Dist (ft)		852		841		893		996
Turn Bay Length (ft)	130		100		50		75	
Base Capacity (vph)	295	1086	289	1093	279	1824	207	1830
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.34	0.45	0.31	0.35	0.59	0.35	0.48

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: Waterman Ave & 9th St

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	122	281	63	123	241	75	91	865	141	68	743	78
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	7.5	7.5		7.4	7.4		7.5	7.5		7.5	7.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.96		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3326		1615	3298		1615	3348		1615	3371	
Flt Permitted	0.55	1.00		0.53	1.00		0.31	1.00		0.23	1.00	
Satd. Flow (perm)	934	3326		907	3298		519	3348		383	3371	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	130	299	67	131	256	80	97	920	150	72	790	83
RTOR Reduction (vph)	0	37	0	0	50	0	0	17	0	0	11	0
Lane Group Flow (vph)	130	329	0	131	286	0	97	1053	0	72	862	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	14.6	14.6		14.7	14.7		34.4	34.4		34.4	34.4	
Effective Green, g (s)	12.6	12.6		12.7	12.7		32.4	32.4		32.4	32.4	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.54	0.54		0.54	0.54	
Clearance Time (s)	5.5	5.5		5.4	5.4		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	196	698		192	698		280	1808		207	1820	
v/s Ratio Prot		0.10			0.09			c0.31			0.26	
v/s Ratio Perm	0.14			c0.14			0.19			0.19		
v/c Ratio	0.66	0.47		0.68	0.41		0.35	0.58		0.35	0.47	
Uniform Delay, d1	21.8	20.8		21.8	20.4		7.8	9.3		7.8	8.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.2	0.5		9.6	0.4		3.4	1.4		4.6	0.9	
Delay (s)	29.9	21.3		31.4	20.8		11.2	10.6		12.4	9.4	
Level of Service	C	C		C	C		B	B		B	A	
Approach Delay (s)		23.5			23.8			10.7			9.6	
Approach LOS		C			C			B			A	

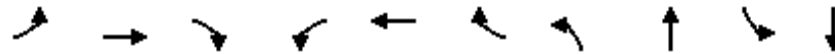
Intersection Summary

HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	14.9
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

12/23/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	162	367	207	166	366	119	151	1061	121	1038
v/c Ratio	0.89	0.60	0.49	0.91	0.60	0.32	0.61	0.78	0.50	0.77
Control Delay	67.3	26.4	8.9	72.2	26.4	7.0	28.7	23.9	23.5	23.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.3	26.4	8.9	72.2	26.4	7.0	28.7	23.9	23.5	23.6
Queue Length 50th (ft)	46	65	6	47	65	0	27	123	21	117
Queue Length 95th (ft)	#114	92	50	#119	92	33	#121	167	#88	160
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	183	969	567	182	969	519	249	1397	241	1401
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	0.89	0.38	0.37	0.91	0.38	0.23	0.61	0.76	0.50	0.74

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	146	330	186	149	329	107	136	855	100	109	801	133
Ideal Flow (vphpl)	1300	1800	1800	1300	1800	1800	1300	1800	1800	1300	1800	1800
Total Lost time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0		5.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1235	3420	1530	1235	3420	1530	1235	4837		1235	4809	
Flt Permitted	0.53	1.00	1.00	0.53	1.00	1.00	0.24	1.00		0.25	1.00	
Satd. Flow (perm)	694	3420	1530	693	3420	1530	315	4837		321	4809	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	162	367	207	166	366	119	151	950	111	121	890	148
RTOR Reduction (vph)	0	0	153	0	0	98	0	24	0	0	39	0
Lane Group Flow (vph)	162	367	54	166	366	21	151	1037	0	121	999	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	16.5	12.7	12.7	16.5	12.7	12.7	27.8	18.5		27.2	18.2	
Effective Green, g (s)	12.5	10.7	10.7	12.5	10.7	10.7	23.8	16.5		23.2	16.2	
Actuated g/C Ratio	0.21	0.18	0.18	0.21	0.18	0.18	0.40	0.28		0.39	0.27	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	161	610	273	161	610	273	237	1330		231	1298	
v/s Ratio Prot	0.03	0.11		c0.03	0.11		c0.08	c0.21		0.06	0.21	
v/s Ratio Perm	0.18		0.04	c0.18		0.01	0.18			0.14		
v/c Ratio	1.01	0.60	0.20	1.03	0.60	0.08	0.64	0.78		0.52	0.77	
Uniform Delay, d1	23.2	22.7	21.0	23.2	22.7	20.5	12.8	20.1		12.8	20.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	72.6	1.7	0.4	79.3	1.6	0.1	5.5	4.6		2.1	2.8	
Delay (s)	95.8	24.4	21.4	102.6	24.3	20.7	18.3	24.7		14.9	23.0	
Level of Service	F	C	C	F	C	C	B	C		B	C	
Approach Delay (s)		39.2			43.6			23.9			22.2	
Approach LOS		D			D			C			C	

Intersection Summary

HCM Average Control Delay	29.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Waterman & E Orange Show

12/23/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	179	668	135	514	211	948	142	1106
v/c Ratio	0.64	0.95	0.58	0.79	0.80	0.85	0.64	1.08
Control Delay	32.2	59.1	31.1	45.9	42.2	38.1	29.0	83.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	59.1	31.1	45.9	42.2	38.1	29.0	83.8
Queue Length 50th (ft)	74	195	54	151	71	268	45	~398
Queue Length 95th (ft)	126	#336	97	#233	#187	#430	89	#546
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	325	705	303	665	302	1118	306	1027
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.95	0.45	0.77	0.70	0.85	0.46	1.08

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.

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	159	442	152	120	396	61	188	721	123	126	848	136
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	7.0		6.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.98		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3289		1615	3351		1615	3345		1615	3349	
Flt Permitted	0.28	1.00		0.23	1.00		0.13	1.00		0.15	1.00	
Satd. Flow (perm)	468	3289		386	3351		222	3345		252	3349	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	179	497	171	135	445	69	211	810	138	142	953	153
RTOR Reduction (vph)	0	34	0	0	12	0	0	13	0	0	13	0
Lane Group Flow (vph)	179	634	0	135	502	0	211	935	0	142	1093	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	33.2	21.0		30.4	19.6		45.4	32.6		40.4	30.1	
Effective Green, g (s)	29.2	19.0		26.4	17.6		41.4	30.6		36.4	28.1	
Actuated g/C Ratio	0.31	0.20		0.28	0.19		0.45	0.33		0.39	0.30	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	274	674		227	636		261	1104		221	1015	
v/s Ratio Prot	c0.07	c0.19		0.06	0.15		c0.09	0.28		0.06	c0.33	
v/s Ratio Perm	0.13			0.11			0.27			0.20		
v/c Ratio	0.65	0.94		0.59	0.79		0.81	0.85		0.64	1.08	
Uniform Delay, d1	24.9	36.3		26.5	35.8		20.6	28.9		20.3	32.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.5	21.2		4.1	6.5		16.6	6.1		6.3	51.5	
Delay (s)	30.4	57.5		30.6	42.2		37.2	35.0		26.5	83.8	
Level of Service	C	E		C	D		D	D		C	F	
Approach Delay (s)		51.8			39.8			35.4			77.3	
Approach LOS		D			D			D			E	

Intersection Summary

HCM Average Control Delay	53.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	92.7	Sum of lost time (s)	19.0
Intersection Capacity Utilization	88.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

12/23/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	1	2	18	1023	1134	3
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)	1	2	20	1112	1233	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						87
pX, platoon unblocked	0.97	0.97	0.97			
vC, conflicting volume	1829	618	1236			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1795	549	1185			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	97			
cM capacity (veh/h)	69	471	580			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	3	20	556	556	822	414
Volume Left	1	20	0	0	0	0
Volume Right	2	0	0	0	0	3
cSH	160	580	1700	1700	1700	1700
Volume to Capacity	0.02	0.03	0.33	0.33	0.48	0.24
Queue Length 95th (ft)	2	3	0	0	0	0
Control Delay (s)	28.0	11.4	0.0	0.0	0.0	0.0
Lane LOS	D	B				
Approach Delay (s)	28.0	0.2	0.0			
Approach LOS	D					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			43.2%	ICU Level of Service	A	
Analysis Period (min)			15			

Queues

6: Waterman & Washington

12/23/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	409	666	5	1057	557	11	164	165	643
v/c Ratio	1.11	0.26	0.06	0.49	0.50	0.11	1.01	0.96	0.88
Control Delay	126.6	5.3	50.4	12.8	4.8	44.0	124.2	110.7	18.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	126.6	5.3	50.4	12.8	4.8	44.0	124.2	110.7	18.5
Queue Length 50th (ft)	~171	48	3	184	37	6	~126	124	0
Queue Length 95th (ft)	#270	150	16	311	134	24	#273	#266	#190
Internal Link Dist (ft)		433		239		527		537	
Turn Bay Length (ft)	225		100		200		125		
Base Capacity (vph)	367	2595	88	2136	1110	562	162	171	732
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.11	0.26	0.06	0.49	0.50	0.02	1.01	0.96	0.88

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.

HCM Signalized Intersection Capacity Analysis

6: Waterman & Washington

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	389	628	5	5	1004	529	3	5	3	306	7	611
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1800	1800	1800	1700	1800	1800
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0		4.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00		1.00		0.95	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.96		1.00	1.00	0.85
Flt Protected	1.00	1.00		0.95	1.00	1.00		0.99		1.00	1.00	1.00
Satd. Flow (prot)	3104	3416		1615	3420	1530		1710		1615	1710	1530
Flt Permitted	1.00	1.00		0.95	1.00	1.00		0.99		1.00	1.00	1.00
Satd. Flow (perm)	3104	3416		1615	3420	1530		1710		1615	1710	1530
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	409	661	5	5	1057	557	3	5	3	322	7	643
RTOR Reduction (vph)	0	0	0	0	0	166	0	3	0	0	0	579
Lane Group Flow (vph)	409	666	0	5	1057	391	0	8	0	164	165	64
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2		1	6		8	8		4	4	
Permitted Phases						6						4
Actuated Green, G (s)	13.0	77.1		1.4	65.5	65.5		1.5		11.0	11.0	11.0
Effective Green, g (s)	13.0	77.1		1.4	65.5	65.5		1.5		11.0	11.0	11.0
Actuated g/C Ratio	0.12	0.70		0.01	0.60	0.60		0.01		0.10	0.10	0.10
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0		4.0		5.0	5.0	5.0
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)	367	2394		21	2036	911		23		162	171	153
v/s Ratio Prot	c0.13	0.19		0.00	c0.31			c0.00		c0.10	0.10	
v/s Ratio Perm						0.26						0.04
v/c Ratio	1.11	0.28		0.24	0.52	0.43		0.35		1.01	0.96	0.42
Uniform Delay, d1	48.5	6.1		53.8	13.0	12.1		53.8		49.5	49.3	46.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	81.6	0.3		5.8	1.0	1.5		9.0		74.0	58.0	1.9
Delay (s)	130.1	6.4		59.6	14.0	13.6		62.7		123.5	107.3	48.4
Level of Service	F	A		E	B	B		E		F	F	D
Approach Delay (s)		53.5			14.0			62.7			71.0	
Approach LOS		D			B			E			E	

Intersection Summary

HCM Average Control Delay	40.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

7: S Tippecanoe & E Victoria

12/23/2013



Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	2	48	24	1	1007	42	927
v/c Ratio	0.01	0.29	0.08	0.00	0.40	0.12	0.34
Control Delay	20.5	28.8	0.5	7.0	6.8	3.8	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.4	0.0	0.0
Total Delay	20.5	28.8	0.5	7.0	7.2	3.8	4.0
Queue Length 50th (ft)	0	17	0	0	67	4	61
Queue Length 95th (ft)	5	41	0	2	178	12	107
Internal Link Dist (ft)	87		770		198		507
Turn Bay Length (ft)		100		150		115	
Base Capacity (vph)	410	470	556	388	2519	349	2717
Starvation Cap Reductn	0	0	0	0	865	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.10	0.04	0.00	0.61	0.12	0.34

Intersection Summary

HCM Signalized Intersection Capacity Analysis

7: S Tippecanoe & E Victoria

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕↕		↕	↕↕	
Volume (vph)	1	0	1	45	0	22	1	896	41	39	862	0
Ideal Flow (vphpl)	1800	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.0		6.0	6.0		7.5	7.5		6.0	7.5	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt		0.93		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1638		1615	1530		1615	3398		1615	3420	
Flt Permitted		0.88		1.00	1.00		0.31	1.00		0.24	1.00	
Satd. Flow (perm)		1481		1700	1530		524	3398		400	3420	
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)	1	0	1	48	0	24	1	963	44	42	927	0
RTOR Reduction (vph)	0	1	0	0	23	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	1	0	48	1	0	1	1004	0	42	927	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.4		5.4	5.4		39.5	39.5		45.1	45.1	
Effective Green, g (s)		3.4		3.4	3.4		37.5	37.5		43.1	43.1	
Actuated g/C Ratio		0.06		0.06	0.06		0.62	0.62		0.72	0.72	
Clearance Time (s)		4.0		4.0	4.0		5.5	5.5		4.0	5.5	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		84		96	87		328	2124		287	2457	
v/s Ratio Prot					0.00			c0.30			c0.27	
v/s Ratio Perm		0.00		c0.03			0.00			0.11		
v/c Ratio		0.01		0.50	0.02		0.00	0.47		0.15	0.38	
Uniform Delay, d1		26.7		27.5	26.7		4.2	6.0		2.7	3.3	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1		4.1	0.1		0.0	0.8		0.2	0.4	
Delay (s)		26.8		31.5	26.8		4.2	6.7		2.9	3.7	
Level of Service		C		C	C		A	A		A	A	
Approach Delay (s)		26.8			29.9			6.7			3.7	
Approach LOS		C			C			A			A	

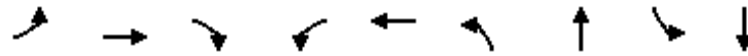
Intersection Summary

HCM Average Control Delay	6.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

12/23/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	192	216	360	71	115	475	665	59	1140
v/c Ratio	0.84	0.70	0.60	0.39	0.31	0.85	0.21	0.23	0.61
Control Delay	63.0	44.7	7.7	35.8	24.6	50.6	9.1	26.1	25.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.0	44.7	7.7	35.8	24.6	50.6	9.1	26.1	25.2
Queue Length 50th (ft)	107	116	0	34	43	145	53	24	193
Queue Length 95th (ft)	#203	190	66	73	86	m193	87	61	263
Internal Link Dist (ft)		517			1151		768		1167
Turn Bay Length (ft)	210			85		260		100	
Base Capacity (vph)	282	380	659	221	457	655	3096	252	1857
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.57	0.55	0.32	0.25	0.73	0.21	0.23	0.61

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.

HCM Signalized Intersection Capacity Analysis

8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖	↖	↖	↖		↖↗	↖↗		↖	↖↗	
Volume (vph)	240	152	346	68	78	33	456	580	59	57	960	134
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1600	1800	1800	1700	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		6.0	7.0		7.0	7.0	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		0.97	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99		1.00	0.98	
Flt Protected	0.95	0.99	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1534	1687	1530	1615	1720		2949	4846		1615	4823	
Flt Permitted	0.68	0.87	1.00	0.51	1.00		0.95	1.00		0.39	1.00	
Satd. Flow (perm)	1103	1488	1530	863	1720		2949	4846		659	4823	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	250	158	360	71	81	34	475	604	61	59	1000	140
RTOR Reduction (vph)	0	0	285	0	18	0	0	12	0	0	18	0
Lane Group Flow (vph)	192	216	75	71	97	0	475	653	0	59	1122	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)	20.7	20.7	20.7	20.7	20.7		19.0	59.3		36.3	36.3	
Effective Green, g (s)	18.7	18.7	18.7	18.7	18.7		17.0	57.3		34.3	34.3	
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21		0.19	0.64		0.38	0.38	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		4.0	5.0		5.0	5.0	
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)	229	309	318	179	357		557	3085		251	1838	
v/s Ratio Prot					0.06		c0.16	0.13			c0.23	
v/s Ratio Perm	c0.17	0.15	0.05	0.08						0.09		
v/c Ratio	0.84	0.70	0.24	0.40	0.27		0.85	0.21		0.24	0.61	
Uniform Delay, d1	34.2	33.0	29.7	30.8	29.9		35.3	6.9		18.9	22.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.06	1.25		1.00	1.00	
Incremental Delay, d2	22.6	6.8	0.4	1.4	0.4		10.6	0.1		2.2	1.5	
Delay (s)	56.8	39.8	30.1	32.2	30.3		48.0	8.7		21.1	24.0	
Level of Service	E	D	C	C	C		D	A		C	C	
Approach Delay (s)		39.5			31.1			25.1			23.8	
Approach LOS		D			C			C			C	

Intersection Summary

HCM Average Control Delay	28.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

9: Anderson/Tippecanoe/Tippecanoe & WB I-10 Ramps

12/23/2013



Lane Group	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	139	140	433	488	793	1056	584
v/c Ratio	0.56	0.53	0.97	0.95	0.33	0.69	0.74
Control Delay	43.4	41.7	53.8	37.1	9.6	37.9	22.4
Queue Delay	0.0	0.0	0.0	4.8	0.4	0.0	0.0
Total Delay	43.4	41.7	53.8	41.9	10.0	37.9	22.4
Queue Length 50th (ft)	75	75	115	303	134	216	126
Queue Length 95th (ft)	138	137	#300	m301	m129	281	#270
Internal Link Dist (ft)		949			347	503	
Turn Bay Length (ft)	225		175				
Base Capacity (vph)	273	291	467	556	2371	1521	786
Starvation Cap Reductn	0	0	0	35	1000	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.48	0.93	0.94	0.58	0.69	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.

HCM Signalized Intersection Capacity Analysis
 9: Anderson/Tippecanoe/Tippecanoe & WB I-10 Ramps

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↖	↖	↖	↖	↕			↕	↖
Volume (vph)	0	0	0	255	16	420	473	769	0	0	1024	566
Ideal Flow (vphpl)	1800	1800	1800	1700	1800	1800	1700	1800	1800	1800	1800	1800
Total Lost time (s)				6.0	6.0	6.0	6.0	7.0			7.0	7.0
Lane Util. Factor				0.95	0.95	1.00	1.00	0.95			0.91	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1534	1637	1530	1615	3420			4914	1530
Flt Permitted				0.95	0.96	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1534	1637	1530	1615	3420			4914	1530
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	263	16	433	488	793	0	0	1056	584
RTOR Reduction (vph)	0	0	0	0	0	199	0	0	0	0	0	313
Lane Group Flow (vph)	0	0	0	139	140	234	488	793	0	0	1056	271
Turn Type				Perm	NA	Perm	Prot	NA			NA	Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8						6
Actuated Green, G (s)				16.6	16.6	16.6	30.5	64.4			29.9	29.9
Effective Green, g (s)				14.6	14.6	14.6	28.5	62.4			27.9	27.9
Actuated g/C Ratio				0.16	0.16	0.16	0.32	0.69			0.31	0.31
Clearance Time (s)				4.0	4.0	4.0	4.0	5.0			5.0	5.0
Vehicle Extension (s)				2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)				249	266	248	511	2371			1523	474
v/s Ratio Prot							c0.30	0.23			c0.21	
v/s Ratio Perm				0.09	0.09	c0.15						0.18
v/c Ratio				0.56	0.53	0.95	0.95	0.33			0.69	0.57
Uniform Delay, d1				34.7	34.5	37.3	30.1	5.5			27.3	26.0
Progression Factor				1.00	1.00	1.00	1.04	1.64			1.23	2.22
Incremental Delay, d2				1.5	0.9	41.6	4.9	0.0			2.5	4.7
Delay (s)				36.3	35.4	78.9	36.3	9.1			36.1	62.5
Level of Service				D	D	E	D	A			D	E
Approach Delay (s)		0.0			62.0			19.4			45.5	
Approach LOS		A			E			B			D	

Intersection Summary

HCM Average Control Delay	39.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	96.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

12/23/2013



Lane Group	EBL	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	442	404	1081	384	879
v/c Ratio	1.03	0.79	1.03	1.02	0.44
Control Delay	84.7	31.4	65.6	92.3	10.0
Queue Delay	20.9	1.2	1.0	0.0	0.1
Total Delay	105.6	32.7	66.6	92.3	10.2
Queue Length 50th (ft)	~271	141	~314	~244	76
Queue Length 95th (ft)	#454	#298	#436	#427	143
Internal Link Dist (ft)		1164	1201		347
Turn Bay Length (ft)	275				
Base Capacity (vph)	431	513	1052	377	2014
Starvation Cap Reductn	0	0	0	0	325
Spillback Cap Reductn	24	25	3	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.09	0.83	1.03	1.02	0.52

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.

HCM Signalized Intersection Capacity Analysis

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	521	12	296	0	0	0	0	746	314	376	861	0
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	6.0						7.0		6.0	7.0	
Lane Util. Factor	*1.00	0.95						*1.00		1.00	0.95	
Frt	1.00	0.89						0.96		1.00	1.00	
Flt Protected	0.95	0.99						1.00		0.95	1.00	
Satd. Flow (prot)	1615	1502						3440		1615	3420	
Flt Permitted	0.95	0.99						1.00		0.95	1.00	
Satd. Flow (perm)	1615	1502						3440		1615	3420	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	532	12	302	0	0	0	0	761	320	384	879	0
RTOR Reduction (vph)	0	112	0	0	0	0	0	58	0	0	0	0
Lane Group Flow (vph)	442	292	0	0	0	0	0	1023	0	384	879	0
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	26.0	26.0						28.0		23.0	55.0	
Effective Green, g (s)	24.0	24.0						26.0		21.0	53.0	
Actuated g/C Ratio	0.27	0.27						0.29		0.23	0.59	
Clearance Time (s)	4.0	4.0						5.0		4.0	5.0	
Vehicle Extension (s)	2.0	2.0						2.0		2.0	2.0	
Lane Grp Cap (vph)	431	401						994		377	2014	
v/s Ratio Prot								c0.30		c0.24	0.26	
v/s Ratio Perm	c0.27	0.19										
v/c Ratio	1.03	0.73						1.03		1.02	0.44	
Uniform Delay, d1	33.0	30.0						32.0		34.5	10.2	
Progression Factor	1.00	1.00						1.00		1.38	0.91	
Incremental Delay, d2	50.0	5.5						36.4		44.9	0.5	
Delay (s)	83.0	35.5						68.4		92.6	9.9	
Level of Service	F	D						E		F	A	
Approach Delay (s)		60.3			0.0			68.4			35.0	
Approach LOS		E			A			E			D	

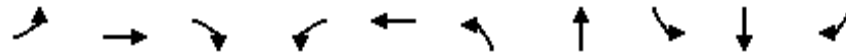
Intersection Summary

HCM Average Control Delay	53.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	96.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues

11: Anderson & Academy

12/23/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	109	46	57	42	84	61	871	68	611	128
v/c Ratio	0.23	0.09	0.12	0.11	0.11	0.12	0.42	0.16	0.29	0.13
Control Delay	13.3	17.0	7.5	12.7	13.9	6.5	11.0	6.8	10.0	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.3	17.0	7.5	12.7	13.9	6.5	11.0	6.8	10.0	3.4
Queue Length 50th (ft)	23	9	0	8	7	8	106	9	68	0
Queue Length 95th (ft)	52	34	24	25	23	22	167	24	111	26
Internal Link Dist (ft)		21			32		1375		514	
Turn Bay Length (ft)	75			100		100		100		
Base Capacity (vph)	478	1110	965	396	1971	522	2092	427	2109	993
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	0.23	0.04	0.06	0.11	0.04	0.12	0.42	0.16	0.29	0.13

Intersection Summary

HCM Signalized Intersection Capacity Analysis

11: Anderson & Academy

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	106	45	55	41	53	28	59	791	54	66	593	124
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	4.0	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	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1615	1800	1530	1615	3243		1615	3387		1615	3420	1530
Flt Permitted	0.87	1.00	1.00	1.00	1.00		0.40	1.00		0.25	1.00	1.00
Satd. Flow (perm)	1478	1800	1530	1700	3243		672	3387		431	3420	1530
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	109	46	57	42	55	29	61	815	56	68	611	128
RTOR Reduction (vph)	0	0	51	0	27	0	0	7	0	0	0	72
Lane Group Flow (vph)	109	46	6	42	57	0	61	864	0	68	611	56
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)	6.8	4.6	4.6	4.6	3.5		19.8	18.1		19.8	18.1	18.1
Effective Green, g (s)	6.8	4.6	4.6	4.6	3.5		19.8	18.1		19.8	18.1	18.1
Actuated g/C Ratio	0.16	0.11	0.11	0.11	0.08		0.48	0.44		0.48	0.44	0.44
Clearance Time (s)	4.0	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	3.0
Lane Grp Cap (vph)	249	200	170	186	274		359	1477		254	1492	667
v/s Ratio Prot	c0.02	0.03		0.01	0.02		0.01	c0.26		c0.01	0.18	
v/s Ratio Perm	c0.05		0.00	0.02			0.07			0.12		0.04
v/c Ratio	0.44	0.23	0.04	0.23	0.21		0.17	0.59		0.27	0.41	0.08
Uniform Delay, d1	15.6	16.8	16.5	16.8	17.7		5.9	8.9		6.1	8.0	6.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.2	0.6	0.1	0.6	0.4		0.2	0.6		0.6	0.2	0.1
Delay (s)	16.9	17.4	16.6	17.5	18.1		6.1	9.5		6.7	8.2	6.9
Level of Service	B	B	B	B	B		A	A		A	A	A
Approach Delay (s)		16.9			17.9			9.2			7.9	
Approach LOS		B			B			A			A	

Intersection Summary

HCM Average Control Delay	10.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	41.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

12: California & WB I-10 Ramps

12/23/2013



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	424	119	642	477	698	669
v/c Ratio	1.01	0.27	1.01	0.22	0.53	0.84
Control Delay	82.9	7.6	49.8	4.4	30.0	18.8
Queue Delay	0.0	0.0	2.3	0.0	0.0	0.0
Total Delay	82.9	7.6	52.1	4.4	30.0	18.8
Queue Length 50th (ft)	~246	0	~297	30	124	69
Queue Length 95th (ft)	#436	43	m#383	m40	162	#297
Internal Link Dist (ft)	1118			276	113	
Turn Bay Length (ft)						
Base Capacity (vph)	419	433	635	2166	1310	792
Starvation Cap Reductn	0	0	5	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.01	0.27	1.02	0.22	0.53	0.84

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.

HCM Signalized Intersection Capacity Analysis

12: California & WB I-10 Ramps

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕	↗	↖	↑↑			↑↑↑	↗
Volume (vph)	0	0	0	379	3	107	578	429	0	0	628	602
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800
Total Lost time (s)					5.0	7.0	5.5	6.0			5.0	5.0
Lane Util. Factor					1.00	1.00	1.00	0.95			0.91	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1715	1530	1615	3420			4914	1530
Flt Permitted					0.95	1.00	0.22	1.00			1.00	1.00
Satd. Flow (perm)					1715	1530	382	3420			4914	1530
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	421	3	119	642	477	0	0	698	669
RTOR Reduction (vph)	0	0	0	0	0	93	0	0	0	0	0	384
Lane Group Flow (vph)	0	0	0	0	424	26	642	477	0	0	698	285
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases					8		5	6			2	
Permitted Phases				8		8	6					2
Actuated Green, G (s)					22.0	22.0	59.0	59.0			26.0	26.0
Effective Green, g (s)					22.0	20.0	57.0	57.0			24.0	24.0
Actuated g/C Ratio					0.24	0.22	0.63	0.63			0.27	0.27
Clearance Time (s)					5.0	5.0	3.5	4.0			3.0	3.0
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					419	340	632	2166			1310	408
v/s Ratio Prot							c0.32	0.14			0.14	
v/s Ratio Perm					0.25	0.02	c0.32					0.19
v/c Ratio					1.01	0.08	1.02	0.22			0.53	0.70
Uniform Delay, d1					34.0	27.7	20.1	7.0			28.2	29.7
Progression Factor					1.00	1.00	0.63	0.59			1.00	1.00
Incremental Delay, d2					47.0	0.0	35.8	0.2			1.6	9.5
Delay (s)					81.0	27.7	48.5	4.3			29.8	39.3
Level of Service					F	C	D	A			C	D
Approach Delay (s)		0.0			69.3			29.7			34.4	
Approach LOS		A			E			C			C	

Intersection Summary

HCM Average Control Delay	38.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	110.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues

13: EB I-10 Ramps & California

12/23/2013



Lane Group	EBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	751	795	509	263	657
v/c Ratio	1.91	0.32	0.50	1.55	0.29
Control Delay	441.5	13.6	3.0	290.8	10.1
Queue Delay	11.1	216.7	6.8	0.0	0.5
Total Delay	452.6	230.3	9.8	290.8	10.6
Queue Length 50th (ft)	~617	93	0	~211	92
Queue Length 95th (ft)	#838	119	48	m#307	m106
Internal Link Dist (ft)	1294	46			276
Turn Bay Length (ft)					
Base Capacity (vph)	393	2484	1025	170	2299
Starvation Cap Reductn	0	1945	459	0	1129
Spillback Cap Reductn	5	12	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.94	1.47	0.90	1.55	0.56


















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.

HCM Signalized Intersection Capacity Analysis

13: EB I-10 Ramps & California

12/23/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	219	7	502	0	0	0	0	771	494	255	637	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800	
Total Lost time (s)		6.0						6.5	6.5	5.5	6.5		
Lane Util. Factor		1.00						0.91	1.00	1.00	0.95		
Frt		0.91						1.00	0.85	1.00	1.00		
Flt Protected		0.99						1.00	1.00	0.95	1.00		
Satd. Flow (prot)		1608						4914	1530	1615	3420		
Flt Permitted		0.99						1.00	1.00	0.95	1.00		
Satd. Flow (perm)		1608						4914	1530	1615	3420		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	226	7	518	0	0	0	0	795	509	263	657	0	
RTOR Reduction (vph)	0	89	0	0	0	0	0	0	252	0	0	0	
Lane Group Flow (vph)	0	662	0	0	0	0	0	795	257	263	657	0	
Turn Type	Perm	NA						NA	Perm	Prot	NA		
Protected Phases		4						2		1	6		
Permitted Phases	4								2				
Actuated Green, G (s)		19.0						47.5	47.5	11.5	62.5		
Effective Green, g (s)		17.0						45.5	45.5	9.5	60.5		
Actuated g/C Ratio		0.19						0.51	0.51	0.11	0.67		
Clearance Time (s)		4.0						4.5	4.5	3.5	4.5		
Vehicle Extension (s)		2.0						2.0	2.0	2.0	2.0		
Lane Grp Cap (vph)		304						2484	774	170	2299		
v/s Ratio Prot								0.16		c0.16	0.19		
v/s Ratio Perm		0.41							c0.17				
v/c Ratio		2.18						0.32	0.33	1.55	0.29		
Uniform Delay, d1		36.5						13.1	13.2	40.2	6.0		
Progression Factor		1.00						1.00	1.00	0.67	1.64		
Incremental Delay, d2		540.3						0.3	1.2	265.2	0.2		
Delay (s)		576.8						13.5	14.4	292.2	10.0		
Level of Service		F						B	B	F	B		
Approach Delay (s)		576.8			0.0			13.8			90.7		
Approach LOS		F			A			B			F		
Intersection Summary													
HCM Average Control Delay			179.7									HCM Level of Service	F
HCM Volume to Capacity ratio			0.93										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	18.0
Intersection Capacity Utilization			110.4%									ICU Level of Service	H
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

14: California & Shopping Center

12/23/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	2	142	1101	40	298	767
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.90	0.97
Hourly flow rate (vph)	2	146	1135	41	331	791
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)			652		321	
pX, platoon unblocked	0.98					
vC, conflicting volume	2213	399			1176	
vC1, stage 1 conf vol	1156					
vC2, stage 2 conf vol	1058					
vCu, unblocked vol	2194	399			1176	
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 %	98	76			45	
cM capacity (veh/h)	119	606			601	

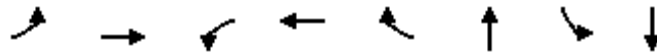
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	148	454	454	268	331	395	395
Volume Left	2	0	0	0	331	0	0
Volume Right	146	0	0	41	0	0	0
cSH	574	1700	1700	1700	601	1700	1700
Volume to Capacity	0.26	0.27	0.27	0.16	0.55	0.23	0.23
Queue Length 95th (ft)	26	0	0	0	84	0	0
Control Delay (s)	13.5	0.0	0.0	0.0	18.1	0.0	0.0
Lane LOS	B				C		
Approach Delay (s)	13.5	0.0			5.3		
Approach LOS	B						

Intersection Summary			
Average Delay		3.3	
Intersection Capacity Utilization	61.2%		ICU Level of Service B
Analysis Period (min)		15	

Queues

15: California/California & W Redlands

12/23/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	172	641	104	454	482	457	319	420
v/c Ratio	0.86	0.89	0.76	0.60	0.73	0.99	0.85	1.02
Control Delay	72.2	55.7	64.1	42.5	13.4	81.5	63.6	91.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.2	55.7	64.1	42.5	13.4	81.5	63.6	91.5
Queue Length 50th (ft)	93	225	54	154	37	~330	223	~319
Queue Length 95th (ft)	#195	295	#126	208	156	#566	#392	#534
Internal Link Dist (ft)		1468		1180		268		572
Turn Bay Length (ft)	90		150		100			
Base Capacity (vph)	200	834	137	870	702	462	374	412
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.77	0.76	0.52	0.69	0.99	0.85	1.02

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.

HCM Signalized Intersection Capacity Analysis

15: California/California & W Redlands

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	167	484	138	101	440	468	41	367	36	309	307	101
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1800	1800	1800	1700	1800	1800
Total Lost time (s)	6.5	7.7		6.5	7.7	7.7		7.2		7.2	7.2	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00		1.00	1.00	
Fr _t	1.00	0.97		1.00	1.00	0.85		0.99		1.00	0.96	
Fl _t Protected	0.95	1.00		0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1615	3306		1615	3420	1530		1772		1615	1733	
Fl _t Permitted	0.39	1.00		0.18	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (perm)	671	3306		311	3420	1530		1772		1615	1733	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	172	499	142	104	454	482	42	378	37	319	316	104
RTOR Reduction (vph)	0	24	0	0	0	327	0	3	0	0	10	0
Lane Group Flow (vph)	172	617	0	104	454	155	0	454	0	319	410	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	5	2		1	6		4	4		8	8	
Permitted Phases	2			6		6						
Actuated Green, G (s)	31.0	25.5		33.0	26.5	26.5		30.8		27.8	27.8	
Effective Green, g (s)	27.0	23.5		29.0	24.5	24.5		28.8		25.8	25.8	
Actuated g/C Ratio	0.24	0.21		0.26	0.22	0.22		0.26		0.23	0.23	
Clearance Time (s)	4.5	5.7		4.5	5.7	5.7		5.2		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	193	699		134	754	337		459		375	402	
v/s Ratio Prot	0.03	0.19		c0.03	0.13			c0.26		0.20	c0.24	
v/s Ratio Perm	c0.19			0.17		0.10						
v/c Ratio	0.89	0.88		0.78	0.60	0.46		0.99		0.85	1.02	
Uniform Delay, d ₁	40.5	42.5		36.0	39.0	37.6		41.0		40.9	42.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d ₂	36.2	12.7		24.0	1.4	1.0		38.7		16.7	50.0	
Delay (s)	76.7	55.2		60.0	40.3	38.6		79.8		57.5	92.7	
Level of Service	E	E		E	D	D		E		E	F	
Approach Delay (s)		59.8			41.5			79.8			77.5	
Approach LOS		E			D			E			E	

Intersection Summary

HCM Average Control Delay	60.8	HCM Level of Service	E
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	111.2	Sum of lost time (s)	27.4
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues

16: Alabama St & WB I-10 Ramps

12/23/2013



Lane Group	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	717	394	1090	1223
v/c Ratio	0.95	0.98	0.50	0.91
Control Delay	54.2	58.0	9.2	36.3
Queue Delay	0.0	0.0	0.2	0.0
Total Delay	54.2	58.0	9.4	36.3
Queue Length 50th (ft)	179	209	149	300
Queue Length 95th (ft)	#287	m#235	m186	#433
Internal Link Dist (ft)	765		376	271
Turn Bay Length (ft)				
Base Capacity (vph)	765	402	2174	1338
Starvation Cap Reductn	0	0	378	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.94	0.98	0.61	0.91

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.

HCM Signalized Intersection Capacity Analysis

16: Alabama St & WB I-10 Ramps

12/23/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	0	0	0	166	310	219	382	1057	0	0	797	389	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800	
Total Lost time (s)					6.5		6.0	8.0			8.0		
Lane Util. Factor					*1.00		1.00	0.95			*1.00		
Frt					0.95		1.00	1.00			0.95		
Flt Protected					0.99		0.95	1.00			1.00		
Satd. Flow (prot)					3389		1615	3420			3423		
Flt Permitted					0.99		0.10	1.00			1.00		
Satd. Flow (perm)					3389		173	3420			3423		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	0	0	0	171	320	226	394	1090	0	0	822	401	
RTOR Reduction (vph)	0	0	0	0	69	0	0	0	0	0	76	0	
Lane Group Flow (vph)	0	0	0	0	648	0	394	1090	0	0	1147	0	
Turn Type				Perm	NA		pm+pt	NA			NA		
Protected Phases					4		1	6			2		
Permitted Phases				4			6						
Actuated Green, G (s)					20.3		59.2	59.2			35.2		
Effective Green, g (s)					18.3		57.2	57.2			33.2		
Actuated g/C Ratio					0.20		0.64	0.64			0.37		
Clearance Time (s)					4.5		4.0	6.0			6.0		
Vehicle Extension (s)					3.0		3.0	3.0			3.0		
Lane Grp Cap (vph)					689		398	2174			1263		
v/s Ratio Prot							c0.20	0.32			0.34		
v/s Ratio Perm					0.19		c0.43						
v/c Ratio					0.94		0.99	0.50			0.91		
Uniform Delay, d1					35.3		26.7	8.8			27.0		
Progression Factor					1.00		1.46	0.99			1.00		
Incremental Delay, d2					21.1		25.2	0.3			11.1		
Delay (s)					56.4		64.2	9.0			38.1		
Level of Service					E		E	A			D		
Approach Delay (s)		0.0			56.4			23.7			38.1		
Approach LOS		A			E			C			D		
Intersection Summary													
HCM Average Control Delay			35.7		HCM Level of Service						D		
HCM Volume to Capacity ratio			0.91										
Actuated Cycle Length (s)			90.0		Sum of lost time (s)					12.5			
Intersection Capacity Utilization			99.7%		ICU Level of Service					F			
Analysis Period (min)			15										
c Critical Lane Group													

Queues

17: EB I-10 Ramps & Alabama St

12/23/2013



Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	897	1385	224	770
v/c Ratio	0.97	0.91	0.95	0.37
Control Delay	49.8	33.6	61.6	5.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	49.8	33.6	61.6	5.1
Queue Length 50th (ft)	200	352	103	52
Queue Length 95th (ft)	#322	#496	m#120	m63
Internal Link Dist (ft)	622	505		376
Turn Bay Length (ft)				
Base Capacity (vph)	944	1525	239	2071
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.95	0.91	0.94	0.37

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.

HCM Signalized Intersection Capacity Analysis

17: EB I-10 Ramps & Alabama St

12/23/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	381	7	482	0	0	0	0	1055	288	217	747	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800	
Total Lost time (s)		7.0						8.0		6.0	7.0		
Lane Util. Factor		*1.00						*1.00		1.00	0.95		
Frt		0.92						0.97		1.00	1.00		
Flt Protected		0.98						1.00		0.95	1.00		
Satd. Flow (prot)		3230						3484		1615	3420		
Flt Permitted		0.98						1.00		0.09	1.00		
Satd. Flow (perm)		3230						3484		149	3420		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	393	7	497	0	0	0	0	1088	297	224	770	0	
RTOR Reduction (vph)	0	155	0	0	0	0	0	30	0	0	0	0	
Lane Group Flow (vph)	0	742	0	0	0	0	0	1355	0	224	770	0	
Turn Type	Perm	NA						NA		pm+pt	NA		
Protected Phases		8						6		5	2		
Permitted Phases	8									2			
Actuated Green, G (s)		23.5						40.6		56.5	56.5		
Effective Green, g (s)		21.5						38.6		54.5	54.5		
Actuated g/C Ratio		0.24						0.43		0.61	0.61		
Clearance Time (s)		5.0						6.0		4.0	5.0		
Vehicle Extension (s)		2.0						2.0		2.0	2.0		
Lane Grp Cap (vph)		772						1494		235	2071		
v/s Ratio Prot								0.39		c0.09	0.23		
v/s Ratio Perm		0.23								c0.48			
v/c Ratio		0.96						0.91		0.95	0.37		
Uniform Delay, d1		33.8						24.0		24.3	9.0		
Progression Factor		1.00						1.00		1.95	0.53		
Incremental Delay, d2		23.0						9.6		25.0	0.2		
Delay (s)		56.8						33.6		72.3	5.0		
Level of Service		E						C		E	A		
Approach Delay (s)		56.8			0.0			33.6			20.2		
Approach LOS		E			A			C			C		
Intersection Summary													
HCM Average Control Delay			35.9									HCM Level of Service	D
HCM Volume to Capacity ratio			0.90										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	13.0
Intersection Capacity Utilization			99.7%									ICU Level of Service	F
Analysis Period (min)			15										
c	Critical Lane Group												

Queues

18: Alabama St & Industrial Park

12/23/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	98	94	64	375	51	1040	296	826	126
v/c Ratio	0.95	0.22	0.23	0.62	0.25	0.86	0.82	0.40	0.13
Control Delay	113.0	19.0	27.8	11.5	22.5	31.7	40.1	9.4	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0
Total Delay	113.0	19.0	27.8	11.5	22.5	34.0	40.1	9.4	3.3
Queue Length 50th (ft)	50	25	27	30	19	262	106	116	7
Queue Length 95th (ft)	#146	65	62	114	48	349	#266	160	29
Internal Link Dist (ft)		298		379		236		505	
Turn Bay Length (ft)	100		50		150		215		55
Base Capacity (vph)	138	556	371	702	263	1536	361	2398	1100
Starvation Cap Reductn	0	0	0	0	0	348	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.17	0.17	0.53	0.19	0.88	0.82	0.34	0.11

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

18: Alabama St & Industrial Park

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	94	56	35	61	55	305	49	916	83	284	793	121
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.2	6.2		6.2	6.2		6.2	6.2		6.0	6.2	6.2
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.94		1.00	0.87		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1615	1697		1615	1571		1615	3378		1615	3420	1530
Flt Permitted	0.26	1.00		0.70	1.00		0.34	1.00		0.12	1.00	1.00
Satd. Flow (perm)	438	1697		1183	1571		579	3378		198	3420	1530
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	98	58	36	64	57	318	51	954	86	296	826	126
RTOR Reduction (vph)	0	26	0	0	233	0	0	8	0	0	0	36
Lane Group Flow (vph)	98	68	0	64	142	0	51	1032	0	296	826	90
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		8			4			6		5	2	
Permitted Phases	8			4			6			2		2
Actuated Green, G (s)	20.5	20.5		20.5	20.5		30.4	30.4		49.8	49.8	49.8
Effective Green, g (s)	18.5	18.5		18.5	18.5		28.4	28.4		47.8	47.8	47.8
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.36	0.36		0.61	0.61	0.61
Clearance Time (s)	4.2	4.2		4.2	4.2		4.2	4.2		4.0	4.2	4.2
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)	103	399		278	369		209	1219		362	2077	929
v/s Ratio Prot		0.04			0.09			0.31		c0.14	0.24	
v/s Ratio Perm	c0.22			0.05			0.09			c0.36		0.06
v/c Ratio	0.95	0.17		0.23	0.39		0.24	0.85		0.82	0.40	0.10
Uniform Delay, d1	29.7	24.0		24.3	25.3		17.6	23.1		18.8	8.0	6.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	72.8	0.2		0.4	0.7		0.6	5.6		13.3	0.1	0.0
Delay (s)	102.4	24.2		24.8	26.0		18.2	28.8		32.1	8.1	6.5
Level of Service	F	C		C	C		B	C		C	A	A
Approach Delay (s)		64.1			25.8			28.3			13.7	
Approach LOS		E			C			C			B	

Intersection Summary

HCM Average Control Delay	24.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	78.7	Sum of lost time (s)	12.2
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues

19: Alabama St & W Redlands

12/23/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	277	751	114	625	117	698	147	724
v/c Ratio	0.85	0.79	0.47	0.77	0.63	0.56	0.75	0.58
Control Delay	38.9	28.1	18.0	25.9	38.4	18.8	48.3	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9
Total Delay	38.9	28.1	18.0	25.9	38.4	18.8	48.3	20.8
Queue Length 50th (ft)	69	141	25	98	38	111	51	108
Queue Length 95th (ft)	#177	200	51	151	#124	176	#156	175
Internal Link Dist (ft)		1247		345		380		164
Turn Bay Length (ft)	240		290		115		75	
Base Capacity (vph)	326	1188	241	1035	185	1238	195	1245
Starvation Cap Reductn	0	0	0	0	0	0	0	395
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	0.85	0.63	0.47	0.60	0.63	0.56	0.75	0.85

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

19: Alabama St & W Redlands

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	263	638	75	108	382	212	111	572	91	140	514	174
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	5.5	6.9		5.5	6.9		6.2	6.2		6.2	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.95		1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3366		1615	3237		1615	3349		1615	3290	
Flt Permitted	0.23	1.00		0.30	1.00		0.30	1.00		0.31	1.00	
Satd. Flow (perm)	387	3366		507	3237		507	3349		534	3290	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	277	672	79	114	402	223	117	602	96	147	541	183
RTOR Reduction (vph)	0	14	0	0	97	0	0	18	0	0	46	0
Lane Group Flow (vph)	277	737	0	114	528	0	117	680	0	147	678	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	30.5	20.2		23.3	16.5		25.9	25.9		25.9	25.9	
Effective Green, g (s)	26.7	18.2		19.3	14.5		23.9	23.9		23.9	23.9	
Actuated g/C Ratio	0.41	0.28		0.29	0.22		0.36	0.36		0.36	0.36	
Clearance Time (s)	3.5	4.9		3.5	4.9		4.2	4.2		4.2	4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	317	935		231	717		185	1222		195	1200	
v/s Ratio Prot	c0.11	c0.22		0.04	0.16			0.20			0.21	
v/s Ratio Perm	c0.24			0.11			0.23			c0.28		
v/c Ratio	0.87	0.79		0.49	0.74		0.63	0.56		0.75	0.57	
Uniform Delay, d1	14.7	21.9		17.6	23.7		17.2	16.6		18.2	16.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	22.3	4.5		1.7	3.9		15.3	1.8		23.3	1.9	
Delay (s)	37.1	26.3		19.3	27.7		32.5	18.4		41.6	18.6	
Level of Service	D	C		B	C		C	B		D	B	
Approach Delay (s)		29.2			26.4			20.4			22.5	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	24.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	65.5	Sum of lost time (s)	18.6
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

20: Tennessee & Redlands

12/23/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	288	784	45	516	693	716
v/c Ratio	0.80	0.56	0.42	0.74	0.71	0.84
Control Delay	33.4	16.6	38.5	25.0	22.5	29.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	116.9
Total Delay	33.4	16.6	38.5	25.0	22.5	146.6
Queue Length 50th (ft)	81	125	17	74	122	135
Queue Length 95th (ft)	#192	188	49	129	204	#255
Internal Link Dist (ft)		2241		737	458	48
Turn Bay Length (ft)	145		140			
Base Capacity (vph)	378	1918	191	1124	1243	1089
Starvation Cap Reductn	0	0	0	0	0	517
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.41	0.24	0.46	0.56	1.25

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

20: Tennessee & Redlands

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↗	↖
Volume (vph)	271	657	80	42	290	195	66	540	46	108	537	28
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.5	6.9		6.9	6.9			6.9			6.9	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frt	1.00	0.98		1.00	0.94			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1615	3364		1615	3214			3367			3371	
Flt Permitted	0.24	1.00		0.35	1.00			0.77			0.68	
Satd. Flow (perm)	413	3364		603	3214			2617			2295	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	288	699	85	45	309	207	70	574	49	115	571	30
RTOR Reduction (vph)	0	12	0	0	131	0	0	7	0	0	4	0
Lane Group Flow (vph)	288	772	0	45	385	0	0	686	0	0	712	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	29.2	29.2		13.7	13.7			26.4			26.4	
Effective Green, g (s)	27.2	27.2		11.7	11.7			24.4			24.4	
Actuated g/C Ratio	0.42	0.42		0.18	0.18			0.37			0.37	
Clearance Time (s)	3.5	4.9		4.9	4.9			4.9			4.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	356	1399		108	575			976			856	
v/s Ratio Prot	c0.12	0.23			0.12							
v/s Ratio Perm	c0.21			0.07				0.26			c0.31	
v/c Ratio	0.81	0.55		0.42	0.67			0.70			0.83	
Uniform Delay, d1	14.4	14.5		23.8	25.1			17.4			18.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	12.7	0.5		2.6	3.1			2.3			6.9	
Delay (s)	27.1	15.0		26.4	28.1			19.7			25.6	
Level of Service	C	B		C	C			B			C	
Approach Delay (s)		18.2			28.0			19.7			25.6	
Approach LOS		B			C			B			C	

Intersection Summary

HCM Average Control Delay	22.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	65.4	Sum of lost time (s)	12.4
Intersection Capacity Utilization	92.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

21: Texas & Stuart

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	3	9	45	16	12	15	16	448	24	16	270	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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	0.91
Hourly flow rate (vph)	3	10	49	18	13	16	18	492	26	18	297	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								193				
pX, platoon unblocked	0.99	0.99		0.99	0.99	0.99				0.99		
vC, conflicting volume	643	892	155	779	886	259	310			519		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	618	870	155	755	864	231	310			493		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	96	94	93	95	98	99			98		
cM capacity (veh/h)	344	280	870	267	283	770	1262			1070		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	63	47	264	273	166	162
Volume Left	3	18	18	0	18	0
Volume Right	49	16	0	26	0	13
cSH	616	353	1262	1700	1070	1700
Volume to Capacity	0.10	0.13	0.01	0.16	0.02	0.10
Queue Length 95th (ft)	8	11	1	0	1	0
Control Delay (s)	11.5	16.8	0.6	0.0	1.0	0.0
Lane LOS	B	C	A		A	
Approach Delay (s)	11.5	16.8	0.3		0.5	
Approach LOS	B	C				

Intersection Summary		
Average Delay		1.9
Intersection Capacity Utilization	45.2%	ICU Level of Service
Analysis Period (min)		15
		A

HCM Unsignalized Intersection Capacity Analysis

22: Texas & Oriental

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	35	9	26	54	3	30	1	523	11	6	339	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	41	10	30	63	3	35	1	608	13	7	394	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											212	
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99		0.99					
vC, conflicting volume	751	1031	197	863	1025	310	394			621		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	739	1020	181	851	1014	310	380			621		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	86	96	96	73	99	95	100			99		
cM capacity (veh/h)	287	235	832	236	237	691	1183			970		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	81	101	305	317	204	197
Volume Left	41	63	1	0	7	0
Volume Right	30	35	0	13	0	0
cSH	366	306	1183	1700	970	1700
Volume to Capacity	0.22	0.33	0.00	0.19	0.01	0.12
Queue Length 95th (ft)	21	35	0	0	1	0
Control Delay (s)	17.6	22.5	0.0	0.0	0.4	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	17.6	22.5	0.0		0.2	
Approach LOS	C	C				

Intersection Summary		
Average Delay		3.2
Intersection Capacity Utilization	30.2%	ICU Level of Service
Analysis Period (min)	15	A

Queues

23: Eureka & EB I-10 off/Pearl

12/23/2013



Lane Group	EBT	EBR	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	836	498	44	19	135	251	71
v/c Ratio	0.96	0.50	0.66	0.04	0.24	0.41	0.14
Control Delay	41.8	3.0	57.9	4.2	19.9	7.7	18.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.8	3.0	57.9	4.2	19.9	7.7	18.9
Queue Length 50th (ft)	317	0	11	0	44	17	22
Queue Length 95th (ft)	#563	43	#55	9	85	68	50
Internal Link Dist (ft)	447				545		418
Turn Bay Length (ft)				75			
Base Capacity (vph)	890	1014	100	796	561	612	516
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.49	0.44	0.02	0.24	0.41	0.14

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

23: Eureka & EB I-10 off/Pearl

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕	↕		↕		↕	↕		↕	
Volume (vph)	171	615	468	41	0	18	0	127	236	17	50	0
Ideal Flow (vphpl)	1800	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		7.0	7.0	6.0		6.0		7.0	7.0		7.0	
Lane Util. Factor		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.99	1.00	0.95		1.00		1.00	1.00		0.99	
Satd. Flow (prot)		1781	1530	1615		1530		1800	1530		1777	
Flt Permitted		0.99	1.00	0.11		1.00		1.00	1.00		0.92	
Satd. Flow (perm)		1781	1530	193		1530		1800	1530		1655	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	182	654	498	44	0	19	0	135	251	18	53	0
RTOR Reduction (vph)	0	0	255	0	0	9	0	0	136	0	0	0
Lane Group Flow (vph)	0	836	243	44	0	10	0	135	115	0	71	0
Turn Type	Perm	NA	Perm	custom		custom		NA	Perm	Perm	NA	
Protected Phases		4						2				6
Permitted Phases	4		4	8		8			2	6		
Actuated Green, G (s)		36.2	36.2	37.2		37.2		23.8	23.8		23.8	
Effective Green, g (s)		34.2	34.2	35.2		35.2		21.8	21.8		21.8	
Actuated g/C Ratio		0.49	0.49	0.50		0.50		0.31	0.31		0.31	
Clearance Time (s)		5.0	5.0	4.0		4.0		5.0	5.0		5.0	
Vehicle Extension (s)		2.0	2.0	2.0		2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)		870	748	97		769		561	476		515	
v/s Ratio Prot								0.07				
v/s Ratio Perm		0.47	0.16	0.23		0.01			c0.08		0.04	
v/c Ratio		0.96	0.33	0.45		0.01		0.24	0.24		0.14	
Uniform Delay, d1		17.3	10.9	11.2		8.7		17.9	17.9		17.3	
Progression Factor		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Incremental Delay, d2		21.3	0.1	1.2		0.0		1.0	1.2		0.6	
Delay (s)		38.6	11.0	12.4		8.7		19.0	19.2		17.9	
Level of Service		D	B	B		A		B	B		B	
Approach Delay (s)		28.3			11.3			19.1			17.9	
Approach LOS		C			B			B			B	

Intersection Summary

HCM Average Control Delay	25.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

24: Eureka & Stuart

12/23/2013



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	51	75	17	443	43	562
v/c Ratio	0.40	0.65	0.03	0.16	0.06	0.20
Control Delay	54.6	79.2	2.5	2.2	2.7	2.5
Queue Delay	0.0	0.0	0.0	1.4	0.0	0.0
Total Delay	54.6	79.2	2.5	3.5	2.7	2.5
Queue Length 50th (ft)	33	59	2	25	5	37
Queue Length 95th (ft)	71	106	7	44	14	63
Internal Link Dist (ft)	380	399		136		545
Turn Bay Length (ft)			20		20	
Base Capacity (vph)	485	461	624	2734	696	2823
Starvation Cap Reductn	0	0	0	2045	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.16	0.03	0.64	0.06	0.20

Intersection Summary

HCM Signalized Intersection Capacity Analysis

24: Eureka & Stuart

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (vph)	13	22	10	39	21	6	15	297	92	38	466	28
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		0.99			1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		0.99			0.99		1.00	1.00		0.99	1.00	
Frt		0.97			0.99		1.00	0.96		1.00	0.99	
Flt Protected		0.99			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1704			1708		1615	3273		1604	3391	
Flt Permitted		0.90			0.85		0.44	1.00		0.50	1.00	
Satd. Flow (perm)		1552			1491		750	3273		836	3391	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	15	25	11	44	24	7	17	338	105	43	530	32
RTOR Reduction (vph)	0	10	0	0	4	0	0	10	0	0	1	0
Lane Group Flow (vph)	0	41	0	0	71	0	17	433	0	43	561	0
Confl. Peds. (#/hr)	9		6	6		9			3	3		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		11.8			11.8		110.2	110.2		110.2	110.2	
Effective Green, g (s)		9.8			9.8		108.2	108.2		108.2	108.2	
Actuated g/C Ratio		0.08			0.08		0.83	0.83		0.83	0.83	
Clearance Time (s)		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	
Lane Grp Cap (vph)		117			112		624	2724		696	2822	
v/s Ratio Prot								0.13			c0.17	
v/s Ratio Perm		0.03			c0.05		0.02			0.05		
v/c Ratio		0.35			0.64		0.03	0.16		0.06	0.20	
Uniform Delay, d1		57.1			58.4		1.9	2.1		1.9	2.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.8			11.3		0.1	0.1		0.2	0.2	
Delay (s)		58.9			69.6		2.0	2.2		2.1	2.3	
Level of Service		E			E		A	A		A	A	
Approach Delay (s)		58.9			69.6			2.2			2.3	
Approach LOS		E			E			A			A	

Intersection Summary

HCM Average Control Delay	8.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

25: Eureka & Oriental

12/23/2013



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	31	31	8	455	35	615
v/c Ratio	0.13	0.12	0.03	0.30	0.10	0.41
Control Delay	10.0	8.5	5.1	6.0	5.9	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	10.0	8.5	5.1	6.0	5.9	7.0
Queue Length 50th (ft)	2	1	1	20	3	30
Queue Length 95th (ft)	13	12	4	33	10	46
Internal Link Dist (ft)	432	448		184		93
Turn Bay Length (ft)			25		40	
Base Capacity (vph)	441	483	406	1939	474	1945
Starvation Cap Reductn	0	0	0	0	0	636
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.06	0.02	0.23	0.07	0.47

Intersection Summary

HCM Signalized Intersection Capacity Analysis

25: Eureka & Oriental

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕		↗	↕	
Volume (vph)	14	1	12	5	3	18	7	365	22	30	504	19
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.2			6.2		6.2	6.2		6.2	6.2	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		0.99			0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			0.91		1.00	0.99		1.00	0.99	
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1624			1589		1614	3386		1609	3399	
Flt Permitted		0.82			0.92		0.42	1.00		0.49	1.00	
Satd. Flow (perm)		1368			1484		712	3386		829	3399	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	16	1	14	6	4	21	8	429	26	35	593	22
RTOR Reduction (vph)	0	12	0	0	18	0	0	11	0	0	7	0
Lane Group Flow (vph)	0	19	0	0	13	0	8	444	0	35	608	0
Confl. Peds. (#/hr)	8		2	2		8	1		6	6		1
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			5			7			3	
Permitted Phases	1			5			7			3		
Actuated Green, G (s)		7.0			7.0		15.8	15.8		15.8	15.8	
Effective Green, g (s)		5.0			5.0		13.8	13.8		13.8	13.8	
Actuated g/C Ratio		0.16			0.16		0.44	0.44		0.44	0.44	
Clearance Time (s)		4.2			4.2		4.2	4.2		4.2	4.2	
Vehicle Extension (s)		2.5			2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		219			238		315	1498		367	1503	
v/s Ratio Prot								0.13			c0.18	
v/s Ratio Perm		c0.01			0.01		0.01			0.04		
v/c Ratio		0.09			0.06		0.03	0.30		0.10	0.40	
Uniform Delay, d1		11.2			11.1		4.9	5.6		5.1	5.9	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			0.1		0.0	0.1		0.1	0.1	
Delay (s)		11.3			11.2		4.9	5.7		5.1	6.0	
Level of Service		B			B		A	A		A	A	
Approach Delay (s)		11.3			11.2			5.7			6.0	
Approach LOS		B			B			A			A	

Intersection Summary

HCM Average Control Delay	6.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	31.2	Sum of lost time (s)	12.4
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

26: Eureka & Redlands

12/23/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	76	823	52	467	352	582
v/c Ratio	0.43	0.73	0.34	0.43	0.36	0.67
Control Delay	37.7	23.1	37.3	18.3	18.0	24.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.7	23.1	37.3	18.3	18.0	24.8
Queue Length 50th (ft)	31	162	21	80	52	105
Queue Length 95th (ft)	74	224	56	122	103	192
Internal Link Dist (ft)		660		354	209	138
Turn Bay Length (ft)	35		40			
Base Capacity (vph)	526	1863	526	1849	1207	1075
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.44	0.10	0.25	0.29	0.54

Intersection Summary

HCM Signalized Intersection Capacity Analysis

26: Eureka & Redlands

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	66	666	50	45	353	53	28	224	55	122	346	38
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.0	6.6		6.0	6.6			6.2			6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.97			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1615	3380		1615	3347			3301			3333	
Flt Permitted	0.95	1.00		0.95	1.00			0.87			0.77	
Satd. Flow (perm)	1615	3380		1615	3347			2889			2593	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	76	766	57	52	406	61	32	257	63	140	398	44
RTOR Reduction (vph)	0	6	0	0	14	0	0	19	0	0	6	0
Lane Group Flow (vph)	76	817	0	52	453	0	0	333	0	0	576	0
Confl. Peds. (#/hr)	2		7	7		2	4		9	9		4
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			4	
Permitted Phases							4			4		
Actuated Green, G (s)	5.1	22.3		4.5	21.7			22.3			22.3	
Effective Green, g (s)	3.1	20.3		2.5	19.7			20.3			20.3	
Actuated g/C Ratio	0.05	0.33		0.04	0.32			0.33			0.33	
Clearance Time (s)	4.0	4.6		4.0	4.6			4.2			4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	81	1108		65	1065			947			850	
v/s Ratio Prot	c0.05	c0.24		0.03	0.14							
v/s Ratio Perm								0.12			c0.22	
v/c Ratio	0.94	0.74		0.80	0.43			0.35			0.68	
Uniform Delay, d1	29.3	18.4		29.5	16.6			15.8			18.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	78.4	2.6		48.8	0.3			0.2			2.2	
Delay (s)	107.7	21.0		78.3	16.9			16.0			20.1	
Level of Service	F	C		E	B			B			C	
Approach Delay (s)		28.4			23.1			16.0			20.1	
Approach LOS		C			C			B			C	

Intersection Summary

HCM Average Control Delay	23.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	61.9	Sum of lost time (s)	12.2
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues
27: Orange & Colton

12/23/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	159	569	153	242	110	64	406	87	508
v/c Ratio	0.37	0.77	0.66	0.32	0.16	0.30	0.44	0.38	0.56
Control Delay	11.3	17.3	25.7	9.4	2.7	18.5	12.6	19.6	16.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.3	17.3	25.7	9.4	2.7	18.5	12.6	19.6	16.1
Queue Length 50th (ft)	22	89	25	33	0	11	31	16	48
Queue Length 95th (ft)	67	225	#110	85	20	43	75	55	107
Internal Link Dist (ft)		502		260			472		133
Turn Bay Length (ft)	50		65		65	50		75	
Base Capacity (vph)	728	1226	394	1267	1110	440	1870	486	1887
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.46	0.39	0.19	0.10	0.15	0.22	0.18	0.27

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

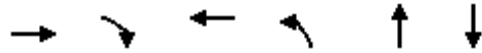
27: Orange & Colton

12/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	156	398	160	150	237	108	63	303	95	85	455	43
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	1723		1615	1800	1530	1615	3297		1615	3376	
Flt Permitted	0.61	1.00		0.33	1.00	1.00	0.47	1.00		0.51	1.00	
Satd. Flow (perm)	1034	1723		559	1800	1530	791	3297		873	3376	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	159	406	163	153	242	110	64	309	97	87	464	44
RTOR Reduction (vph)	0	25	0	0	0	63	0	56	0	0	13	0
Lane Group Flow (vph)	159	544	0	153	242	47	64	350	0	87	495	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	19.3	19.3		19.3	19.3	19.3	13.1	13.1		13.1	13.1	
Effective Green, g (s)	17.3	17.3		17.3	17.3	17.3	11.1	11.1		11.1	11.1	
Actuated g/C Ratio	0.43	0.43		0.43	0.43	0.43	0.27	0.27		0.27	0.27	
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	3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	443	738		239	771	655	217	906		240	928	
v/s Ratio Prot		c0.32			0.13			0.11			c0.15	
v/s Ratio Perm	0.15			0.27		0.03	0.08			0.10		
v/c Ratio	0.36	0.74		0.64	0.31	0.07	0.29	0.39		0.36	0.53	
Uniform Delay, d1	7.8	9.6		9.1	7.6	6.8	11.6	11.9		11.8	12.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	3.9		5.7	0.2	0.0	0.9	0.3		1.1	0.7	
Delay (s)	8.3	13.5		14.8	7.9	6.9	12.5	12.2		12.9	13.1	
Level of Service	A	B		B	A	A	B	B		B	B	
Approach Delay (s)		12.4			9.8			12.2			13.1	
Approach LOS		B			A			B			B	
Intersection Summary												
HCM Average Control Delay			12.0								HCM Level of Service	B
HCM Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			40.4								Sum of lost time (s)	12.0
Intersection Capacity Utilization			80.3%								ICU Level of Service	D
Analysis Period (min)			15									
c	Critical Lane Group											

Queues
28: Pearl & Orange

12/23/2013



Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	677	231	344	21	1011	442
v/c Ratio	1.00	0.28	0.53	0.08	0.92	0.53
Control Delay	56.0	8.8	15.3	20.0	40.5	24.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.0	8.8	15.3	20.0	40.5	24.7
Queue Length 50th (ft)	~320	43	99	7	250	93
Queue Length 95th (ft)	#560	84	175	24	#373	138
Internal Link Dist (ft)	445		279		526	472
Turn Bay Length (ft)		20		75		
Base Capacity (vph)	678	833	651	254	1109	843
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.28	0.53	0.08	0.91	0.52

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.

HCM Signalized Intersection Capacity Analysis

28: Pearl & Orange

12/23/2013



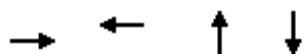
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↕			↕	
Volume (vph)	262	381	219	48	43	236	20	886	74	25	388	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95			0.95	
Frt		1.00	0.85		0.90		1.00	0.99			1.00	
Flt Protected		0.98	1.00		0.99		0.95	1.00			1.00	
Satd. Flow (prot)		1764	1530		1613		1615	3380			3401	
Flt Permitted		0.72	1.00		0.75		0.46	1.00			0.76	
Satd. Flow (perm)		1288	1530		1216		777	3380			2584	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	276	401	231	51	45	248	21	933	78	26	408	8
RTOR Reduction (vph)	0	0	27	0	10	0	0	7	0	0	1	0
Lane Group Flow (vph)	0	677	204	0	334	0	21	1004	0	0	441	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2				2
Permitted Phases	4		4	4			2			2		
Actuated Green, G (s)		44.0	44.0		44.0		27.8	27.8			27.8	
Effective Green, g (s)		42.0	42.0		42.0		25.8	25.8			25.8	
Actuated g/C Ratio		0.53	0.53		0.53		0.32	0.32			0.32	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.5	3.5			3.5	
Lane Grp Cap (vph)		678	805		640		251	1093			835	
v/s Ratio Prot								c0.30				
v/s Ratio Perm		c0.53	0.13		0.27		0.03				0.17	
v/c Ratio		1.00	0.25		0.52		0.08	0.92			0.53	
Uniform Delay, d1		18.9	10.3		12.3		18.8	26.0			22.0	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		33.9	0.2		0.8		0.2	12.1			0.7	
Delay (s)		52.8	10.5		13.1		18.9	38.1			22.7	
Level of Service		D	B		B		B	D			C	
Approach Delay (s)		42.0			13.1			37.7			22.7	
Approach LOS		D			B			D			C	

Intersection Summary

HCM Average Control Delay	33.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	79.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	103.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues
29: Orange & Stuart

12/23/2013



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	220	278	978	628
v/c Ratio	0.55	0.72	0.74	0.56
Control Delay	18.0	24.3	14.6	12.2
Queue Delay	0.0	0.0	0.1	0.0
Total Delay	18.0	24.3	14.8	12.2
Queue Length 50th (ft)	38	49	87	53
Queue Length 95th (ft)	105	138	195	123
Internal Link Dist (ft)	305	198	150	526
Turn Bay Length (ft)				
Base Capacity (vph)	745	712	2134	1860
Starvation Cap Reductn	0	0	263	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.30	0.39	0.52	0.34
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

29: Orange & Stuart

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	75	81	46	133	49	74	8	746	145	51	517	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.2			6.2			6.2			6.2	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frbp, ped/bikes		0.99			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.97			0.96			0.98			1.00	
Flt Protected		0.98			0.97			1.00			1.00	
Satd. Flow (prot)		1693			1660			3312			3393	
Flt Permitted		0.80			0.77			0.95			0.81	
Satd. Flow (perm)		1381			1311			3144			2757	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	88	50	145	53	80	9	811	158	55	562	11
RTOR Reduction (vph)	0	19	0	0	26	0	0	28	0	0	2	0
Lane Group Flow (vph)	0	201	0	0	252	0	0	950	0	0	626	0
Confl. Peds. (#/hr)	33		35	35		33	12		21	21		12
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		14.0			14.0			19.7			19.7	
Effective Green, g (s)		12.0			12.0			17.7			17.7	
Actuated g/C Ratio		0.29			0.29			0.42			0.42	
Clearance Time (s)		4.2			4.2			4.2			4.2	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		394			374			1322			1159	
v/s Ratio Prot												
v/s Ratio Perm		0.15			0.19			0.30			0.23	
v/c Ratio		0.51			0.67			0.72			0.54	
Uniform Delay, d1		12.6			13.3			10.1			9.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.0			4.7			1.9			0.5	
Delay (s)		13.6			18.0			12.0			9.6	
Level of Service		B			B			B			A	
Approach Delay (s)		13.6			18.0			12.0			9.6	
Approach LOS		B			B			B			A	

Intersection Summary

HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	42.1	Sum of lost time (s)	12.4
Intersection Capacity Utilization	83.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 30: Orange & Oriental

12/23/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	53	25	10	849	663	31
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	56	26	11	894	698	33
Pedestrians	16			24	1	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	1			2	0	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				464	165	
pX, platoon unblocked	0.90	0.99	0.99			
vC, conflicting volume	1199	405	747			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	932	368	715			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	76	96	99			
cM capacity (veh/h)	236	605	871			

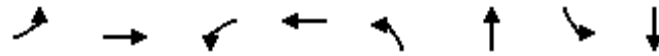
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	82	308	596	465	265
Volume Left	56	11	0	0	0
Volume Right	26	0	0	0	33
cSH	294	871	1700	1700	1700
Volume to Capacity	0.28	0.01	0.35	0.27	0.16
Queue Length 95th (ft)	28	1	0	0	0
Control Delay (s)	22.0	0.4	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	22.0	0.2		0.0	
Approach LOS	C				

Intersection Summary					
Average Delay			1.1		
Intersection Capacity Utilization	48.7%		ICU Level of Service	A	
Analysis Period (min)	15				

Queues

31: Orange & Redlands

12/23/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	192	642	54	581	66	499	155	497
v/c Ratio	0.63	0.76	0.23	0.69	0.25	0.72	0.56	0.66
Control Delay	23.2	27.0	14.3	17.3	15.0	28.4	22.4	24.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.2	27.0	14.3	17.3	15.0	28.4	22.4	24.3
Queue Length 50th (ft)	43	107	11	55	15	88	37	79
Queue Length 95th (ft)	#103	178	33	114	39	142	79	132
Internal Link Dist (ft)		387		273		223		384
Turn Bay Length (ft)	60		60		75		60	
Base Capacity (vph)	324	1116	241	1044	268	1038	283	1098
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.58	0.22	0.56	0.25	0.48	0.55	0.45

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

31: Orange & Redlands

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	186	536	86	52	313	250	64	440	44	150	386	96
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	5.5	6.2		5.5	6.2		5.5	6.2		5.5	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.93		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1613	3336		1612	3153		1608	3364		1610	3296	
Flt Permitted	0.27	1.00		0.36	1.00		0.44	1.00		0.37	1.00	
Satd. Flow (perm)	459	3336		608	3153		743	3364		626	3296	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	192	553	89	54	323	258	66	454	45	155	398	99
RTOR Reduction (vph)	0	19	0	0	206	0	0	11	0	0	33	0
Lane Group Flow (vph)	192	623	0	54	375	0	66	488	0	155	464	0
Confl. Peds. (#/hr)	16		15	15		16	26		23	23		26
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	25.7	16.8		20.3	14.1		20.4	14.3		22.2	15.2	
Effective Green, g (s)	21.7	14.8		16.3	12.1		16.4	12.3		18.2	13.2	
Actuated g/C Ratio	0.36	0.25		0.27	0.20		0.27	0.21		0.30	0.22	
Clearance Time (s)	3.5	4.2		3.5	4.2		3.5	4.2		3.5	4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	300	827		237	639		264	693		273	729	
v/s Ratio Prot	c0.07	c0.19		0.02	0.12		0.02	c0.15		c0.05	0.14	
v/s Ratio Perm	0.16			0.05			0.05			0.13		
v/c Ratio	0.64	0.75		0.23	0.59		0.25	0.70		0.57	0.64	
Uniform Delay, d1	14.2	20.8		16.3	21.5		16.4	22.0		16.0	21.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.6	3.9		0.5	1.4		0.5	3.3		2.7	1.8	
Delay (s)	18.8	24.7		16.8	22.9		16.9	25.3		18.7	22.9	
Level of Service	B	C		B	C		B	C		B	C	
Approach Delay (s)		23.3			22.4			24.3			21.9	
Approach LOS		C			C			C			C	

Intersection Summary

















HCM Average Control Delay	23.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	59.7	Sum of lost time (s)	23.4
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

32: 6th St & WB I-10 Ramp

12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	197	10	166	0	315	0	0	386	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	207	11	175	0	332	0	0	406	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	918	738	406	738	738	332	406			332		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	918	738	406	738	738	332	406			332		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	38	97	76	100			100		
cM capacity (veh/h)	188	348	649	336	348	715	1163			1239		
Direction, Lane #	WB 1	WB 2	NB 1	SB 1								
Volume Total	207	185	332	406								
Volume Left	207	0	0	0								
Volume Right	0	175	0	0								
cSH	336	674	1700	1700								
Volume to Capacity	0.62	0.27	0.20	0.24								
Queue Length 95th (ft)	97	28	0	0								
Control Delay (s)	31.5	12.3	0.0	0.0								
Lane LOS	D	B										
Approach Delay (s)	22.5		0.0	0.0								
Approach LOS	C											
Intersection Summary												
Average Delay			7.8									
Intersection Capacity Utilization			40.3%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

33: 6th St & EB I-10 Ramp

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔				↔	↔		↔	↔	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	127	204	175	0	0	0	188	168	119	233	245	107
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	131	210	180	0	0	0	194	173	123	240	253	110

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	341	180	194	296	240	363
Volume Left (vph)	131	0	194	0	240	0
Volume Right (vph)	0	180	0	123	0	110
Hadj (s)	0.19	-0.70	0.50	-0.29	0.50	-0.21
Departure Headway (s)	7.6	6.7	7.8	7.0	7.7	6.9
Degree Utilization, x	0.72	0.33	0.42	0.58	0.51	0.70
Capacity (veh/h)	459	519	436	490	457	503
Control Delay (s)	26.3	11.8	15.2	18.0	17.2	23.3
Approach Delay (s)	21.3		16.9		20.9	
Approach LOS	C		C		C	

Intersection Summary	
Delay	19.8
HCM Level of Service	C
Intersection Capacity Utilization	60.9%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

34: 6th St & Stuart

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (veh/h)	17	13	34	13	7	40	58	446	19	34	308	33
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	18	13	35	13	7	41	60	460	20	35	318	34
Pedestrians		2			2			4			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)								231				
pX, platoon unblocked	0.98	0.98		0.98	0.98	0.98				0.98		
vC, conflicting volume	1033	1008	182	866	1015	474	354			481		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1022	996	182	851	1004	450	354			458		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	89	94	96	94	97	92	95			97		
cM capacity (veh/h)	159	221	832	214	219	547	1214			1087		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	66	62	60	479	35	212	140
Volume Left	18	13	60	0	35	0	0
Volume Right	35	41	0	20	0	0	34
cSH	309	362	1214	1700	1087	1700	1700
Volume to Capacity	0.21	0.17	0.05	0.28	0.03	0.12	0.08
Queue Length 95th (ft)	20	15	4	0	2	0	0
Control Delay (s)	19.8	17.0	8.1	0.0	8.4	0.0	0.0
Lane LOS	C	C	A		A		
Approach Delay (s)	19.8	17.0	0.9		0.8		
Approach LOS	C	C					

Intersection Summary

Average Delay		3.0					
Intersection Capacity Utilization		46.1%		ICU Level of Service		A	
Analysis Period (min)		15					

Queues

35: Redlands Blvd & Citrus Ave

12/23/2013



Lane Group	EBT	WBT	SET	SER	NWT
Lane Group Flow (vph)	618	363	636	105	403
v/c Ratio	0.77	0.69	0.70	0.17	0.45
Control Delay	28.8	28.9	25.8	6.5	19.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	28.8	28.9	25.8	6.5	19.5
Queue Length 50th (ft)	112	58	115	3	61
Queue Length 95th (ft)	183	110	#242	38	128
Internal Link Dist (ft)	399	463	375		430
Turn Bay Length (ft)				100	
Base Capacity (vph)	1162	933	972	643	955
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.53	0.39	0.65	0.16	0.42

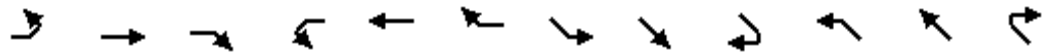
Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

35: Redlands Blvd & Citrus Ave

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕↕			↕↕			↕↕	↗		↕↕	
Volume (vph)	127	293	185	49	190	117	157	466	103	72	269	55
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.2			6.2	6.2		6.2	
Lane Util. Factor		0.95			0.95			0.95	1.00		0.95	
Frt		0.95			0.95			1.00	0.85		0.98	
Flt Protected		0.99			0.99			0.99	1.00		0.99	
Satd. Flow (prot)		3229			3230			3378	1530		3319	
Flt Permitted		0.99			0.99			0.74	1.00		0.74	
Satd. Flow (perm)		3229			3230			2545	1530		2465	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	130	299	189	50	194	119	160	476	105	73	274	56
RTOR Reduction (vph)	0	62	0	0	76	0	0	0	61	0	14	0
Lane Group Flow (vph)	0	556	0	0	287	0	0	636	44	0	389	0
Turn Type	Split	NA		Split	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	4	4		1	1			2			2	
Permitted Phases							2		2	2		
Actuated Green, G (s)		17.7			11.6			26.5	26.5		26.5	
Effective Green, g (s)		15.7			9.6			24.5	24.5		24.5	
Actuated g/C Ratio		0.23			0.14			0.36	0.36		0.36	
Clearance Time (s)		4.0			4.2			4.2	4.2		4.2	
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		743			455			914	550		886	
v/s Ratio Prot		c0.17			c0.09							
v/s Ratio Perm								c0.25	0.03		0.16	
v/c Ratio		0.75			0.63			0.70	0.08		0.44	
Uniform Delay, d1		24.4			27.6			18.7	14.4		16.6	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		4.1			2.7			2.3	0.1		0.3	
Delay (s)		28.5			30.4			21.0	14.5		17.0	
Level of Service		C			C			C	B		B	
Approach Delay (s)		28.5			30.4			20.1			17.0	
Approach LOS		C			C			C			B	

Intersection Summary

HCM Average Control Delay	23.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	68.2	Sum of lost time (s)	18.4
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

36: Stuart & Church

12/23/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	43	20	10	268	235	16
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	44	21	10	276	242	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				203		
pX, platoon unblocked	0.99					
vC, conflicting volume	547	251	259			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	538	251	259			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	97	99			
cM capacity (veh/h)	499	793	1318			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	65	287	259			
Volume Left	44	10	0			
Volume Right	21	0	16			
cSH	565	1318	1700			
Volume to Capacity	0.11	0.01	0.15			
Queue Length 95th (ft)	10	1	0			
Control Delay (s)	12.2	0.3	0.0			
Lane LOS	B	A				
Approach Delay (s)	12.2	0.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			33.9%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

37: Universtiy & WB I-10 Ramp/E Central

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↔			↔	
Volume (veh/h)	0	0	0	1	16	11	304	596	41	10	178	419
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	0	0	1	16	11	313	614	42	10	184	432
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												563
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99		0.99					
vC, conflicting volume	1374	1704	308	1375	1898	328	615			657		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1356	1690	279	1357	1887	328	590			657		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	99	65	98	68			99		
cM capacity (veh/h)	59	63	717	81	48	673	985			940		

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	29	621	349	102	524
Volume Left	1	313	0	10	0
Volume Right	11	0	42	0	432
cSH	77	985	1700	940	1700
Volume to Capacity	0.38	0.32	0.21	0.01	0.31
Queue Length 95th (ft)	36	34	0	1	0
Control Delay (s)	77.8	7.2	0.0	1.0	0.0
Lane LOS	F	A		A	
Approach Delay (s)	77.8	4.6		0.2	
Approach LOS	F				

Intersection Summary

Average Delay	4.2
Intersection Capacity Utilization	61.2%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

38: Universtiy & EB I-10 Ramp

12/23/2013

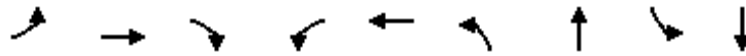


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	451	582	0	514	204	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	456	588	0	519	206	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	12					
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)	1022					
pX, platoon unblocked						
vC, conflicting volume	466	103	206			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	466	103	206			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	14	37	100			
cM capacity (veh/h)	531	938	1377			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	1043	260	260	103	103	
Volume Left	456	0	0	0	0	
Volume Right	588	0	0	0	0	
cSH	1216	1700	1700	1700	1700	
Volume to Capacity	0.86	0.15	0.15	0.06	0.06	
Queue Length 95th (ft)	294	0	0	0	0	
Control Delay (s)	26.0	0.0	0.0	0.0	0.0	
Lane LOS	D					
Approach Delay (s)	26.0	0.0		0.0		
Approach LOS	D					
Intersection Summary						
Average Delay	15.4					
Intersection Capacity Utilization	50.7%			ICU Level of Service	A	
Analysis Period (min)	15					

Queues

39: Tippecanoe & Harriman PI

12/23/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	179	8	395	46	15	132	1119	11	1436
v/c Ratio	0.84	0.03	0.66	0.21	0.05	0.80	0.48	0.04	0.32
Control Delay	68.2	31.0	22.6	34.5	19.4	49.0	9.5	1.1	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.2	31.0	22.6	34.5	19.4	49.0	9.5	1.1	1.6
Queue Length 50th (ft)	98	4	56	23	2	55	118	0	11
Queue Length 95th (ft)	#207	16	110	54	19	m#162	m139	m1	11
Internal Link Dist (ft)		611			794		503		768
Turn Bay Length (ft)	280		170	170		260		225	
Base Capacity (vph)	226	320	617	227	294	165	2311	272	4541
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.03	0.64	0.20	0.05	0.80	0.48	0.04	0.32

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.

HCM Signalized Intersection Capacity Analysis

39: Tippecanoe & Harriman PI

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗↗	↖	↗		↖	↖↖↗		↖	↖↖↗	
Volume (vph)	170	8	375	44	4	10	252	915	22	10	1189	175
Ideal Flow (vphpl)	1700	1800	1700	1700	1800	1800	1700	1800	1800	1700	1800	1800
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	0.88	1.00	1.00		0.86	0.86		1.00	0.86	
Frt	1.00	1.00	0.85	1.00	0.89		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.99		0.95	1.00	
Satd. Flow (prot)	1615	1800	2543	1615	1602		1389	4602		1615	6073	
Flt Permitted	0.75	1.00	1.00	0.75	1.00		0.15	0.67		0.22	1.00	
Satd. Flow (perm)	1271	1800	2543	1279	1602		222	3108		366	6073	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	179	8	395	46	4	11	265	963	23	11	1252	184
RTOR Reduction (vph)	0	0	167	0	9	0	0	2	0	0	28	0
Lane Group Flow (vph)	179	8	228	46	6	0	132	1117	0	11	1408	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	15.1	15.1	15.1	15.1	15.1		66.9	66.9		66.9	66.9	
Effective Green, g (s)	15.1	15.1	15.1	15.1	15.1		66.9	66.9		66.9	66.9	
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17		0.74	0.74		0.74	0.74	
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)	213	302	427	215	269		165	2310		272	4514	
v/s Ratio Prot		0.00			0.00							0.23
v/s Ratio Perm	c0.14		0.09	0.04			c0.59	0.36		0.03		
v/c Ratio	0.84	0.03	0.53	0.21	0.02		0.80	0.48		0.04	0.31	
Uniform Delay, d1	36.3	31.3	34.2	32.3	31.3		7.3	4.6		3.1	3.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.69	1.82		0.25	0.39	
Incremental Delay, d2	24.6	0.0	1.3	0.5	0.0		28.4	0.6		0.2	0.1	
Delay (s)	60.9	31.3	35.5	32.8	31.3		40.8	9.0		1.0	1.7	
Level of Service	E	C	D	C	C		D	A		A	A	
Approach Delay (s)		43.3			32.5			12.4			1.7	
Approach LOS		D			C			B			A	

Intersection Summary

HCM Average Control Delay	13.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues

50: California & Rail













12/23/2013

	↑	↓
Lane Group	NBT	SBT
Lane Group Flow (vph)	1332	1199
v/c Ratio	0.23	0.37
Control Delay	1.7	2.2
Queue Delay	1.0	21.1
Total Delay	2.7	23.3
Queue Length 50th (ft)	140	276
Queue Length 95th (ft)	137	270
Internal Link Dist (ft)	241	46
Turn Bay Length (ft)		
Base Capacity (vph)	5869	3241
Starvation Cap Reductn	4140	2071
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.77	1.02
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

50: California & Rail

12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑↑↑			↑↑	
Volume (vph)	0	0	0	0	0	0	0	1265	0	0	1139	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								2.0			2.0	
Lane Util. Factor								0.86			0.95	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								6192			3420	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								6192			3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	1332	0	0	1199	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	1332	0	0	1199	0
Turn Type								NA			NA	
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)								853.0			853.0	
Effective Green, g (s)								853.0			853.0	
Actuated g/C Ratio								0.95			0.95	
Clearance Time (s)								2.0			2.0	
Lane Grp Cap (vph)								5869			3241	
v/s Ratio Prot								0.22			c0.35	
v/s Ratio Perm												
v/c Ratio								0.23			0.37	
Uniform Delay, d1								1.6			1.9	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.1			0.3	
Delay (s)								1.7			2.2	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			1.7			2.2	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			1.9					HCM Level of Service			A	
HCM Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			900.0					Sum of lost time (s)		47.0		
Intersection Capacity Utilization			36.6%					ICU Level of Service		A		
Analysis Period (min)			15									
c Critical Lane Group												

Intersection Sign configuration not allowed in HCM analysis.

Queues

71: Alabama St & Rail













12/23/2013

	↑	↓
Lane Group	NBT	SBT
Lane Group Flow (vph)	1131	872
v/c Ratio	0.35	0.27
Control Delay	2.1	1.9
Queue Delay	14.8	10.1
Total Delay	16.9	11.9
Queue Length 50th (ft)	253	175
Queue Length 95th (ft)	248	175
Internal Link Dist (ft)	164	236
Turn Bay Length (ft)		
Base Capacity (vph)	3241	3241
Starvation Cap Reductn	2111	2338
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.00	0.97
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

71: Alabama St & Rail

12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑↑			↑↑	
Volume (vph)	0	0	0	0	0	0	0	1074	0	0	828	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								2.0			2.0	
Lane Util. Factor								0.95			0.95	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								3420			3420	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								3420			3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	1131	0	0	872	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	1131	0	0	872	0
Turn Type								NA			NA	
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)								853.0			853.0	
Effective Green, g (s)								853.0			853.0	
Actuated g/C Ratio								0.95			0.95	
Clearance Time (s)								2.0			2.0	
Lane Grp Cap (vph)								3241			3241	
v/s Ratio Prot								c0.33			0.25	
v/s Ratio Perm												
v/c Ratio								0.35			0.27	
Uniform Delay, d1								1.8			1.6	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.3			0.2	
Delay (s)								2.1			1.9	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			2.1			1.9	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			2.0					HCM Level of Service			A	
HCM Volume to Capacity ratio			0.35									
Actuated Cycle Length (s)			900.0					Sum of lost time (s)			47.0	
Intersection Capacity Utilization			34.7%					ICU Level of Service			A	
Analysis Period (min)			15									
c Critical Lane Group												













Intersection Sign configuration not allowed in HCM analysis.

	↑	↓
Lane Group	NBT	SBT
Lane Group Flow (vph)	1059	708
v/c Ratio	0.33	0.22
Control Delay	2.0	1.7
Queue Delay	21.2	0.0
Total Delay	23.2	1.7
Queue Length 50th (ft)	229	133
Queue Length 95th (ft)	226	135
Internal Link Dist (ft)	48	508
Turn Bay Length (ft)		
Base Capacity (vph)	3241	3241
Starvation Cap Reductn	2205	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	1.02	0.22
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

82: Rail & Tennessee

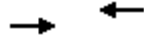
12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑↑			↑↑	
Volume (vph)	0	0	0	0	0	0	0	1006	0	0	673	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								2.0			2.0	
Lane Util. Factor								0.95			0.95	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								3420			3420	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								3420			3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	1059	0	0	708	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	1059	0	0	708	0
Turn Type								NA			NA	
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)								853.0			853.0	
Effective Green, g (s)								853.0			853.0	
Actuated g/C Ratio								0.95			0.95	
Clearance Time (s)								2.0			2.0	
Lane Grp Cap (vph)								3241			3241	
v/s Ratio Prot								c0.31			0.21	
v/s Ratio Perm												
v/c Ratio								0.33			0.22	
Uniform Delay, d1								1.8			1.5	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.3			0.2	
Delay (s)								2.0			1.7	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			2.0			1.7	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			1.9					HCM Level of Service			A	
HCM Volume to Capacity ratio			0.33									
Actuated Cycle Length (s)			900.0					Sum of lost time (s)			47.0	
Intersection Capacity Utilization			32.7%					ICU Level of Service			A	
Analysis Period (min)			15									
c Critical Lane Group												

Queues

85: E Orange Show & Rail

12/23/2013

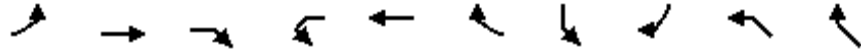


Lane Group	EBT	WBT
Lane Group Flow (vph)	793	758
v/c Ratio	0.24	0.23
Control Delay	1.8	1.7
Queue Delay	0.0	3.3
Total Delay	1.8	5.1
Queue Length 50th (ft)	154	145
Queue Length 95th (ft)	155	147
Internal Link Dist (ft)	346	622
Turn Bay Length (ft)		
Base Capacity (vph)	3241	3241
Starvation Cap Reductn	0	2353
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.24	0.85
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

85: E Orange Show & Rail

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	NWL	NWR
Lane Configurations		↑↑			↑↑		↑			↑
Volume (vph)	0	753	0	0	720	0	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		2.0			2.0					
Lane Util. Factor		0.95			0.95					
Frt		1.00			1.00					
Flt Protected		1.00			1.00					
Satd. Flow (prot)		3420			3420					
Flt Permitted		1.00			1.00					
Satd. Flow (perm)		3420			3420					
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	793	0	0	758	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	793	0	0	758	0	0	0	0	0
Turn Type		NA			NA					Over
Protected Phases		4			4		2			2
Permitted Phases										
Actuated Green, G (s)		853.0			853.0					
Effective Green, g (s)		853.0			853.0					
Actuated g/C Ratio		0.95			0.95					
Clearance Time (s)		2.0			2.0					
Lane Grp Cap (vph)		3241			3241					
v/s Ratio Prot		c0.23			0.22					
v/s Ratio Perm										
v/c Ratio		0.24			0.23					
Uniform Delay, d1		1.6			1.6					
Progression Factor		1.00			1.00					
Incremental Delay, d2		0.2			0.2					
Delay (s)		1.8			1.7					
Level of Service		A			A					
Approach Delay (s)		1.8			1.7		0.0		0.0	
Approach LOS		A			A		A		A	

Intersection Summary

HCM Average Control Delay	1.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	900.0	Sum of lost time (s)	47.0
Intersection Capacity Utilization	25.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

93: S Waterman/Waterman & Rail

12/23/2013















Lane Group	NBT	SBT
Lane Group Flow (vph)	1078	1197
v/c Ratio	0.33	0.37
Control Delay	2.1	2.2
Queue Delay	0.0	5.0
Total Delay	2.1	7.2
Queue Length 50th (ft)	236	276
Queue Length 95th (ft)	232	270
Internal Link Dist (ft)	7	578
Turn Bay Length (ft)		
Base Capacity (vph)	3241	3241
Starvation Cap Reductn	0	1960
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.33	0.93
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

93: S Waterman/Waterman & Rail

12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑↑			↑↑	
Volume (vph)	0	0	0	0	0	0	0	1024	0	0	1137	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								2.0			2.0	
Lane Util. Factor								0.95			0.95	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								3420			3420	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								3420			3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	1078	0	0	1197	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	1078	0	0	1197	0
Turn Type								NA			NA	
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)								853.0			853.0	
Effective Green, g (s)								853.0			853.0	
Actuated g/C Ratio								0.95			0.95	
Clearance Time (s)								2.0			2.0	
Lane Grp Cap (vph)								3241			3241	
v/s Ratio Prot								0.32			c0.35	
v/s Ratio Perm												
v/c Ratio								0.33			0.37	
Uniform Delay, d1								1.8			1.9	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.3			0.3	
Delay (s)								2.1			2.2	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			2.1			2.2	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			2.1					HCM Level of Service			A	
HCM Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			900.0					Sum of lost time (s)		47.0		
Intersection Capacity Utilization			36.5%					ICU Level of Service		A		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

96: Texas & Rail













12/23/2013

	↑	↓
Lane Group	NBT	SBT
Lane Group Flow (vph)	619	363
v/c Ratio	0.19	0.11
Control Delay	1.6	1.4
Queue Delay	0.0	0.0
Total Delay	1.6	1.4
Queue Length 50th (ft)	113	61
Queue Length 95th (ft)	116	64
Internal Link Dist (ft)	132	113
Turn Bay Length (ft)		
Base Capacity (vph)	3241	3241
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.19	0.11
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

96: Texas & Rail

12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑↑			↑↑	
Volume (vph)	0	0	0	0	0	0	0	588	0	0	345	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								2.0			2.0	
Lane Util. Factor								0.95			0.95	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								3420			3420	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								3420			3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	619	0	0	363	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	619	0	0	363	0
Turn Type								NA			NA	
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)								853.0			853.0	
Effective Green, g (s)								853.0			853.0	
Actuated g/C Ratio								0.95			0.95	
Clearance Time (s)								2.0			2.0	
Lane Grp Cap (vph)								3241			3241	
v/s Ratio Prot								c0.18			0.11	
v/s Ratio Perm												
v/c Ratio								0.19			0.11	
Uniform Delay, d1								1.5			1.4	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.1			0.1	
Delay (s)								1.6			1.4	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			1.6			1.4	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			1.6					HCM Level of Service			A	
HCM Volume to Capacity ratio			0.19									
Actuated Cycle Length (s)			900.0					Sum of lost time (s)			47.0	
Intersection Capacity Utilization			20.5%					ICU Level of Service			A	
Analysis Period (min)			15									
c Critical Lane Group												

Queues
101: Eureka & Rail













12/23/2013

	↑	↓
Lane Group	NBT	SBT
Lane Group Flow (vph)	418	582
v/c Ratio	0.13	0.18
Control Delay	1.5	1.6
Queue Delay	16.3	13.1
Total Delay	17.8	14.7
Queue Length 50th (ft)	71	105
Queue Length 95th (ft)	74	107
Internal Link Dist (ft)	93	136
Turn Bay Length (ft)		
Base Capacity (vph)	3241	3241
Starvation Cap Reductn	2807	2637
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.96	0.96
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

101: Eureka & Rail

12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑↑			↑↑	
Volume (vph)	0	0	0	0	0	0	0	397	0	0	553	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								2.0			2.0	
Lane Util. Factor								0.95			0.95	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								3420			3420	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								3420			3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	418	0	0	582	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	418	0	0	582	0
Turn Type								NA			NA	
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)								853.0			853.0	
Effective Green, g (s)								853.0			853.0	
Actuated g/C Ratio								0.95			0.95	
Clearance Time (s)								2.0			2.0	
Lane Grp Cap (vph)								3241			3241	
v/s Ratio Prot								0.12			c0.17	
v/s Ratio Perm												
v/c Ratio								0.13			0.18	
Uniform Delay, d1								1.4			1.5	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.1			0.1	
Delay (s)								1.5			1.6	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			1.5			1.6	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			1.6					HCM Level of Service			A	
HCM Volume to Capacity ratio			0.18									
Actuated Cycle Length (s)			900.0					Sum of lost time (s)		47.0		
Intersection Capacity Utilization			19.5%					ICU Level of Service		A		
Analysis Period (min)			15									
c Critical Lane Group												

Queues
119: Orange & Rail













12/23/2013

	↑	↓
Lane Group	NBT	SBT
Lane Group Flow (vph)	949	731
v/c Ratio	0.29	0.23
Control Delay	1.9	1.7
Queue Delay	4.5	12.5
Total Delay	6.5	14.2
Queue Length 50th (ft)	196	139
Queue Length 95th (ft)	195	141
Internal Link Dist (ft)	85	150
Turn Bay Length (ft)		
Base Capacity (vph)	3241	3241
Starvation Cap Reductn	2196	2489
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.91	0.97
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

119: Orange & Rail

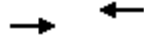
12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑↑			↑↑	
Volume (vph)	0	0	0	0	0	0	0	902	0	0	694	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								2.0			2.0	
Lane Util. Factor								0.95			0.95	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								3420			3420	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								3420			3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	949	0	0	731	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	949	0	0	731	0
Turn Type								NA			NA	
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)								853.0			853.0	
Effective Green, g (s)								853.0			853.0	
Actuated g/C Ratio								0.95			0.95	
Clearance Time (s)								2.0			2.0	
Lane Grp Cap (vph)								3241			3241	
v/s Ratio Prot								c0.28			0.21	
v/s Ratio Perm												
v/c Ratio								0.29			0.23	
Uniform Delay, d1								1.7			1.6	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.2			0.2	
Delay (s)								1.9			1.7	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			1.9			1.7	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			1.8					HCM Level of Service			A	
HCM Volume to Capacity ratio			0.29									
Actuated Cycle Length (s)			900.0					Sum of lost time (s)			47.0	
Intersection Capacity Utilization			29.7%					ICU Level of Service			A	
Analysis Period (min)			15									
c Critical Lane Group												

Queues

124: Rail & E Mill

12/23/2013



Lane Group	EBT	WBT
Lane Group Flow (vph)	616	587
v/c Ratio	0.19	0.18
Control Delay	1.6	1.6
Queue Delay	3.6	1.1
Total Delay	5.2	2.7
Queue Length 50th (ft)	112	106
Queue Length 95th (ft)	115	108
Internal Link Dist (ft)	521	1246
Turn Bay Length (ft)		
Base Capacity (vph)	3241	3241
Starvation Cap Reductn	2506	2342
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.84	0.65
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

124: Rail & E Mill

12/23/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑			↑			↑	
Volume (vph)	0	585	0	0	558	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		2.0			2.0							
Lane Util. Factor		0.95			0.95							
Frt		1.00			1.00							
Flt Protected		1.00			1.00							
Satd. Flow (prot)		3420			3420							
Flt Permitted		1.00			1.00							
Satd. Flow (perm)		3420			3420							
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	616	0	0	587	0	0	0	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	616	0	0	587	0	0	0	0	0	0	0
Turn Type		NA			NA							
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)		853.0			853.0							
Effective Green, g (s)		853.0			853.0							
Actuated g/C Ratio		0.95			0.95							
Clearance Time (s)		2.0			2.0							
Lane Grp Cap (vph)		3241			3241							
v/s Ratio Prot		c0.18			0.17							
v/s Ratio Perm												
v/c Ratio		0.19			0.18							
Uniform Delay, d1		1.5			1.5							
Progression Factor		1.00			1.00							
Incremental Delay, d2		0.1			0.1							
Delay (s)		1.6			1.6							
Level of Service		A			A							
Approach Delay (s)		1.6			1.6			0.0			0.0	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	1.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.19		
Actuated Cycle Length (s)	900.0	Sum of lost time (s)	47.0
Intersection Capacity Utilization	20.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

132: 6th St & Rail













12/23/2013

	↑	↓
Lane Group	NBT	SBT
Lane Group Flow (vph)	551	374
v/c Ratio	0.32	0.12
Control Delay	2.3	1.5
Queue Delay	0.0	0.0
Total Delay	2.3	1.5
Queue Length 50th (ft)	226	63
Queue Length 95th (ft)	235	66
Internal Link Dist (ft)	280	151
Turn Bay Length (ft)		
Base Capacity (vph)	1706	3241
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.32	0.12
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

132: 6th St & Rail

12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑			↑↑	
Volume (vph)	0	0	0	0	0	0	0	523	0	0	355	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								2.0			2.0	
Lane Util. Factor								1.00			0.95	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								1800			3420	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								1800			3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	551	0	0	374	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	551	0	0	374	0
Turn Type								NA			NA	
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)								853.0			853.0	
Effective Green, g (s)								853.0			853.0	
Actuated g/C Ratio								0.95			0.95	
Clearance Time (s)								2.0			2.0	
Lane Grp Cap (vph)								1706			3241	
v/s Ratio Prot								c0.31			0.11	
v/s Ratio Perm												
v/c Ratio								0.32			0.12	
Uniform Delay, d1								1.8			1.4	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.5			0.1	
Delay (s)								2.3			1.5	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			2.3			1.5	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			1.9					HCM Level of Service			A	
HCM Volume to Capacity ratio			0.32									
Actuated Cycle Length (s)			900.0					Sum of lost time (s)			47.0	
Intersection Capacity Utilization			32.4%					ICU Level of Service			A	
Analysis Period (min)			15									
c Critical Lane Group												

Queues
139: Church & Rail

















12/23/2013

	↑	↓
Lane Group	NBT	SBT
Lane Group Flow (vph)	293	268
v/c Ratio	0.17	0.16
Control Delay	1.7	1.6
Queue Delay	0.0	0.0
Total Delay	1.7	1.6
Queue Length 50th (ft)	100	90
Queue Length 95th (ft)	109	99
Internal Link Dist (ft)	171	123
Turn Bay Length (ft)		
Base Capacity (vph)	1706	1706
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.17	0.16
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

139: Church & Rail

12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	0	0	0	278	0	0	255	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								2.0			2.0	
Lane Util. Factor								1.00			1.00	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								1800			1800	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								1800			1800	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	293	0	0	268	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	293	0	0	268	0
Turn Type								NA			NA	
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)								853.0			853.0	
Effective Green, g (s)								853.0			853.0	
Actuated g/C Ratio								0.95			0.95	
Clearance Time (s)								2.0			2.0	
Lane Grp Cap (vph)								1706			1706	
v/s Ratio Prot								c0.16			0.15	
v/s Ratio Perm												
v/c Ratio								0.17			0.16	
Uniform Delay, d1								1.5			1.4	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.2			0.2	
Delay (s)								1.7			1.6	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			1.7			1.6	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			1.7					HCM Level of Service			A	
HCM Volume to Capacity ratio			0.17									
Actuated Cycle Length (s)			900.0					Sum of lost time (s)		47.0		
Intersection Capacity Utilization			18.8%					ICU Level of Service		A		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

169: S Tippecanoe & Rail













12/23/2013

	↑	↓
Lane Group	NBT	SBT
Lane Group Flow (vph)	987	956
v/c Ratio	0.30	0.29
Control Delay	2.0	1.9
Queue Delay	1.0	12.7
Total Delay	3.0	14.7
Queue Length 50th (ft)	207	198
Queue Length 95th (ft)	206	197
Internal Link Dist (ft)	69	198
Turn Bay Length (ft)		
Base Capacity (vph)	3241	3241
Starvation Cap Reductn	1897	2271
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.73	0.99
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

169: S Tippecanoe & Rail

12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑↑			↑↑	
Volume (vph)	0	0	0	0	0	0	0	938	0	0	908	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								2.0			2.0	
Lane Util. Factor								0.95			0.95	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								3420			3420	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								3420			3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	987	0	0	956	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	987	0	0	956	0
Turn Type								NA			NA	
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)								853.0			853.0	
Effective Green, g (s)								853.0			853.0	
Actuated g/C Ratio								0.95			0.95	
Clearance Time (s)								2.0			2.0	
Lane Grp Cap (vph)								3241			3241	
v/s Ratio Prot								c0.29			0.28	
v/s Ratio Perm												
v/c Ratio								0.30			0.29	
Uniform Delay, d1								1.7			1.7	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.2			0.2	
Delay (s)								2.0			1.9	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			2.0			1.9	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			2.0					HCM Level of Service			A	
HCM Volume to Capacity ratio			0.30									
Actuated Cycle Length (s)			900.0					Sum of lost time (s)		47.0		
Intersection Capacity Utilization			30.7%					ICU Level of Service		A		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

182: Universtiy & Rail













12/23/2013

	↑	↓
Lane Group	NBT	SBT
Lane Group Flow (vph)	639	636
v/c Ratio	0.20	0.20
Control Delay	1.6	1.6
Queue Delay	0.0	0.0
Total Delay	1.6	1.6
Queue Length 50th (ft)	117	116
Queue Length 95th (ft)	120	119
Internal Link Dist (ft)	483	348
Turn Bay Length (ft)		
Base Capacity (vph)	3241	3241
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.20	0.20
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

182: Universtiy & Rail













12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑			↑			↑↑			↑↑	
Volume (vph)	0	0	0	0	0	0	0	607	0	0	604	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)								2.0			2.0	
Lane Util. Factor								0.95			0.95	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								3420			3420	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								3420			3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	0	0	0	0	639	0	0	636	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	639	0	0	636	0
Turn Type								NA			NA	
Protected Phases		4			4			2			2	
Permitted Phases												
Actuated Green, G (s)								853.0			853.0	
Effective Green, g (s)								853.0			853.0	
Actuated g/C Ratio								0.95			0.95	
Clearance Time (s)								2.0			2.0	
Lane Grp Cap (vph)								3241			3241	
v/s Ratio Prot								c0.19			0.19	
v/s Ratio Perm												
v/c Ratio								0.20			0.20	
Uniform Delay, d1								1.5			1.5	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.1			0.1	
Delay (s)								1.6			1.6	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			1.6			1.6	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM Average Control Delay			1.6					HCM Level of Service			A	
HCM Volume to Capacity ratio			0.20									
Actuated Cycle Length (s)			900.0					Sum of lost time (s)		47.0		
Intersection Capacity Utilization			21.0%					ICU Level of Service		A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

188: Rail & E St













12/23/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑			↑			↑↑			↑↑		
Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type							None						
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	0	0	0	0	0	0	0			0			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	0	0	0	0	0	0	0			0			
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1			
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2			
p0 queue free %	100	100	100	100	100	100	100			100			
cM capacity (veh/h)	1029	900	1091	1029	900	1091	1636			1636			
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2							
Volume Total	0	0	0	0	0	0							
Volume Left	0	0	0	0	0	0							
Volume Right	0	0	0	0	0	0							
cSH	1700	1700	1700	1700	1700	1700							
Volume to Capacity	0.00	0.00	0.00	0.00	0.00	0.00							
Queue Length 95th (ft)	0	0	0	0	0	0							
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0							
Lane LOS	A	A											
Approach Delay (s)	0.0	0.0	0.0			0.0							
Approach LOS	A	A											
Intersection Summary													
Average Delay			0.0										
Intersection Capacity Utilization			0.0%		ICU Level of Service								A
Analysis Period (min)			15										

HCM Unsignalized Intersection Capacity Analysis

191: D St & Rail













12/23/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑						↑↑			↑↑	
Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	0	0	0	0	0	0	0			0		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	0	0	0	0	0	0			0		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	1029	900	1091	1029	900	1091	1636			1636		
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2							
Volume Total	0	0	0	0	0							
Volume Left	0	0	0	0	0							
Volume Right	0	0	0	0	0							
cSH	1700	1700	1700	1700	1700							
Volume to Capacity	0.00	0.00	0.00	0.00	0.00							
Queue Length 95th (ft)	0	0	0	0	0							
Control Delay (s)	0.0	0.0	0.0	0.0	0.0							
Lane LOS	A											
Approach Delay (s)	0.0	0.0	0.0									
Approach LOS	A											
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			0.0%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

195: Arrowhead & Rail

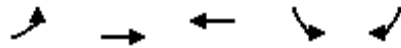
12/23/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↑						↑↑			↑↑		
Volume (veh/h)	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type							None						
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	0	0	0	0	0	0	0			0			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	0	0	0	0	0	0	0			0			
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1			
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2			
p0 queue free %	100	100	100	100	100	100	100			100			
cM capacity (veh/h)	1029	900	1091	1029	900	1091	1636			1636			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2								
Volume Total	0	0	0	0	0								
Volume Left	0	0	0	0	0								
Volume Right	0	0	0	0	0								
cSH	1700	1700	1700	1700	1700								
Volume to Capacity	0.00	0.00	0.00	0.00	0.00								
Queue Length 95th (ft)	0	0	0	0	0								
Control Delay (s)	0.0	0.0	0.0	0.0	0.0								
Lane LOS	A												
Approach Delay (s)	0.0	0.0	0.0										
Approach LOS	A												
Intersection Summary													
Average Delay			0.0										
Intersection Capacity Utilization			0.0%		ICU Level of Service				A				
Analysis Period (min)			15										

Intersection Sign configuration not allowed in HCM analysis.

Queues
1: Mill St

11/25/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	67	695	777	142	67
v/c Ratio	0.18	0.32	0.37	0.32	0.29
Control Delay	6.4	5.4	5.5	12.3	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.4	5.4	5.5	12.3	9.1
Queue Length 50th (ft)	6	36	41	8	0
Queue Length 95th (ft)	22	66	74	25	25
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	390	2197	2186	1880	839
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.17	0.32	0.36	0.08	0.08

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St

11/25/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	62	639	684	31	78	114
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.94	0.85
Flt Protected	0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	1615	3420	3398		3186	1392
Flt Permitted	0.36	1.00	1.00		0.97	1.00
Satd. Flow (perm)	608	3420	3398		3186	1392
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	695	743	34	85	124
RTOR Reduction (vph)	0	0	4	0	52	61
Lane Group Flow (vph)	67	695	773	0	90	6
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	23.1	23.1	23.1		5.2	5.2
Effective Green, g (s)	21.1	21.1	21.1		3.2	3.2
Actuated g/C Ratio	0.57	0.57	0.57		0.09	0.09
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	344	1935	1922		273	119
v/s Ratio Prot		0.20	c0.23		c0.03	
v/s Ratio Perm	0.11					0.00
v/c Ratio	0.19	0.36	0.40		0.33	0.05
Uniform Delay, d1	4.0	4.4	4.6		16.0	15.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.1	0.1		0.7	0.2
Delay (s)	4.2	4.5	4.7		16.8	15.8
Level of Service	A	A	A		B	B
Approach Delay (s)		4.5	4.7		16.5	
Approach LOS		A	A		B	

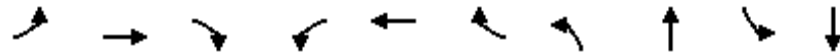
Intersection Summary

HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	37.3	Sum of lost time (s)	13.0
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

11/25/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	241	383	258	166	366	119	243	1139	121	1208
v/c Ratio	1.03	0.53	0.56	0.72	0.58	0.31	0.80	0.67	0.47	0.86
Control Delay	94.3	23.9	12.0	37.8	25.3	6.6	42.6	20.3	22.1	27.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	94.3	23.9	12.0	37.8	25.3	6.6	42.6	20.3	22.1	27.1
Queue Length 50th (ft)	~83	68	24	45	64	0	45	135	21	138
Queue Length 95th (ft)	#153	92	74	74	88	32	#223	#187	#83	#212
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	233	969	563	229	969	519	304	1699	260	1418
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	1.03	0.40	0.46	0.72	0.38	0.23	0.80	0.67	0.47	0.85

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.

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗↗	↘	↘	↗↗	↘	↘	↗↗↗		↘	↗↗↗	
Volume (vph)	217	345	232	149	329	107	219	925	100	109	878	209
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0		5.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3420	1530	1615	3420	1530	1615	4842		1615	4772	
Flt Permitted	0.50	1.00	1.00	0.52	1.00	1.00	0.20	1.00		0.25	1.00	
Satd. Flow (perm)	850	3420	1530	892	3420	1530	347	4842		422	4772	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	241	383	258	166	366	119	243	1028	111	121	976	232
RTOR Reduction (vph)	0	0	143	0	0	96	0	20	0	0	67	0
Lane Group Flow (vph)	241	383	115	166	366	23	243	1119	0	121	1141	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	17.8	14.6	14.6	16.2	13.8	13.8	30.0	21.6		23.5	18.1	
Effective Green, g (s)	13.8	12.6	12.6	12.2	11.8	11.8	26.5	19.6		19.5	16.1	
Actuated g/C Ratio	0.23	0.21	0.21	0.20	0.20	0.20	0.44	0.33		0.32	0.27	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	211	718	321	186	673	301	299	1582		205	1280	
v/s Ratio Prot	c0.02	0.11		0.01	0.11		c0.09	0.23		0.03	0.24	
v/s Ratio Perm	c0.24		0.08	0.18		0.02	c0.27			0.16		
v/c Ratio	1.14	0.53	0.36	0.89	0.54	0.08	0.81	0.71		0.59	0.89	
Uniform Delay, d1	23.0	21.1	20.2	23.1	21.7	19.7	12.4	17.7		14.8	21.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	105.5	0.8	0.7	37.4	0.9	0.1	15.4	2.7		4.5	8.1	
Delay (s)	128.5	21.9	20.9	60.4	22.6	19.8	27.8	20.4		19.3	29.2	
Level of Service	F	C	C	E	C	B	C	C		B	C	
Approach Delay (s)		50.7			31.7			21.7			28.3	
Approach LOS		D			C			C			C	

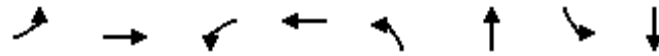
Intersection Summary

HCM Average Control Delay	31.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Waterman & E Orange Show

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	258	738	135	514	240	977	142	1305
v/c Ratio	1.05	0.91	0.94	0.82	0.96	0.69	0.58	1.04
Control Delay	103.4	56.9	97.1	56.3	79.9	31.7	24.1	71.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	103.4	56.9	97.1	56.3	79.9	31.7	24.1	71.7
Queue Length 50th (ft)	~161	269	73	194	139	320	53	~574
Queue Length 95th (ft)	#311	#361	#172	254	#309	416	88	#700
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	246	873	143	694	250	1410	303	1257
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.05	0.85	0.94	0.74	0.96	0.69	0.47	1.04

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.

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	230	457	200	120	396	61	214	747	123	126	894	268
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	7.0		6.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3264		1615	3351		1615	3348		1615	3302	
Flt Permitted	0.20	1.00		0.18	1.00		0.08	1.00		0.19	1.00	
Satd. Flow (perm)	333	3264		313	3351		138	3348		326	3302	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	258	513	225	135	445	69	240	839	138	142	1004	301
RTOR Reduction (vph)	0	42	0	0	11	0	0	10	0	0	23	0
Lane Group Flow (vph)	258	696	0	135	503	0	240	967	0	142	1282	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	41.7	29.7		31.7	23.7		66.0	51.2		56.8	46.0	
Effective Green, g (s)	39.7	27.7		27.7	21.7		63.2	49.2		52.8	44.0	
Actuated g/C Ratio	0.34	0.24		0.24	0.18		0.54	0.42		0.45	0.37	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	243	768		140	618		250	1400		243	1234	
v/s Ratio Prot	c0.11	0.21		0.05	0.15		c0.11	c0.29		0.04	c0.39	
v/s Ratio Perm	c0.25			0.18			0.40			0.22		
v/c Ratio	1.06	0.91		0.96	0.81		0.96	0.69		0.58	1.04	
Uniform Delay, d1	34.1	43.7		41.7	46.1		36.1	28.0		21.0	36.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	75.0	14.2		64.7	8.1		45.2	1.5		3.6	36.3	
Delay (s)	109.1	58.0		106.4	54.2		81.4	29.5		24.5	73.1	
Level of Service	F	E		F	D		F	C		C	E	
Approach Delay (s)		71.2			65.0			39.7			68.3	
Approach LOS		E			E			D			E	

Intersection Summary

HCM Average Control Delay	60.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	117.7	Sum of lost time (s)	26.0
Intersection Capacity Utilization	97.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

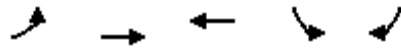
11/25/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	1	2	18	1083	1211	3
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)	1	2	20	1177	1316	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					87	
pX, platoon unblocked	0.97	0.97	0.97			
vC, conflicting volume	1946	660	1320			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1911	584	1265			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	96			
cM capacity (veh/h)	57	446	539			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	3	20	589	589	878	442
Volume Left	1	20	0	0	0	0
Volume Right	2	0	0	0	0	3
cSH	136	539	1700	1700	1700	1700
Volume to Capacity	0.02	0.04	0.35	0.35	0.52	0.26
Queue Length 95th (ft)	2	3	0	0	0	0
Control Delay (s)	32.0	11.9	0.0	0.0	0.0	0.0
Lane LOS	D	B				
Approach Delay (s)	32.0	0.2			0.0	
Approach LOS	D					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			45.4%		ICU Level of Service	A
Analysis Period (min)			15			

Queues
1: Mill St

12/16/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	65	474	418	125	56
v/c Ratio	0.14	0.25	0.22	0.26	0.23
Control Delay	6.5	5.9	5.5	11.4	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.5	5.9	5.5	11.4	7.3
Queue Length 50th (ft)	6	22	18	5	0
Queue Length 95th (ft)	19	44	37	22	19
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	634	2515	2490	2205	958
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.10	0.19	0.17	0.06	0.06

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St

12/16/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷↷	↷↶		↶↶↶	↶
Volume (vph)	62	450	365	32	93	79
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.97	0.85
Flt Protected	0.95	1.00	1.00		0.96	1.00
Satd. Flow (prot)	1615	3420	3378		3251	1392
Flt Permitted	0.51	1.00	1.00		0.96	1.00
Satd. Flow (perm)	863	3420	3378		3251	1392
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	65	474	384	34	98	83
RTOR Reduction (vph)	0	0	10	0	24	50
Lane Group Flow (vph)	65	474	408	0	101	6
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	17.9	17.9	17.9		5.4	5.4
Effective Green, g (s)	15.9	15.9	15.9		3.4	3.4
Actuated g/C Ratio	0.49	0.49	0.49		0.11	0.11
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	425	1684	1663		342	147
v/s Ratio Prot		c0.14	0.12		c0.03	
v/s Ratio Perm	0.08					0.00
v/c Ratio	0.15	0.28	0.25		0.29	0.04
Uniform Delay, d1	4.5	4.8	4.7		13.3	13.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.1	0.1		0.5	0.1
Delay (s)	4.7	4.9	4.8		13.8	13.1
Level of Service	A	A	A		B	B
Approach Delay (s)		4.9	4.8		13.6	
Approach LOS		A	A		B	

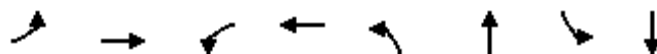
Intersection Summary

HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	32.3	Sum of lost time (s)	13.0
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

2: Waterman Ave & 9th St

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	52	256	101	326	52	558	84	892
v/c Ratio	0.23	0.30	0.41	0.38	0.28	0.44	0.30	0.70
Control Delay	16.4	11.6	19.7	12.3	13.6	10.1	12.3	13.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.4	11.6	19.7	12.3	13.6	10.1	12.3	13.8
Queue Length 50th (ft)	9	18	18	24	7	39	11	73
Queue Length 95th (ft)	33	46	57	57	31	86	42	153
Internal Link Dist (ft)		852		841		893		996
Turn Bay Length (ft)	130		100		50		75	
Base Capacity (vph)	459	1639	493	1654	268	1822	405	1829
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.16	0.20	0.20	0.19	0.31	0.21	0.49

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: Waterman Ave & 9th St

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	49	192	51	96	248	62	49	473	57	80	796	51
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	7.5	7.5		7.4	7.4		7.5	7.5		7.5	7.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.97		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3312		1615	3318		1615	3365		1615	3389	
Flt Permitted	0.55	1.00		0.59	1.00		0.29	1.00		0.44	1.00	
Satd. Flow (perm)	943	3312		1009	3318		497	3365		753	3389	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	52	202	54	101	261	65	52	498	60	84	838	54
RTOR Reduction (vph)	0	41	0	0	46	0	0	17	0	0	9	0
Lane Group Flow (vph)	52	215	0	101	280	0	52	541	0	84	883	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	11.8	11.8		11.9	11.9		17.1	17.1		17.1	17.1	
Effective Green, g (s)	9.8	9.8		9.9	9.9		15.1	15.1		15.1	15.1	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.38	0.38		0.38	0.38	
Clearance Time (s)	5.5	5.5		5.4	5.4		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	232	813		250	823		188	1273		285	1283	
v/s Ratio Prot		0.06			0.08			0.16			c0.26	
v/s Ratio Perm	0.06			c0.10			0.10			0.11		
v/c Ratio	0.22	0.26		0.40	0.34		0.28	0.43		0.29	0.69	
Uniform Delay, d1	12.0	12.1		12.5	12.3		8.6	9.2		8.7	10.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.2		1.1	0.2		0.8	0.2		0.6	1.6	
Delay (s)	12.5	12.3		13.6	12.6		9.4	9.4		9.3	12.0	
Level of Service	B	B		B	B		A	A		A	B	
Approach Delay (s)		12.4			12.8			9.4			11.7	
Approach LOS		B			B			A			B	

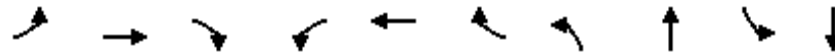
Intersection Summary

HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	39.9	Sum of lost time (s)	14.9
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	97	324	134	173	334	98	100	744	88	744
v/c Ratio	0.44	0.40	0.29	0.78	0.41	0.22	0.29	0.36	0.25	0.40
Control Delay	22.7	18.1	5.1	42.1	18.3	5.2	11.4	12.7	10.8	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.7	18.1	5.1	42.1	18.3	5.2	11.4	12.7	10.8	14.2
Queue Length 50th (ft)	26	45	0	51	47	0	15	65	13	68
Queue Length 95th (ft)	58	70	30	#118	71	26	39	95	35	98
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	291	1066	569	294	1066	545	350	2078	352	1915
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	0.33	0.30	0.24	0.59	0.31	0.18	0.29	0.36	0.25	0.39

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗↗	↘	↘	↗↗	↘	↘	↗↗↗		↘	↗↗↗	
Volume (vph)	92	308	127	164	317	93	95	605	102	84	637	69
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	7.0		5.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3420	1530	1615	3420	1530	1615	4808		1615	4842	
Flt Permitted	0.55	1.00	1.00	0.56	1.00	1.00	0.34	1.00		0.36	1.00	
Satd. Flow (perm)	936	3420	1530	945	3420	1530	571	4808		608	4842	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	97	324	134	173	334	98	100	637	107	88	671	73
RTOR Reduction (vph)	0	0	102	0	0	75	0	37	0	0	22	0
Lane Group Flow (vph)	97	324	32	173	334	23	100	707	0	88	722	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	15.0	15.0	15.0	15.0	15.0	15.0	28.3	23.7		25.7	22.4	
Effective Green, g (s)	13.0	13.0	13.0	13.0	13.0	13.0	24.3	21.7		21.7	20.4	
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24	0.24	0.44	0.39		0.39	0.37	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	221	808	362	223	808	362	302	1897		264	1796	
v/s Ratio Prot		0.09			0.10		c0.02	0.15		0.01	c0.15	
v/s Ratio Perm	0.10		0.02	c0.18		0.02	0.13			0.12		
v/c Ratio	0.44	0.40	0.09	0.78	0.41	0.06	0.33	0.37		0.33	0.40	
Uniform Delay, d1	17.9	17.7	16.4	19.6	17.8	16.3	9.2	11.8		10.8	12.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.4	0.3	0.1	15.5	0.3	0.1	0.6	0.6		0.7	0.7	
Delay (s)	19.3	18.0	16.5	35.1	18.1	16.4	9.8	12.4		11.5	13.5	
Level of Service	B	B	B	D	B	B	A	B		B	B	
Approach Delay (s)		17.9			22.7			12.1			13.3	
Approach LOS		B			C			B			B	

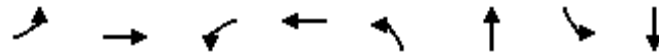
Intersection Summary

HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Waterman & E Orange Show

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	186	739	98	315	80	692	77	1045
v/c Ratio	0.68	0.69	0.78	0.32	0.38	0.58	0.24	0.85
Control Delay	35.6	17.9	64.1	17.4	15.5	20.3	11.7	28.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.6	17.9	64.1	17.4	15.5	20.3	11.7	28.3
Queue Length 50th (ft)	71	101	39	49	16	124	16	210
Queue Length 95th (ft)	139	157	#115	79	41	192	39	#352
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	406	1494	187	1440	214	1447	330	1502
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.49	0.52	0.22	0.37	0.48	0.23	0.70

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	177	410	292	93	249	50	76	611	47	73	886	106
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.94		1.00	0.97		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3207		1615	3334		1615	3384		1615	3365	
Flt Permitted	0.56	1.00		0.26	1.00		0.18	1.00		0.32	1.00	
Satd. Flow (perm)	953	3207		439	3334		300	3384		548	3365	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	186	432	307	98	262	53	80	643	49	77	933	112
RTOR Reduction (vph)	0	158	0	0	24	0	0	7	0	0	12	0
Lane Group Flow (vph)	186	581	0	98	291	0	80	685	0	77	1033	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	20.3	20.3		20.3	20.3		29.1	24.7		30.1	25.2	
Effective Green, g (s)	18.3	18.3		18.3	18.3		25.1	22.7		26.1	23.2	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.39	0.36		0.41	0.36	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	273	918		126	955		167	1202		272	1222	
v/s Ratio Prot		0.18			0.09		c0.02	0.20		0.01	c0.31	
v/s Ratio Perm	0.20			c0.22			0.17			0.10		
v/c Ratio	0.68	0.63		0.78	0.30		0.48	0.57		0.28	0.85	
Uniform Delay, d1	20.2	19.9		20.9	17.8		13.4	16.7		11.9	18.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.8	1.4		25.4	0.2		2.2	0.6		0.6	5.5	
Delay (s)	27.0	21.3		46.4	18.0		15.5	17.3		12.5	24.2	
Level of Service	C	C		D	B		B	B		B	C	
Approach Delay (s)		22.5			24.7			17.1			23.4	
Approach LOS		C			C			B			C	

Intersection Summary

HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	63.9	Sum of lost time (s)	13.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	4	3	4	735	1082	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	4	3	4	774	1139	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					745	
pX, platoon unblocked						
vC, conflicting volume	1536	572	1143			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1536	572	1143			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	99			
cM capacity (veh/h)	108	469	619			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	7	4	387	387	759	384
Volume Left	4	4	0	0	0	0
Volume Right	3	0	0	0	0	4
cSH	161	619	1700	1700	1700	1700
Volume to Capacity	0.05	0.01	0.23	0.23	0.45	0.23
Queue Length 95th (ft)	4	1	0	0	0	0
Control Delay (s)	28.4	10.9	0.0	0.0	0.0	0.0
Lane LOS	D	B				
Approach Delay (s)	28.4	0.1			0.0	
Approach LOS	D					

Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			41.7%		ICU Level of Service	A
Analysis Period (min)			15			

Queues

6: Waterman & Washington

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	603	1197	13	613	418	5	265	266	216
v/c Ratio	1.02	0.63	0.11	0.59	0.55	0.02	0.71	0.69	0.35
Control Delay	76.6	16.1	28.8	29.7	6.5	20.0	33.8	32.7	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.6	16.1	28.8	29.7	6.5	20.0	33.8	32.7	4.0
Queue Length 50th (ft)	~161	199	5	135	0	2	122	122	0
Queue Length 95th (ft)	#268	355	23	#276	81	7	170	168	37
Internal Link Dist (ft)		433		239		527		537	
Turn Bay Length (ft)	225		100		200		125		
Base Capacity (vph)	590	1899	122	1044	758	735	533	548	791
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.02	0.63	0.11	0.59	0.55	0.01	0.50	0.49	0.27





























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.

HCM Signalized Intersection Capacity Analysis

6: Waterman & Washington

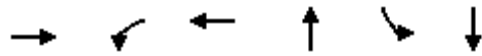
12/16/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 	 		 	 			 		 	 		
Volume (vph)	573	1135	2	12	582	397	2	2	1	494	10	205	
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1800	1800	1800	1700	1800	1800	
Total Lost time (s)	4.0	6.0		6.0	6.0	6.0		4.0		5.0	5.0	5.0	
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00		1.00		0.95	0.95	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.97		1.00	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98		0.95	0.95	1.00	
Satd. Flow (prot)	2949	3419		1615	3420	1530		1717		1534	1632	1530	
Flt Permitted	0.95	1.00		0.24	1.00	1.00		0.93		0.75	0.73	1.00	
Satd. Flow (perm)	2949	3419		400	3420	1530		1632		1218	1251	1530	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	603	1195	2	13	613	418	2	2	1	520	11	216	
RTOR Reduction (vph)	0	0	0	0	0	291	0	1	0	0	0	150	
Lane Group Flow (vph)	603	1197	0	13	613	127	0	4	0	265	266	66	
Turn Type	Prot	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm	
Protected Phases	5	2			6			8			4		
Permitted Phases				6		6	8			4		4	
Actuated Green, G (s)	16.0	44.4		24.4	24.4	24.4		25.6		24.6	24.6	24.6	
Effective Green, g (s)	16.0	44.4		24.4	24.4	24.4		25.6		24.6	24.6	24.6	
Actuated g/C Ratio	0.20	0.55		0.30	0.30	0.30		0.32		0.31	0.31	0.31	
Clearance Time (s)	4.0	6.0		6.0	6.0	6.0		4.0		5.0	5.0	5.0	
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)	590	1898		122	1043	467		522		375	385	470	
v/s Ratio Prot	c0.20	c0.35			0.18					c0.22	0.21	0.04	
v/s Ratio Perm				0.03		0.08		0.00			0.21	0.04	
v/c Ratio	1.02	0.63		0.11	0.59	0.27		0.01		0.71	0.69	0.14	
Uniform Delay, d1	32.0	12.2		20.0	23.5	21.1		18.5		24.5	24.4	20.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2	42.7	1.6		1.8	2.4	1.4		0.0		6.0	5.3	0.1	
Delay (s)	74.7	13.8		21.7	26.0	22.5		18.6		30.5	29.6	20.2	
Level of Service	E	B		C	C	C		B		C	C	C	
Approach Delay (s)		34.2			24.5			18.6			27.2		
Approach LOS		C			C			B			C		
Intersection Summary													
HCM Average Control Delay			29.9									HCM Level of Service	C
HCM Volume to Capacity ratio			0.71										
Actuated Cycle Length (s)			80.0									Sum of lost time (s)	9.0
Intersection Capacity Utilization			73.5%									ICU Level of Service	D
Analysis Period (min)			15										
c	Critical Lane Group												

Queues

7: S Tippecanoe & E Victoria

12/16/2013



Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	2	79	41	584	25	1045
v/c Ratio	0.01	0.36	0.17	0.23	0.05	0.41
Control Delay	15.0	23.6	9.1	4.6	5.5	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.0	23.6	9.1	4.6	5.5	5.7
Queue Length 50th (ft)	0	22	0	35	3	76
Queue Length 95th (ft)	5	49	19	68	12	142
Internal Link Dist (ft)	87		770	198		507
Turn Bay Length (ft)		100			115	
Base Capacity (vph)	441	531	519	2523	544	2534
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.15	0.08	0.23	0.05	0.41

Intersection Summary

HCM Signalized Intersection Capacity Analysis

7: S Tippecanoe & E Victoria

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↖	↗		↖	↕		↖	↕	
Volume (vph)	1	0	1	75	1	38	0	536	19	24	991	2
Ideal Flow (vphpl)	1800	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.0		6.0	6.0			7.5		7.5	7.5	
Lane Util. Factor		1.00		1.00	1.00			0.95		1.00	0.95	
Frt		0.93		1.00	0.85			0.99		1.00	1.00	
Flt Protected		0.98		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1638		1615	1537			3402		1615	3419	
Flt Permitted		0.82		0.98	1.00			1.00		0.43	1.00	
Satd. Flow (perm)		1378		1659	1537			3402		734	3419	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1	0	1	79	1	40	0	564	20	25	1043	2
RTOR Reduction (vph)	0	1	0	0	37	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	1	0	79	4	0	0	581	0	25	1045	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.1		6.1	6.1			34.4		34.4	34.4	
Effective Green, g (s)		4.1		4.1	4.1			32.4		32.4	32.4	
Actuated g/C Ratio		0.08		0.08	0.08			0.65		0.65	0.65	
Clearance Time (s)		4.0		4.0	4.0			5.5		5.5	5.5	
Vehicle Extension (s)		3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		113		136	126			2204		476	2216	
v/s Ratio Prot					0.00			0.17			c0.31	
v/s Ratio Perm		0.00		c0.05						0.03		
v/c Ratio		0.01		0.58	0.03			0.26		0.05	0.47	
Uniform Delay, d1		21.1		22.1	21.1			3.7		3.2	4.5	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.0		6.2	0.1			0.3		0.2	0.7	
Delay (s)		21.1		28.3	21.2			4.0		3.4	5.2	
Level of Service		C		C	C			A		A	A	
Approach Delay (s)		21.1			25.9			4.0			5.1	
Approach LOS		C			C			A			A	

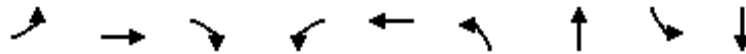
Intersection Summary

HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	62	70	97	111	219	579	766	71	763
v/c Ratio	0.48	0.39	0.31	0.60	0.75	0.84	0.24	0.35	0.46
Control Delay	36.9	29.9	8.4	38.6	37.1	38.1	3.6	26.4	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.9	29.9	8.4	38.6	37.1	38.1	3.6	26.4	18.7
Queue Length 50th (ft)	24	26	0	41	69	119	19	21	83
Queue Length 95th (ft)	56	58	33	82	126	#160	52	#71	131
Internal Link Dist (ft)		517			1151		774		1167
Turn Bay Length (ft)	210			85		260		100	
Base Capacity (vph)	180	253	406	260	397	777	3235	200	1653
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.28	0.24	0.43	0.55	0.75	0.24	0.35	0.46

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖	↖	↖	↖		↖↖	↖↖↖		↖	↖↖↖	
Volume (vph)	88	37	92	105	135	73	550	677	50	67	647	78
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1600	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		0.97	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	0.98	
Flt Protected	0.95	0.98	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1534	1673	1530	1615	1705		2949	4863		1615	4835	
Flt Permitted	0.52	0.69	1.00	0.71	1.00		0.95	1.00		0.35	1.00	
Satd. Flow (perm)	838	1174	1530	1205	1705		2949	4863		594	4835	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	93	39	97	111	142	77	579	713	53	71	681	82
RTOR Reduction (vph)	0	0	82	0	32	0	0	11	0	0	21	0
Lane Group Flow (vph)	62	70	15	111	187	0	579	755	0	71	742	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)	11.9	11.9	11.9	11.9	11.9		17.1	45.1		24.0	24.0	
Effective Green, g (s)	9.9	9.9	9.9	9.9	9.9		15.1	43.1		22.0	22.0	
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15		0.23	0.66		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)	128	179	233	184	260		685	3225		201	1636	
v/s Ratio Prot					c0.11		c0.20	0.16			c0.15	
v/s Ratio Perm	0.07	0.06	0.01	0.09						0.12		
v/c Ratio	0.48	0.39	0.06	0.60	0.72		0.85	0.23		0.35	0.45	
Uniform Delay, d1	25.2	24.8	23.6	25.7	26.2		23.8	4.4		16.2	16.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.11	0.74		1.00	1.00	
Incremental Delay, d2	2.9	1.4	0.1	5.5	9.1		8.9	0.2		4.8	0.9	
Delay (s)	28.1	26.2	23.7	31.2	35.4		35.5	3.4		21.0	17.7	
Level of Service	C	C	C	C	D		D	A		C	B	
Approach Delay (s)		25.7			34.0			17.2			18.0	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection has too many lanes per leg.

HCM All-Way analysis is limited to two lanes per leg.

Channelized right turn lanes are not counted.

Queues

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

12/16/2013



Lane Group	EBL	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	242	450	908	119	903
v/c Ratio	0.81	0.66	0.59	0.48	0.44
Control Delay	45.4	21.7	15.5	27.9	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	45.4	21.7	15.5	27.9	15.0
Queue Length 50th (ft)	100	64	134	18	194
Queue Length 95th (ft)	#172	103	200	m38	m188
Internal Link Dist (ft)		1164	1201		347
Turn Bay Length (ft)	275				
Base Capacity (vph)	384	842	1574	247	2044
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.63	0.53	0.58	0.48	0.44

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.

HCM Signalized Intersection Capacity Analysis

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↔						↕		↗	↕	↘
Volume (vph)	353	0	304	0	0	0	0	643	219	113	858	0
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	6.0						7.0		6.0	7.0	
Lane Util. Factor	0.91	0.91						0.95		0.97	0.95	
Frt	1.00	0.89						0.96		1.00	1.00	
Flt Protected	0.95	0.99						1.00		0.95	1.00	
Satd. Flow (prot)	1470	2885						3289		3133	3420	
Flt Permitted	0.95	0.99						1.00		0.95	1.00	
Satd. Flow (perm)	1470	2885						3289		3133	3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	372	0	320	0	0	0	0	677	231	119	903	0
RTOR Reduction (vph)	0	95	0	0	0	0	0	47	0	0	0	0
Lane Group Flow (vph)	242	355	0	0	0	0	0	861	0	119	903	0
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	15.2	15.2						30.9		5.9	40.8	
Effective Green, g (s)	13.2	13.2						28.9		3.9	38.8	
Actuated g/C Ratio	0.20	0.20						0.44		0.06	0.60	
Clearance Time (s)	4.0	4.0						5.0		4.0	5.0	
Vehicle Extension (s)	2.0	2.0						2.0		3.0	2.0	
Lane Grp Cap (vph)	299	586						1462		188	2041	
v/s Ratio Prot								c0.26		0.04	c0.26	
v/s Ratio Perm	c0.16	0.12										
v/c Ratio	0.81	0.61						0.59		0.63	0.44	
Uniform Delay, d1	24.7	23.5						13.6		29.9	7.2	
Progression Factor	1.00	1.00						1.00		0.74	1.81	
Incremental Delay, d2	14.1	1.2						1.7		4.7	0.5	
Delay (s)	38.8	24.8						15.3		26.9	13.4	
Level of Service	D	C						B		C	B	
Approach Delay (s)		29.7			0.0			15.3			15.0	
Approach LOS		C			A			B			B	

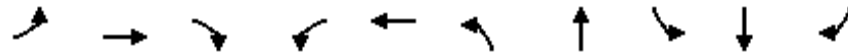
Intersection Summary

HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

11: Anderson & Academy

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	305	157	252	94	318	199	513	31	1168	442
v/c Ratio	0.93	0.27	0.40	0.66	0.71	0.83	0.29	0.10	0.89	0.52
Control Delay	55.7	15.2	6.7	49.2	31.3	40.3	7.6	12.1	27.3	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.7	15.2	6.7	49.2	31.3	40.3	7.6	12.1	27.3	4.0
Queue Length 50th (ft)	81	37	14	30	48	32	43	6	181	0
Queue Length 95th (ft)	#178	75	58	#92	#98	#102	67	21	#301	47
Internal Link Dist (ft)		21			32		1375		514	
Turn Bay Length (ft)	75			100		100		100		
Base Capacity (vph)	329	589	628	142	451	241	1799	300	1306	857
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	0.93	0.27	0.40	0.66	0.71	0.83	0.29	0.10	0.89	0.52

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

11: Anderson & Academy

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	290	149	239	89	259	43	189	471	16	29	1110	420
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	4.0	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	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1615	1800	1530	1615	3347		1615	3403		1615	3420	1530
Flt Permitted	0.36	1.00	1.00	0.66	1.00		0.16	1.00		0.46	1.00	1.00
Satd. Flow (perm)	618	1800	1530	1118	3347		272	3403		787	3420	1530
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	305	157	252	94	273	45	199	496	17	31	1168	442
RTOR Reduction (vph)	0	0	127	0	24	0	0	4	0	0	0	273
Lane Group Flow (vph)	305	157	125	94	294	0	199	509	0	31	1168	169
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)	18.0	18.0	18.0	7.0	7.0		29.0	29.0		21.0	21.0	21.0
Effective Green, g (s)	18.0	18.0	18.0	7.0	7.0		29.0	29.0		21.0	21.0	21.0
Actuated g/C Ratio	0.33	0.33	0.33	0.13	0.13		0.53	0.53		0.38	0.38	0.38
Clearance Time (s)	4.0	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	3.0
Lane Grp Cap (vph)	329	589	501	142	426		241	1794		300	1306	584
v/s Ratio Prot	c0.12	0.09			0.09		c0.06	0.15			0.34	
v/s Ratio Perm	c0.19		0.08	0.08			c0.38			0.04		0.11
v/c Ratio	0.93	0.27	0.25	0.66	0.69		0.83	0.28		0.10	0.89	0.29
Uniform Delay, d1	16.6	13.6	13.6	22.9	23.0		10.6	7.2		10.9	16.0	11.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	31.1	0.2	0.3	11.0	4.6		20.1	0.1		0.2	8.2	0.3
Delay (s)	47.7	13.9	13.8	33.9	27.6		30.7	7.3		11.1	24.2	12.1
Level of Service	D	B	B	C	C		C	A		B	C	B
Approach Delay (s)		28.3			29.0			13.8			20.7	
Approach LOS		C			C			B			C	

Intersection Summary

HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

12: California & WB I-10 Ramps

12/16/2013



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	535	438	572	782	268	249
v/c Ratio	0.91	0.74	0.91	0.43	0.26	0.48
Control Delay	48.6	25.8	42.9	20.3	32.4	8.2
Queue Delay	1.3	0.0	6.9	0.5	0.0	0.0
Total Delay	49.9	25.8	49.8	20.8	32.4	8.2
Queue Length 50th (ft)	275	142	301	194	49	0
Queue Length 95th (ft)	#458	256	m#396	m225	75	64
Internal Link Dist (ft)	1118			276	113	
Turn Bay Length (ft)						
Base Capacity (vph)	630	623	646	1825	1016	514
Starvation Cap Reductn	0	0	50	581	0	0
Spillback Cap Reductn	21	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.70	0.96	0.63	0.26	0.48

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.

HCM Signalized Intersection Capacity Analysis

12: California & WB I-10 Ramps

12/16/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	0	0	0	488	20	416	543	743	0	0	255	237	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800	
Total Lost time (s)					5.0	7.0	6.0	6.0			5.0	5.0	
Lane Util. Factor					1.00	1.00	1.00	0.95			0.91	1.00	
Frt					1.00	0.85	1.00	1.00			1.00	0.85	
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00	
Satd. Flow (prot)					1717	1530	1615	3420			4914	1530	
Flt Permitted					0.95	1.00	0.43	1.00			1.00	1.00	
Satd. Flow (perm)					1717	1530	735	3420			4914	1530	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	0	0	0	514	21	438	572	782	0	0	268	249	
RTOR Reduction (vph)	0	0	0	0	0	99	0	0	0	0	0	198	
Lane Group Flow (vph)	0	0	0	0	535	339	572	782	0	0	268	51	
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm	
Protected Phases					8		1	6			2		
Permitted Phases				8		8	6					2	
Actuated Green, G (s)					31.0	31.0	50.0	50.0			20.6	20.6	
Effective Green, g (s)					31.0	29.0	48.0	48.0			18.6	18.6	
Actuated g/C Ratio					0.34	0.32	0.53	0.53			0.21	0.21	
Clearance Time (s)					5.0	5.0	4.0	4.0			3.0	3.0	
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0	
Lane Grp Cap (vph)					591	493	631	1824			1016	316	
v/s Ratio Prot							c0.25	0.23			0.05		
v/s Ratio Perm					0.31	0.22	c0.24					0.03	
v/c Ratio					0.91	0.69	0.91	0.43			0.26	0.16	
Uniform Delay, d1					28.1	26.6	15.7	12.7			30.0	29.3	
Progression Factor					1.00	1.00	1.52	1.48			1.00	1.00	
Incremental Delay, d2					17.0	3.2	14.5	0.6			0.6	1.1	
Delay (s)					45.1	29.7	38.3	19.4			30.6	30.4	
Level of Service					D	C	D	B			C	C	
Approach Delay (s)		0.0			38.2			27.4			30.5		
Approach LOS		A			D			C			C		
Intersection Summary													
HCM Average Control Delay			31.7		HCM Level of Service						C		
HCM Volume to Capacity ratio			0.88										
Actuated Cycle Length (s)			90.0		Sum of lost time (s)					11.0			
Intersection Capacity Utilization			92.1%		ICU Level of Service					F			
Analysis Period (min)			15										
c Critical Lane Group													

Queues

13: EB I-10 Ramps & California

12/16/2013



Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	495	487	738	337	85	792
v/c Ratio	1.08	0.94	0.25	0.32	0.23	0.39
Control Delay	100.0	47.6	9.0	1.8	15.1	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	2.8
Total Delay	100.0	47.6	9.0	1.8	15.1	17.9
Queue Length 50th (ft)	~318	176	67	0	27	179
Queue Length 95th (ft)	#507	#379	87	32	m58	m277
Internal Link Dist (ft)	1294		46			276
Turn Bay Length (ft)						
Base Capacity (vph)	457	519	2921	1046	364	2033
Starvation Cap Reductn	0	0	0	0	0	1092
Spillback Cap Reductn	0	0	352	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.08	0.94	0.29	0.32	0.23	0.84






















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.

HCM Signalized Intersection Capacity Analysis

13: EB I-10 Ramps & California

12/16/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations								  			 		
Volume (vph)	469	1	463	0	0	0	0	701	320	81	752	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800	
Lane Width	12	12	8	12	12	12	12	12	12	12	12	12	
Total Lost time (s)		6.0	4.0					6.5	6.5	6.5	6.5		
Lane Util. Factor		1.00	1.00					0.91	1.00	1.00	0.95		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		0.95	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		1714	1326					4914	1530	1615	3420		
Flt Permitted		0.95	1.00					1.00	1.00	0.36	1.00		
Satd. Flow (perm)		1714	1326					4914	1530	611	3420		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	494	1	487	0	0	0	0	738	337	85	792	0	
RTOR Reduction (vph)	0	0	136	0	0	0	0	0	137	0	0	0	
Lane Group Flow (vph)	0	495	351	0	0	0	0	738	200	85	792	0	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		4						2			6		
Permitted Phases	4		4						2	6			
Actuated Green, G (s)		26.0	26.0					55.5	55.5	55.5	55.5		
Effective Green, g (s)		24.0	26.0					53.5	53.5	53.5	53.5		
Actuated g/C Ratio		0.27	0.29					0.59	0.59	0.59	0.59		
Clearance Time (s)		4.0	4.0					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		2.0	2.0					2.0	2.0	2.0	2.0		
Lane Grp Cap (vph)		457	383					2921	910	363	2033		
v/s Ratio Prot								0.15			c0.23		
v/s Ratio Perm		0.29	0.26						0.13	0.14			
v/c Ratio		1.08	0.92					0.25	0.22	0.23	0.39		
Uniform Delay, d1		33.0	31.0					8.7	8.5	8.6	9.6		
Progression Factor		1.00	1.00					1.00	1.00	1.51	1.51		
Incremental Delay, d2		66.4	25.7					0.2	0.6	1.2	0.5		
Delay (s)		99.4	56.7					8.9	9.1	14.2	15.0		
Level of Service		F	E					A	A	B	B		
Approach Delay (s)		78.2			0.0			9.0			14.9		
Approach LOS		E			A			A			B		
Intersection Summary													
HCM Average Control Delay			33.9									HCM Level of Service	C
HCM Volume to Capacity ratio			0.60										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	12.5
Intersection Capacity Utilization			92.1%									ICU Level of Service	F
Analysis Period (min)			15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

14: California & Shopping Center

12/16/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	1	79	846	19	198	729
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	83	891	20	208	767
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)			652		447	
pX, platoon unblocked						
vC, conflicting volume	1701	307			911	
vC1, stage 1 conf vol	901					
vC2, stage 2 conf vol	801					
vCu, unblocked vol	1701	307			911	
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 %	100	88			72	
cM capacity (veh/h)	230	695			756	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	84	356	356	198	208	384	384
Volume Left	1	0	0	0	208	0	0
Volume Right	83	0	0	20	0	0	0
cSH	678	1700	1700	1700	756	1700	1700
Volume to Capacity	0.12	0.21	0.21	0.12	0.28	0.23	0.23
Queue Length 95th (ft)	11	0	0	0	28	0	0
Control Delay (s)	11.1	0.0	0.0	0.0	11.6	0.0	0.0
Lane LOS	B				B		
Approach Delay (s)	11.1	0.0			2.5		
Approach LOS	B						

Intersection Summary			
Average Delay		1.7	
Intersection Capacity Utilization	45.2%		ICU Level of Service A
Analysis Period (min)	15		

Queues

15: California/California & W Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	142	498	49	317	344	159	621	347	451
v/c Ratio	0.64	0.55	0.26	0.40	0.59	0.60	0.65	1.01	0.28
Control Delay	34.2	13.2	22.4	20.0	8.9	28.1	21.5	69.6	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.2	13.2	22.4	20.0	8.9	28.1	21.5	69.6	8.6
Queue Length 50th (ft)	40	40	13	44	12	41	88	-62	34
Queue Length 95th (ft)	109	94	43	92	79	119	173	#292	84
Internal Link Dist (ft)		1468		1180			268		572
Turn Bay Length (ft)	90		150		100			150	
Base Capacity (vph)	485	1737	407	1744	925	456	1731	344	2385
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.29	0.12	0.18	0.37	0.35	0.36	1.01	0.19

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.

HCM Signalized Intersection Capacity Analysis

15: California/California & W Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↗	↖	↗		↖	↗	
Volume (vph)	135	275	199	47	301	327	151	570	20	330	340	88
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	7.7	7.7		7.7	7.7	7.7	5.2	7.2		6.0	7.2	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3205		1615	3420	1530	1615	3403		1615	3314	
Flt Permitted	0.56	1.00		0.47	1.00	1.00	0.49	1.00		0.27	1.00	
Satd. Flow (perm)	951	3205		798	3420	1530	836	3403		464	3314	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	142	289	209	49	317	344	159	600	21	347	358	93
RTOR Reduction (vph)	0	159	0	0	0	225	0	4	0	0	28	0
Lane Group Flow (vph)	142	339	0	49	317	119	159	617	0	347	423	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		2			6			4		3	8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	15.3	15.3		15.3	15.3	15.3	18.0	18.0		29.4	29.4	
Effective Green, g (s)	13.3	13.3		13.3	13.3	13.3	18.0	16.0		27.4	27.4	
Actuated g/C Ratio	0.24	0.24		0.24	0.24	0.24	0.32	0.29		0.49	0.49	
Clearance Time (s)	5.7	5.7		5.7	5.7	5.7	5.2	5.2		4.0	5.2	
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)	227	767		191	818	366	271	979		340	1633	
v/s Ratio Prot		0.11			0.09			0.18		c0.10	0.13	
v/s Ratio Perm	c0.15			0.06		0.08	0.19			c0.40		
v/c Ratio	0.63	0.44		0.26	0.39	0.32	0.59	0.63		1.02	0.26	
Uniform Delay, d1	18.9	18.0		17.1	17.7	17.4	15.7	17.2		12.5	8.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.3	0.4		0.7	0.3	0.5	3.2	1.3		54.2	0.1	
Delay (s)	24.2	18.4		17.9	18.0	18.0	18.9	18.6		66.7	8.3	
Level of Service	C	B		B	B	B	B	B		E	A	
Approach Delay (s)		19.7			18.0			18.6			33.7	
Approach LOS		B			B			B			C	

Intersection Summary

HCM Average Control Delay	22.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	55.6	Sum of lost time (s)	13.7
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

16: Alabama St & WB I-10 Ramps

12/16/2013



Lane Group	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	1050	440	562	572
v/c Ratio	0.96	0.87	0.32	0.47
Control Delay	46.4	31.7	12.0	22.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	46.4	31.7	12.0	22.6
Queue Length 50th (ft)	241	130	81	72
Queue Length 95th (ft)	#369	#266	114	106
Internal Link Dist (ft)	765		376	271
Turn Bay Length (ft)				
Base Capacity (vph)	1092	522	1753	1205
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.96	0.84	0.32	0.47


















Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

16: Alabama St & WB I-10 Ramps

12/16/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	0	0	0	328	409	260	418	534	0	0	391	152	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800	
Total Lost time (s)					6.5		6.0	8.0			8.0		
Lane Util. Factor					*1.00		1.00	0.95			0.91		
Fr _t					0.96		1.00	1.00			0.96		
Fl _t Protected					0.98		0.95	1.00			1.00		
Satd. Flow (prot)					3403		1615	3420			4708		
Fl _t Permitted					0.98		0.32	1.00			1.00		
Satd. Flow (perm)					3403		550	3420			4708		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	0	0	0	345	431	274	440	562	0	0	412	160	
RTOR Reduction (vph)	0	0	0	0	49	0	0	0	0	0	86	0	
Lane Group Flow (vph)	0	0	0	0	1001	0	440	562	0	0	486	0	
Turn Type				Perm	NA		pm+pt	NA			NA		
Protected Phases					4		1	6			2		
Permitted Phases				4			6						
Actuated Green, G (s)					26.5		43.0	43.0			21.0		
Effective Green, g (s)					24.5		41.0	41.0			19.0		
Actuated g/C Ratio					0.31		0.51	0.51			0.24		
Clearance Time (s)					4.5		4.0	6.0			6.0		
Vehicle Extension (s)					3.0		3.0	3.0			3.0		
Lane Grp Cap (vph)					1042		495	1753			1118		
v/s Ratio Prot							c0.18	0.16			0.10		
v/s Ratio Perm					0.29		c0.28						
v/c Ratio					0.96		0.89	0.32			0.43		
Uniform Delay, d ₁					27.3		13.6	11.4			25.9		
Progression Factor					1.00		1.00	1.00			1.00		
Incremental Delay, d ₂					19.0		17.4	0.5			1.2		
Delay (s)					46.3		31.1	11.9			27.2		
Level of Service					D		C	B			C		
Approach Delay (s)		0.0			46.3			20.3			27.2		
Approach LOS		A			D			C			C		
Intersection Summary													
HCM Average Control Delay			32.2		HCM Level of Service						C		
HCM Volume to Capacity ratio			0.86										
Actuated Cycle Length (s)			80.0		Sum of lost time (s)					12.5			
Intersection Capacity Utilization			85.3%		ICU Level of Service					E			
Analysis Period (min)			15										
c Critical Lane Group													

Queues

17: EB I-10 Ramps & Alabama St

12/16/2013



Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	705	1010	62	682
v/c Ratio	0.90dr	0.48	0.24	0.37
Control Delay	26.7	14.3	10.0	9.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.7	14.3	10.0	9.7
Queue Length 50th (ft)	98	96	10	69
Queue Length 95th (ft)	143	148	28	118
Internal Link Dist (ft)	622	505		376
Turn Bay Length (ft)				
Base Capacity (vph)	1025	2083	257	1823
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.69	0.48	0.24	0.37



















Intersection Summary

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

HCM Signalized Intersection Capacity Analysis

17: EB I-10 Ramps & Alabama St

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	254	2	414	0	0	0	0	796	163	59	648	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800
Total Lost time (s)		7.0						8.0		6.0	7.0	
Lane Util. Factor		0.95						0.91		1.00	0.95	
Frt		0.91						0.97		1.00	1.00	
Flt Protected		0.98						1.00		0.95	1.00	
Satd. Flow (prot)		3045						4788		1615	3420	
Flt Permitted		0.98						1.00		0.21	1.00	
Satd. Flow (perm)		3045						4788		353	3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	267	2	436	0	0	0	0	838	172	62	682	0
RTOR Reduction (vph)	0	123	0	0	0	0	0	44	0	0	0	0
Lane Group Flow (vph)	0	582	0	0	0	0	0	966	0	62	682	0
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		8						6		5	2	
Permitted Phases	8									2		
Actuated Green, G (s)		16.0						26.0		34.0	34.0	
Effective Green, g (s)		14.0						24.0		32.0	32.0	
Actuated g/C Ratio		0.23						0.40		0.53	0.53	
Clearance Time (s)		5.0						6.0		4.0	5.0	
Vehicle Extension (s)		2.0						2.0		2.0	2.0	
Lane Grp Cap (vph)		711						1915		209	1824	
v/s Ratio Prot								c0.20		0.00	c0.20	
v/s Ratio Perm		0.19								0.15		
v/c Ratio		0.90dr						0.50		0.30	0.37	
Uniform Delay, d1		21.8						13.5		7.7	8.2	
Progression Factor		1.00						1.00		1.00	1.00	
Incremental Delay, d2		6.9						1.0		0.3	0.6	
Delay (s)		28.7						14.5		8.0	8.7	
Level of Service		C						B		A	A	
Approach Delay (s)		28.7			0.0			14.5			8.7	
Approach LOS		C			A			B			A	

Intersection Summary

HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

Queues

18: Alabama St & Industrial Park

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	66	51	21	81	29	959	80	856	123
v/c Ratio	0.24	0.17	0.08	0.28	0.07	0.28	0.24	0.36	0.11
Control Delay	15.9	9.1	14.3	10.7	6.0	4.7	8.2	5.5	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	9.1	14.3	10.7	6.0	4.7	8.2	5.5	2.8
Queue Length 50th (ft)	10	2	3	5	3	35	8	49	3
Queue Length 95th (ft)	39	23	17	34	12	65	33	96	20
Internal Link Dist (ft)		298		379		236		505	
Turn Bay Length (ft)	100		50		150		215		55
Base Capacity (vph)	1240	1176	1240	1180	404	3507	349	2453	1122
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.04	0.02	0.07	0.07	0.27	0.23	0.35	0.11

Intersection Summary

HCM Signalized Intersection Capacity Analysis

18: Alabama St & Industrial Park

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	63	12	36	20	20	57	28	876	35	76	813	117
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.2	6.2		6.2	6.2		6.2	6.2		6.2	6.2	6.2
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.89		1.00	0.89		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1615	1599		1615	1600		1615	4886		1615	3420	1530
Flt Permitted	1.00	1.00		1.00	1.00		0.33	1.00		0.29	1.00	1.00
Satd. Flow (perm)	1700	1599		1700	1600		562	4886		487	3420	1530
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	66	13	38	21	21	60	29	922	37	80	856	123
RTOR Reduction (vph)	0	35	0	0	43	0	0	5	0	0	0	37
Lane Group Flow (vph)	66	16	0	21	38	0	29	954	0	80	856	86
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		8			4			6			2	
Permitted Phases	8			4			6			2		2
Actuated Green, G (s)	4.8	4.8		4.8	4.8		22.5	22.5		22.5	22.5	22.5
Effective Green, g (s)	2.8	2.8		2.8	2.8		20.5	20.5		20.5	20.5	20.5
Actuated g/C Ratio	0.08	0.08		0.08	0.08		0.57	0.57		0.57	0.57	0.57
Clearance Time (s)	4.2	4.2		4.2	4.2		4.2	4.2		4.2	4.2	4.2
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)	133	125		133	125		323	2806		280	1964	879
v/s Ratio Prot		0.01			0.02			0.20			c0.25	
v/s Ratio Perm	c0.04			0.01			0.05			0.16		0.06
v/c Ratio	0.50	0.13		0.16	0.30		0.09	0.34		0.29	0.44	0.10
Uniform Delay, d1	15.8	15.3		15.3	15.5		3.4	4.0		3.9	4.3	3.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.9	0.5		0.6	1.4		0.1	0.1		0.6	0.2	0.0
Delay (s)	18.7	15.8		15.9	16.9		3.5	4.1		4.4	4.5	3.5
Level of Service	B	B		B	B		A	A		A	A	A
Approach Delay (s)		17.4			16.7			4.1			4.4	
Approach LOS		B			B			A			A	

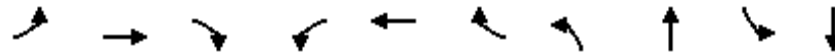
Intersection Summary

HCM Average Control Delay	5.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	35.7	Sum of lost time (s)	12.4
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

19: Alabama St & W Redlands

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	198	328	61	80	327	102	93	515	86	749
v/c Ratio	0.98	0.47	0.19	0.32	0.60	0.27	0.46	0.31	0.42	0.64
Control Delay	92.7	25.7	8.1	30.9	28.2	7.1	36.3	15.0	35.1	18.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	92.7	25.7	8.1	30.9	28.2	7.1	36.3	15.0	35.1	18.5
Queue Length 50th (ft)	~38	41	0	14	59	0	17	46	15	105
Queue Length 95th (ft)	#106	64	26	35	95	32	#43	79	37	180
Internal Link Dist (ft)		1247			345			380		164
Turn Bay Length (ft)	240		240	290			115		125	
Base Capacity (vph)	203	1511	563	253	1110	615	203	1681	203	1179
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	0.98	0.22	0.11	0.32	0.29	0.17	0.46	0.31	0.42	0.64

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.

HCM Signalized Intersection Capacity Analysis

19: Alabama St & W Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	188	312	58	76	311	97	88	436	53	82	516	196
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Total Lost time (s)	5.0	6.9	4.9	5.0	6.9	4.9	5.0	6.2		5.0	6.2	
Lane Util. Factor	0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.91		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2949	4914	1530	2949	3420	1530	2949	4834		2949	3279	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	2949	4914	1530	2949	3420	1530	2949	4834		2949	3279	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	198	328	61	80	327	102	93	459	56	86	543	206
RTOR Reduction (vph)	0	0	50	0	0	82	0	20	0	0	52	0
Lane Group Flow (vph)	198	328	11	80	327	20	93	495	0	86	697	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	6.1	10.4	10.4	7.1	11.4	11.4	4.6	22.2		4.6	22.2	
Effective Green, g (s)	4.1	8.4	10.4	5.1	9.4	11.4	2.6	20.2		2.6	20.2	
Actuated g/C Ratio	0.07	0.14	0.18	0.09	0.16	0.19	0.04	0.34		0.04	0.34	
Clearance Time (s)	3.0	4.9	4.9	3.0	4.9	4.9	3.0	4.2		3.0	4.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	204	695	268	253	541	294	129	1644		129	1115	
v/s Ratio Prot	c0.07	0.07		0.03	c0.10		c0.03	0.10		0.03	c0.21	
v/s Ratio Perm			0.01			0.01						
v/c Ratio	0.97	0.47	0.04	0.32	0.60	0.07	0.72	0.30		0.67	0.62	
Uniform Delay, d1	27.6	23.5	20.4	25.5	23.3	19.6	28.0	14.4		28.0	16.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	55.8	0.5	0.1	3.3	1.9	0.1	17.9	0.5		12.3	2.6	
Delay (s)	83.4	24.0	20.4	28.8	25.2	19.7	46.0	14.9		40.3	19.1	
Level of Service	F	C	C	C	C	B	D	B		D	B	
Approach Delay (s)		43.6			24.7			19.6			21.3	
Approach LOS		D			C			B			C	

Intersection Summary

HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	59.4	Sum of lost time (s)	16.2
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

20: Tennessee & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	14	149	40	293	712	774
v/c Ratio	0.08	0.24	0.20	0.46	0.55	0.72
Control Delay	16.6	13.5	18.2	14.1	9.3	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.6	13.5	18.2	14.1	9.3	12.6
Queue Length 50th (ft)	2	11	7	21	47	57
Queue Length 95th (ft)	15	35	31	58	95	120
Internal Link Dist (ft)		2241		737	458	48
Turn Bay Length (ft)	145		140			
Base Capacity (vph)	522	1743	584	1755	2138	1794
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.09	0.07	0.17	0.33	0.43

Intersection Summary

HCM Signalized Intersection Capacity Analysis

20: Tennessee & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↗	↖
Volume (vph)	13	110	31	38	209	69	51	605	20	136	581	18
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.9	6.9		6.9	6.9			6.9			6.9	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frt	1.00	0.97		1.00	0.96			1.00			1.00	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1615	3306		1615	3292			3392			3376	
Flt Permitted	0.59	1.00		0.66	1.00			0.85			0.71	
Satd. Flow (perm)	1000	3306		1118	3292			2881			2418	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	14	116	33	40	220	73	54	637	21	143	612	19
RTOR Reduction (vph)	0	27	0	0	60	0	0	3	0	0	3	0
Lane Group Flow (vph)	14	122	0	40	233	0	0	709	0	0	771	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	8.8	8.8		8.8	8.8			19.1			19.1	
Effective Green, g (s)	6.8	6.8		6.8	6.8			17.1			17.1	
Actuated g/C Ratio	0.18	0.18		0.18	0.18			0.45			0.45	
Clearance Time (s)	4.9	4.9		4.9	4.9			4.9			4.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	180	596		202	594			1307			1097	
v/s Ratio Prot		0.04			c0.07							
v/s Ratio Perm	0.01			0.04				0.25			c0.32	
v/c Ratio	0.08	0.20		0.20	0.39			0.54			0.70	
Uniform Delay, d1	12.8	13.1		13.1	13.6			7.5			8.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	0.2		0.5	0.4			0.5			2.1	
Delay (s)	13.0	13.3		13.6	14.1			7.9			10.3	
Level of Service	B	B		B	B			A			B	
Approach Delay (s)		13.3			14.0			7.9			10.3	
Approach LOS		B			B			A			B	

Intersection Summary

HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	13.8
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

21: Texas & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕			↕	
Volume (veh/h)	26	4	30	16	30	13	61	298	20	32	463	100
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	27	4	32	17	32	14	64	314	21	34	487	105
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	922	1071	296	797	1113	167	593			335		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	922	1071	296	797	1113	167	593			335		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	85	98	96	93	83	98	94			97		
cM capacity (veh/h)	183	203	706	246	191	854	993			1236		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	63	62	221	178	277	349
Volume Left	27	17	64	0	34	0
Volume Right	32	14	0	21	0	105
cSH	294	249	993	1700	1236	1700
Volume to Capacity	0.22	0.25	0.06	0.10	0.03	0.21
Queue Length 95th (ft)	20	24	5	0	2	0
Control Delay (s)	20.6	24.2	3.0	0.0	1.2	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	20.6	24.2	1.7		0.5	
Approach LOS	C	C				

Intersection Summary		
Average Delay		3.3
Intersection Capacity Utilization	50.1%	ICU Level of Service
Analysis Period (min)		15
		A

HCM Unsignalized Intersection Capacity Analysis

22: Texas & Oriental

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	6	3	5	21	1	12	2	532	15	5	449	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	6	3	5	22	1	13	2	560	16	5	473	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	783	1065	238	826	1059	288	477			576		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	783	1065	238	826	1059	288	477			576		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	99	99	92	100	98	100			99		
cM capacity (veh/h)	280	223	769	262	224	715	1096			1008		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	15	36	282	296	242	241
Volume Left	6	22	2	0	5	0
Volume Right	5	13	0	16	0	4
cSH	338	335	1096	1700	1008	1700
Volume to Capacity	0.04	0.11	0.00	0.17	0.01	0.14
Queue Length 95th (ft)	3	9	0	0	0	0
Control Delay (s)	16.1	17.0	0.1	0.0	0.2	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	16.1	17.0	0.0		0.1	
Approach LOS	C	C				

Intersection Summary		
Average Delay		0.8
Intersection Capacity Utilization	27.5%	ICU Level of Service
Analysis Period (min)		15
		A

Queues

23: Eureka & EB I-10 off/Pearl

12/16/2013



Lane Group	EBT	EBR	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	594	563	61	15	36	74	70
v/c Ratio	0.85	0.60	0.50	0.03	0.05	0.11	0.10
Control Delay	29.9	4.1	28.5	5.0	14.9	5.1	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.9	4.1	28.5	5.0	14.9	5.1	15.3
Queue Length 50th (ft)	197	0	16	0	9	0	18
Queue Length 95th (ft)	294	48	43	8	27	24	45
Internal Link Dist (ft)	447				545		418
Turn Bay Length (ft)				75			
Base Capacity (vph)	824	1009	189	738	707	646	697
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.56	0.32	0.02	0.05	0.11	0.10

Intersection Summary

HCM Signalized Intersection Capacity Analysis

23: Eureka & EB I-10 off/Pearl

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗	↖		↗		↑	↗		↖	
Volume (vph)	90	474	535	58	0	14	0	34	70	6	61	0
Ideal Flow (vphpl)	1800	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		7.0	7.0	6.0		6.0		7.0	7.0		7.0	
Lane Util. Factor		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.99	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1786	1530	1615		1530		1800	1530		1792	
Flt Permitted		0.99	1.00	0.23		1.00		1.00	1.00		0.99	
Satd. Flow (perm)		1786	1530	397		1530		1800	1530		1774	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	499	563	61	0	15	0	36	74	6	64	0
RTOR Reduction (vph)	0	0	342	0	0	9	0	0	45	0	0	0
Lane Group Flow (vph)	0	594	221	61	0	6	0	36	29	0	70	0
Turn Type	Perm	NA	Perm	custom		custom		NA	Perm	Perm	NA	
Protected Phases		8						2				6
Permitted Phases	8		8	3		3			2	6		
Actuated Green, G (s)		27.5	27.5	28.5		28.5		27.5	27.5		27.5	
Effective Green, g (s)		25.5	25.5	26.5		26.5		25.5	25.5		25.5	
Actuated g/C Ratio		0.39	0.39	0.41		0.41		0.39	0.39		0.39	
Clearance Time (s)		5.0	5.0	4.0		4.0		5.0	5.0		5.0	
Vehicle Extension (s)		2.0	2.0	2.0		2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)		701	600	162		624		706	600		696	
v/s Ratio Prot								0.02				
v/s Ratio Perm		0.33	0.14	0.15		0.00			0.02		c0.04	
v/c Ratio		0.85	0.37	0.38		0.01		0.05	0.05		0.10	
Uniform Delay, d1		18.0	14.0	13.5		11.4		12.2	12.2		12.5	
Progression Factor		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Incremental Delay, d2		9.0	0.1	0.5		0.0		0.1	0.2		0.3	
Delay (s)		27.0	14.2	14.0		11.4		12.4	12.4		12.8	
Level of Service		C	B	B		B		B	B		B	
Approach Delay (s)		20.7			13.5			12.4			12.8	
Approach LOS		C			B			B			B	

Intersection Summary

HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

24: Eureka & Stuart

12/16/2013



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	34	19	9	93	24	617
v/c Ratio	0.14	0.08	0.03	0.08	0.06	0.51
Control Delay	11.4	10.4	5.3	5.1	5.4	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.4	10.4	5.3	5.1	5.4	7.6
Queue Length 50th (ft)	3	2	1	3	2	25
Queue Length 95th (ft)	17	11	4	9	8	48
Internal Link Dist (ft)	380	399		136		545
Turn Bay Length (ft)			20		20	
Base Capacity (vph)	846	842	426	1918	665	1917
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.02	0.02	0.05	0.04	0.32

Intersection Summary

HCM Signalized Intersection Capacity Analysis

24: Eureka & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (vph)	15	15	2	8	8	3	9	85	4	23	535	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.98		1.00	0.99		1.00	0.99	
Flt Protected		0.98			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1743			1721		1615	3395		1614	3375	
Flt Permitted		0.84			0.85		0.44	1.00		0.69	1.00	
Satd. Flow (perm)		1499			1490		756	3395		1178	3375	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	16	2	8	8	3	9	89	4	24	563	54
RTOR Reduction (vph)	0	2	0	0	3	0	0	3	0	0	18	0
Lane Group Flow (vph)	0	32	0	0	17	0	9	90	0	24	599	0
Confl. Peds. (#/hr)	1		2	2		1			1	1		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.2			6.2		11.0	11.0		11.0	11.0	
Effective Green, g (s)		4.2			4.2		9.0	9.0		9.0	9.0	
Actuated g/C Ratio		0.17			0.17		0.36	0.36		0.36	0.36	
Clearance Time (s)		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	
Lane Grp Cap (vph)		250			248		270	1213		421	1205	
v/s Ratio Prot								0.03			c0.18	
v/s Ratio Perm		c0.02			0.01		0.01			0.02		
v/c Ratio		0.13			0.07		0.03	0.07		0.06	0.50	
Uniform Delay, d1		8.9			8.8		5.3	5.3		5.3	6.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.1		0.1	0.0		0.1	0.3	
Delay (s)		9.2			9.0		5.3	5.4		5.4	6.7	
Level of Service		A			A		A	A		A	A	
Approach Delay (s)		9.2			9.0			5.4			6.6	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	25.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	31.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

25: Eureka & Oriental

12/16/2013



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	19	17	6	102	12	567
v/c Ratio	0.08	0.07	0.02	0.06	0.02	0.33
Control Delay	12.7	13.9	4.5	4.5	4.5	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.7	13.9	4.5	4.5	4.5	5.4
Queue Length 50th (ft)	2	3	1	4	1	26
Queue Length 95th (ft)	13	13	3	10	5	44
Internal Link Dist (ft)	432	448		184		93
Turn Bay Length (ft)			25		40	
Base Capacity (vph)	348	397	417	1911	654	1899
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.04	0.01	0.05	0.02	0.30

Intersection Summary

HCM Signalized Intersection Capacity Analysis

25: Eureka & Oriental

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕		↗	↕	
Volume (vph)	5	9	5	0	16	0	6	96	1	11	489	49
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.2			6.2		6.2	6.2		6.2	6.2	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.96			1.00		1.00	1.00		1.00	0.99	
Flt Protected		0.99			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1702			1800		1614	3414		1614	3366	
Flt Permitted		0.90			1.00		0.44	1.00		0.69	1.00	
Satd. Flow (perm)		1560			1800		746	3414		1168	3366	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	5	9	5	0	17	0	6	101	1	12	515	52
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	19	0
Lane Group Flow (vph)	0	15	0	0	17	0	6	102	0	12	548	0
Confl. Peds. (#/hr)	6		1	1		6	2		1	1		2
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			5			7				3
Permitted Phases	1			5			7			3		
Actuated Green, G (s)		7.0			7.0		20.0	20.0		20.0	20.0	
Effective Green, g (s)		5.0			5.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio		0.14			0.14		0.51	0.51		0.51	0.51	
Clearance Time (s)		4.2			4.2		4.2	4.2		4.2	4.2	
Vehicle Extension (s)		2.5			2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		220			254		379	1736		594	1712	
v/s Ratio Prot					c0.01			0.03				c0.16
v/s Ratio Perm		0.01					0.01			0.01		
v/c Ratio		0.07			0.07		0.02	0.06		0.02	0.32	
Uniform Delay, d1		13.2			13.2		4.3	4.4		4.3	5.1	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			0.1		0.0	0.0		0.0	0.1	
Delay (s)		13.3			13.3		4.3	4.4		4.3	5.2	
Level of Service		B			B		A	A		A	A	
Approach Delay (s)		13.3			13.3			4.4			5.2	
Approach LOS		B			B			A			A	

Intersection Summary

HCM Average Control Delay	5.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	35.4	Sum of lost time (s)	12.4
Intersection Capacity Utilization	32.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

26: Eureka & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	11	183	13	404	132	485
v/c Ratio	0.05	0.22	0.05	0.49	0.14	0.51
Control Delay	10.4	9.9	10.3	12.2	6.9	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.4	9.9	10.3	12.2	6.9	9.1
Queue Length 50th (ft)	1	10	1	25	5	23
Queue Length 95th (ft)	10	31	10	64	18	57
Internal Link Dist (ft)		660		354	209	138
Turn Bay Length (ft)	35		40			
Base Capacity (vph)	562	2049	651	2056	2080	2095
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.09	0.02	0.20	0.06	0.23

Intersection Summary

HCM Signalized Intersection Capacity Analysis

26: Eureka & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Volume (vph)	10	162	11	12	366	18	13	93	19	62	310	89
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.6	6.6		6.6	6.6			6.2			6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.98			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1614	3383		1611	3394			3318			3290	
Flt Permitted	0.55	1.00		0.64	1.00			0.89			0.89	
Satd. Flow (perm)	931	3383		1079	3394			2952			2950	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	171	12	13	385	19	14	98	20	65	326	94
RTOR Reduction (vph)	0	9	0	0	8	0	0	14	0	0	48	0
Lane Group Flow (vph)	11	174	0	13	396	0	0	118	0	0	437	0
Confl. Peds. (#/hr)	3		7	7		3	2		1	1		2
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			4	
Permitted Phases	6			2			4			4		
Actuated Green, G (s)	9.3	9.3		9.3	9.3			11.3			11.3	
Effective Green, g (s)	7.3	7.3		7.3	7.3			9.3			9.3	
Actuated g/C Ratio	0.25	0.25		0.25	0.25			0.32			0.32	
Clearance Time (s)	4.6	4.6		4.6	4.6			4.2			4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	231	840		268	843			934			933	
v/s Ratio Prot		0.05			c0.12							
v/s Ratio Perm	0.01			0.01				0.04			c0.15	
v/c Ratio	0.05	0.21		0.05	0.47			0.13			0.47	
Uniform Delay, d1	8.4	8.8		8.4	9.4			7.2			8.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	0.1		0.1	0.4			0.1			0.4	
Delay (s)	8.5	8.9		8.5	9.8			7.2			8.4	
Level of Service	A	A		A	A			A			A	
Approach Delay (s)		8.9			9.8			7.2			8.4	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	8.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	29.4	Sum of lost time (s)	12.8
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
27: Orange & Colton

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	66	237	236	282	98	15	253	88	699
v/c Ratio	0.25	0.44	0.79	0.53	0.19	0.05	0.15	0.17	0.41
Control Delay	15.8	13.7	37.3	20.0	3.8	11.8	8.8	12.2	11.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.8	13.7	37.3	20.0	3.8	11.8	8.8	12.2	11.5
Queue Length 50th (ft)	18	50	77	84	0	3	20	16	74
Queue Length 95th (ft)	36	81	123	115	22	14	48	51	146
Internal Link Dist (ft)		502		260			472		133
Turn Bay Length (ft)	50		65		65	50		75	
Base Capacity (vph)	386	771	439	780	719	314	1710	512	1718
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.31	0.54	0.36	0.14	0.05	0.15	0.17	0.41

Intersection Summary

HCM Signalized Intersection Capacity Analysis

27: Orange & Colton

12/16/2013



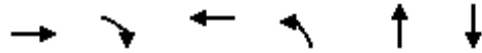
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	63	146	79	224	268	93	14	204	36	84	600	64
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	1705		1615	1800	1530	1615	3343		1615	3371	
Flt Permitted	0.52	1.00		0.60	1.00	1.00	0.37	1.00		0.60	1.00	
Satd. Flow (perm)	891	1705		1014	1800	1530	621	3343		1012	3371	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	66	154	83	236	282	98	15	215	38	88	632	67
RTOR Reduction (vph)	0	40	0	0	0	69	0	19	0	0	10	0
Lane Group Flow (vph)	66	197	0	236	282	29	15	234	0	88	689	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	19.6	19.6		19.6	19.6	19.6	32.4	32.4		32.4	32.4	
Effective Green, g (s)	17.6	17.6		17.6	17.6	17.6	30.4	30.4		30.4	30.4	
Actuated g/C Ratio	0.29	0.29		0.29	0.29	0.29	0.51	0.51		0.51	0.51	
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	3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	261	500		297	528	449	315	1694		513	1708	
v/s Ratio Prot		0.12			0.16			0.07			c0.20	
v/s Ratio Perm	0.07			c0.23		0.02	0.02			0.09		
v/c Ratio	0.25	0.39		0.79	0.53	0.06	0.05	0.14		0.17	0.40	
Uniform Delay, d1	16.2	16.9		19.5	17.8	15.3	7.5	7.9		8.0	9.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.5		13.6	1.0	0.1	0.3	0.2		0.7	0.7	
Delay (s)	16.7	17.4		33.1	18.8	15.3	7.8	8.0		8.7	9.9	
Level of Service	B	B		C	B	B	A	A		A	A	
Approach Delay (s)		17.3			23.7			8.0			9.8	
Approach LOS		B			C			A			A	

Intersection Summary

HCM Average Control Delay	15.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
28: Pearl & Orange

12/16/2013



Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	498	121	335	2	769	343
v/c Ratio	0.86	0.18	0.49	0.01	0.71	0.34
Control Delay	31.1	6.4	11.5	12.5	19.4	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.1	6.4	11.5	12.5	19.4	14.2
Queue Length 50th (ft)	131	12	59	1	112	42
Queue Length 95th (ft)	#290	36	116	4	165	70
Internal Link Dist (ft)	445		279		526	472
Turn Bay Length (ft)		20		75		
Base Capacity (vph)	721	839	847	356	1310	1212
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.14	0.40	0.01	0.59	0.28

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

28: Pearl & Orange

12/16/2013



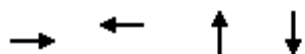
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↗			↖↗	
Volume (vph)	183	290	115	18	45	256	2	718	12	10	299	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95			0.95	
Frt		1.00	0.85		0.89		1.00	1.00			0.99	
Flt Protected		0.98	1.00		1.00		0.95	1.00			1.00	
Satd. Flow (prot)		1766	1530		1600		1615	3411			3389	
Flt Permitted		0.75	1.00		0.96		0.55	1.00			0.93	
Satd. Flow (perm)		1353	1530		1547		928	3411			3142	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	193	305	121	19	47	269	2	756	13	11	315	17
RTOR Reduction (vph)	0	0	30	0	28	0	0	2	0	0	7	0
Lane Group Flow (vph)	0	498	91	0	307	0	2	767	0	0	336	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4		4	4		2	2			2	
Permitted Phases	4		4	4			2			2		
Actuated Green, G (s)		23.0	23.0		23.0		17.7	17.7			17.7	
Effective Green, g (s)		21.0	21.0		21.0		15.7	15.7			15.7	
Actuated g/C Ratio		0.43	0.43		0.43		0.32	0.32			0.32	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.5	3.5			3.5	
Lane Grp Cap (vph)		583	660		667		299	1100			1013	
v/s Ratio Prot								c0.22				
v/s Ratio Perm		c0.37	0.06		0.20		0.00				0.11	
v/c Ratio		0.85	0.14		0.46		0.01	0.70			0.33	
Uniform Delay, d1		12.5	8.4		9.8		11.2	14.4			12.5	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		11.7	0.1		0.5		0.0	2.0			0.2	
Delay (s)		24.1	8.5		10.3		11.2	16.4			12.7	
Level of Service		C	A		B		B	B			B	
Approach Delay (s)		21.1			10.3			16.4			12.7	
Approach LOS		C			B			B			B	

Intersection Summary

HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	48.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues
29: Orange & Stuart

12/16/2013



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	34	78	781	377
v/c Ratio	0.13	0.29	0.63	0.30
Control Delay	9.3	11.6	9.4	6.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.3	11.6	9.4	6.6
Queue Length 50th (ft)	2	6	40	16
Queue Length 95th (ft)	17	31	81	37
Internal Link Dist (ft)	305	198	150	526
Turn Bay Length (ft)				
Base Capacity (vph)	1098	1061	2909	2925
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.03	0.07	0.27	0.13
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

29: Orange & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	9	6	18	36	10	28	5	682	55	3	350	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.2			6.2			6.2			6.2	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frbp, ped/bikes		0.99			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.92			0.95			0.99			1.00	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1630			1660			3375			3409	
Flt Permitted		0.88			0.83			0.95			0.95	
Satd. Flow (perm)		1461			1408			3214			3233	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	9	6	19	38	11	29	5	718	58	3	368	6
RTOR Reduction (vph)	0	16	0	0	24	0	0	11	0	0	2	0
Lane Group Flow (vph)	0	18	0	0	54	0	0	770	0	0	375	0
Confl. Peds. (#/hr)	4		2	2		4	3		2	2		3
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.0			7.0			13.2			13.2	
Effective Green, g (s)		5.0			5.0			11.2			11.2	
Actuated g/C Ratio		0.17			0.17			0.39			0.39	
Clearance Time (s)		4.2			4.2			4.2			4.2	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		255			246			1259			1266	
v/s Ratio Prot												
v/s Ratio Perm		0.01			0.04			0.24			0.12	
v/c Ratio		0.07			0.22			0.61			0.30	
Uniform Delay, d1		9.9			10.1			7.0			6.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.5			0.9			0.1	
Delay (s)		10.0			10.6			7.8			6.1	
Level of Service		A			B			A			A	
Approach Delay (s)		10.0			10.6			7.8			6.1	
Approach LOS		A			B			A			A	

Intersection Summary

HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	28.6	Sum of lost time (s)	12.4
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

30: Orange & Oriental

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	3	1	1	722	396	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	3	1	1	760	417	1
Pedestrians	2			1		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	4.0			4.0		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				464	395	
pX, platoon unblocked	0.93					
vC, conflicting volume	801	212	420			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	643	212	420			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	382	798	1148			

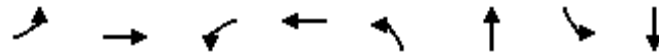
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	4	254	507	278	140
Volume Left	3	1	0	0	0
Volume Right	1	0	0	0	1
cSH	439	1148	1700	1700	1700
Volume to Capacity	0.01	0.00	0.30	0.16	0.08
Queue Length 95th (ft)	1	0	0	0	0
Control Delay (s)	13.3	0.0	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	13.3	0.0		0.0	
Approach LOS	B				

Intersection Summary					
Average Delay			0.1		
Intersection Capacity Utilization			32.1%	ICU Level of Service	A
Analysis Period (min)			15		

Queues

31: Orange & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	48	161	18	364	37	632	51	343
v/c Ratio	0.20	0.21	0.07	0.45	0.12	0.56	0.21	0.30
Control Delay	12.2	8.3	10.5	8.4	8.0	10.0	9.7	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.2	8.3	10.5	8.4	8.0	10.0	9.7	7.1
Queue Length 50th (ft)	5	6	2	13	3	33	5	14
Queue Length 95th (ft)	24	23	12	42	16	77	21	38
Internal Link Dist (ft)		387		273		223		384
Turn Bay Length (ft)	60		60		75		60	
Base Capacity (vph)	701	2148	718	2138	670	2461	523	2429
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.07	0.03	0.17	0.06	0.26	0.10	0.14

Intersection Summary

HCM Signalized Intersection Capacity Analysis

31: Orange & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	46	112	41	17	221	124	35	582	18	48	283	43
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.2	6.2		6.2	6.2		6.2	6.2		6.2	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.95		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3283		1615	3221		1614	3403		1615	3347	
Flt Permitted	0.63	1.00		0.65	1.00		0.55	1.00		0.43	1.00	
Satd. Flow (perm)	1079	3283		1105	3221		927	3403		723	3347	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	48	118	43	18	233	131	37	613	19	51	298	45
RTOR Reduction (vph)	0	33	0	0	102	0	0	5	0	0	26	0
Lane Group Flow (vph)	48	128	0	18	262	0	37	627	0	51	317	0
Confl. Peds. (#/hr)	1					1	3		1	1		3
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	8.3	8.3		8.3	8.3		11.4	11.4		11.4	11.4	
Effective Green, g (s)	6.3	6.3		6.3	6.3		9.4	9.4		9.4	9.4	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.33	0.33		0.33	0.33	
Clearance Time (s)	4.2	4.2		4.2	4.2		4.2	4.2		4.2	4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	242	736		248	722		310	1138		242	1120	
v/s Ratio Prot		0.04			c0.08			c0.18			0.09	
v/s Ratio Perm	0.04			0.02			0.04			0.07		
v/c Ratio	0.20	0.17		0.07	0.36		0.12	0.55		0.21	0.28	
Uniform Delay, d1	8.8	8.8		8.6	9.2		6.5	7.6		6.7	6.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.1		0.1	0.3		0.2	0.6		0.4	0.1	
Delay (s)	9.3	8.9		8.7	9.5		6.7	8.2		7.1	7.0	
Level of Service	A	A		A	A		A	A		A	A	
Approach Delay (s)		9.0			9.5			8.1			7.0	
Approach LOS		A			A			A			A	

















Intersection Summary

HCM Average Control Delay	8.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	28.1	Sum of lost time (s)	12.4
Intersection Capacity Utilization	59.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 32: 6th St & WB I-10 Ramp

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	275	26	286	0	189	0	0	306	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	289	27	301	0	199	0	0	322	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	836	521	322	521	521	199	322			199		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	836	521	322	521	521	199	322			199		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	38	94	64	100			100		
cM capacity (veh/h)	178	463	723	469	463	847	1249			1386		
Direction, Lane #	WB 1	WB 2	NB 1	SB 1								
Volume Total	289	328	199	322								
Volume Left	289	0	0	0								
Volume Right	0	301	0	0								
cSH	469	792	1700	1700								
Volume to Capacity	0.62	0.41	0.12	0.19								
Queue Length 95th (ft)	102	51	0	0								
Control Delay (s)	24.3	12.7	0.0	0.0								
Lane LOS	C	B										
Approach Delay (s)	18.1		0.0	0.0								
Approach LOS	C											
Intersection Summary												
Average Delay			9.8									
Intersection Capacity Utilization			43.8%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

33: 6th St & EB I-10 Ramp

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔				↔	↔		↔	↔	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	71	36	183	0	0	0	216	94	33	131	284	102
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	75	38	193	0	0	0	227	99	35	138	299	107

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	113	193	227	134	138	406
Volume Left (vph)	75	0	227	0	138	0
Volume Right (vph)	0	193	0	35	0	107
Hadj (s)	0.33	-0.70	0.50	-0.18	0.50	-0.18
Departure Headway (s)	7.1	6.0	6.7	6.0	6.5	5.8
Degree Utilization, x	0.22	0.32	0.42	0.22	0.25	0.66
Capacity (veh/h)	476	556	520	572	533	598
Control Delay (s)	10.9	10.7	13.4	9.5	10.4	18.0
Approach Delay (s)	10.8		11.9		16.1	
Approach LOS	B		B		C	

Intersection Summary

Delay	13.5
HCM Level of Service	B
Intersection Capacity Utilization	51.9%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

34: 6th St & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↕	↘
Volume (veh/h)	5	7	13	23	11	90	10	258	6	81	347	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	7	14	24	12	95	11	272	6	85	365	14
Pedestrians		1						1			2	
Lane Width (ft)		12.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	939	843	191	667	846	277	380			278		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	939	843	191	667	846	277	380			278		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	97	98	92	96	87	99			93		
cM capacity (veh/h)	176	280	823	316	279	725	1189			1297		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	26	131	11	278	85	244	135
Volume Left	5	24	11	0	85	0	0
Volume Right	14	95	0	6	0	0	14
cSH	361	525	1189	1700	1297	1700	1700
Volume to Capacity	0.07	0.25	0.01	0.16	0.07	0.14	0.08
Queue Length 95th (ft)	6	24	1	0	5	0	0
Control Delay (s)	15.8	14.1	8.1	0.0	8.0	0.0	0.0
Lane LOS	C	B	A		A		
Approach Delay (s)	15.8	14.1	0.3		1.5		
Approach LOS	C	B					

Intersection Summary			
Average Delay		3.3	
Intersection Capacity Utilization	40.3%		ICU Level of Service A
Analysis Period (min)		15	

Queues

35: Redlands Blvd & Citrus Ave

12/16/2013



Lane Group	EBT	WBT	SET	SER	NWT
Lane Group Flow (vph)	370	620	332	33	671
v/c Ratio	0.67	0.77	0.49	0.06	0.76
Control Delay	28.7	25.5	21.0	7.0	26.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	28.7	25.5	21.0	7.0	26.7
Queue Length 50th (ft)	64	95	53	0	120
Queue Length 95th (ft)	111	164	106	18	#221
Internal Link Dist (ft)	399	463	375		430
Turn Bay Length (ft)				100	
Base Capacity (vph)	1241	1034	806	645	1046
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.30	0.60	0.41	0.05	0.64

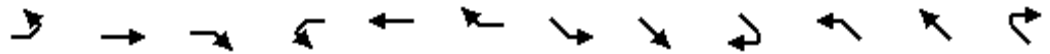
Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

35: Redlands Blvd & Citrus Ave

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕↕			↕↕			↕↕	↕		↕↕	
Volume (vph)	19	234	99	55	302	232	132	183	31	182	417	38
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.2			6.2	6.2		6.2	
Lane Util. Factor		0.95			0.95			0.95	1.00		0.95	
Frt		0.96			0.94			1.00	0.85		0.99	
Flt Protected		1.00			1.00			0.98	1.00		0.99	
Satd. Flow (prot)		3267			3203			3350	1530		3342	
Flt Permitted		1.00			1.00			0.58	1.00		0.75	
Satd. Flow (perm)		3267			3203			1974	1530		2550	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	20	246	104	58	318	244	139	193	33	192	439	40
RTOR Reduction (vph)	0	56	0	0	126	0	0	0	22	0	5	0
Lane Group Flow (vph)	0	314	0	0	494	0	0	332	11	0	666	0
Turn Type	Split	NA		Split	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	4	4		1	1			2		2	2	
Permitted Phases							2		2	2		
Actuated Green, G (s)		11.9			15.8			24.3	24.3		24.3	
Effective Green, g (s)		9.9			13.8			22.3	22.3		22.3	
Actuated g/C Ratio		0.15			0.21			0.35	0.35		0.35	
Clearance Time (s)		4.0			4.2			4.2	4.2		4.2	
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		502			686			684	530		883	
v/s Ratio Prot		c0.10			c0.15							
v/s Ratio Perm								0.17	0.01		c0.26	
v/c Ratio		0.63			0.72			0.49	0.02		0.75	
Uniform Delay, d1		25.5			23.5			16.5	13.9		18.6	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		2.4			3.7			0.5	0.0		3.7	
Delay (s)		28.0			27.2			17.1	13.9		22.3	
Level of Service		C			C			B	B		C	
Approach Delay (s)		28.0			27.2			16.8			22.3	
Approach LOS		C			C			B			C	

Intersection Summary

HCM Average Control Delay	23.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	64.4	Sum of lost time (s)	18.4
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

36: Stuart & Church

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	26	41	42	296	356	63
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	27	43	44	312	375	66
Pedestrians					40	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					3	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	692	221	441			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	692	221	441			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	95	96			
cM capacity (veh/h)	355	790	1130			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	71	148	208	250	191
Volume Left	27	44	0	0	0
Volume Right	43	0	0	0	66
cSH	535	1130	1700	1700	1700
Volume to Capacity	0.13	0.04	0.12	0.15	0.11
Queue Length 95th (ft)	11	3	0	0	0
Control Delay (s)	12.7	2.7	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	12.7	1.1		0.0	
Approach LOS	B				

Intersection Summary					
Average Delay			1.5		
Intersection Capacity Utilization			36.6%	ICU Level of Service	A
Analysis Period (min)			15		

HCM Unsignalized Intersection Capacity Analysis

37: Universtiy & WB I-10 Ramp/E Central

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↔			↔	
Volume (veh/h)	0	0	0	0	8	27	479	425	22	6	142	949
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	0	8	28	504	447	23	6	149	999
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1926	2141	574	1555	2628	235	1148				471	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1926	2141	574	1555	2628	235	1148				471	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	0	100	100	100	0	96	18				99	
cM capacity (veh/h)	0	9	467	25	4	773	616				1102	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	37	728	247	81	1074
Volume Left	0	504	0	6	0
Volume Right	28	0	23	0	999
cSH	19	616	1700	1102	1700
Volume to Capacity	1.97	0.82	0.15	0.01	0.63
Queue Length 95th (ft)	126	211	0	0	0
Control Delay (s)	885.6	31.3	0.0	0.7	0.0
Lane LOS	F	D		A	
Approach Delay (s)	885.6	23.4		0.0	
Approach LOS	F				

Intersection Summary	
Average Delay	25.6
Intersection Capacity Utilization	78.1%
ICU Level of Service	D
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

38: Universtiy & EB I-10 Ramp

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	297	459	0	682	145	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	313	483	0	718	153	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	12					
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	512	76	153			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	512	76	153			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	37	50	100			
cM capacity (veh/h)	497	976	1440			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	796	359	359	76	76
Volume Left	313	0	0	0	0
Volume Right	483	0	0	0	0
cSH	1264	1700	1700	1700	1700
Volume to Capacity	0.63	0.21	0.21	0.04	0.04
Queue Length 95th (ft)	118	0	0	0	0
Control Delay (s)	16.8	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	16.8	0.0		0.0	
Approach LOS	C				

Intersection Summary					
Average Delay			8.0		
Intersection Capacity Utilization	45.0%		ICU Level of Service	A	
Analysis Period (min)	15				

Queues

39: Tippecanoe & Harriman PI

12/16/2013



Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	85	226	684	270	258	232	821	384	993
v/c Ratio	0.44	0.42	1.03	0.54	0.53	0.45	0.34	0.41	0.59
Control Delay	34.2	6.2	72.1	13.1	12.6	28.8	14.0	6.3	27.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.2	6.2	72.1	13.1	12.6	28.8	14.0	6.3	27.6
Queue Length 50th (ft)	32	0	~147	38	33	37	71	10	57
Queue Length 95th (ft)	70	26	#250	91	87	m#105	141	90	155
Internal Link Dist (ft)				592			376		774
Turn Bay Length (ft)	280		300		300	225		500	
Base Capacity (vph)	210	833	663	612	589	512	2390	941	1677
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.27	1.03	0.44	0.44	0.45	0.34	0.41	0.59

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

39: Tippecanoe & Harriman PI

12/16/2013



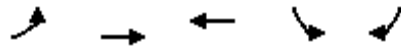
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖		↖↖	↖↖	↖	↖	↖↖	↖↖↖	↖		↖↖↖	
Volume (vph)	81	0	215	650	71	430	220	780	365	0	855	88
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00		0.88	0.97	0.95	0.95	0.97	0.91	1.00		0.86	
Frt	1.00		0.85	1.00	0.89	0.85	1.00	1.00	0.85		0.99	
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (prot)	1710		2693	3317	1525	1454	3317	4914	1530		6105	
Flt Permitted	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (perm)	1710		2693	3317	1525	1454	3317	4914	1530		6105	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	85	0	226	684	75	453	232	821	384	0	900	93
RTOR Reduction (vph)	0	0	194	0	126	126	0	0	201	0	26	0
Lane Group Flow (vph)	85	0	32	684	144	132	232	821	183	0	967	0
Turn Type	Prot		custom	Prot	NA	Perm	Prot	NA	Perm		NA	
Protected Phases	7			3	8		5	2				6
Permitted Phases			4			8			2			
Actuated Green, G (s)	6.2		9.1	13.0	15.9	15.9	10.0	30.9	30.9		16.9	
Effective Green, g (s)	6.2		9.1	13.0	15.9	15.9	10.0	30.9	30.9		16.9	
Actuated g/C Ratio	0.10		0.14	0.20	0.24	0.24	0.15	0.48	0.48		0.26	
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)	163		377	663	373	356	510	2336	727		1587	
v/s Ratio Prot	0.05			c0.21	c0.09		c0.07	0.17			c0.16	
v/s Ratio Perm			0.01			0.09			0.12			
v/c Ratio	0.52		0.08	1.03	0.39	0.37	0.45	0.35	0.25		0.61	
Uniform Delay, d1	28.0		24.3	26.0	20.5	20.4	25.0	10.7	10.2		21.1	
Progression Factor	1.00		1.00	1.00	1.00	1.00	0.88	1.23	2.79		1.29	
Incremental Delay, d2	3.0		0.1	43.3	0.7	0.7	0.6	0.4	0.8		1.6	
Delay (s)	31.0		24.4	69.3	21.1	21.0	22.7	13.6	29.2		28.9	
Level of Service	C		C	E	C	C	C	B	C		C	
Approach Delay (s)		26.2			48.3			19.2			28.9	
Approach LOS		C			D			B			C	

Intersection Summary

HCM Average Control Delay	31.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Mill St

11/25/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	65	601	617	125	56
v/c Ratio	0.15	0.29	0.30	0.28	0.24
Control Delay	6.2	5.4	5.4	13.6	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.2	5.4	5.4	13.6	8.6
Queue Length 50th (ft)	6	30	30	7	0
Queue Length 95th (ft)	20	56	57	26	23
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	473	2274	2260	1978	864
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.14	0.26	0.27	0.06	0.06

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St

11/25/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	62	571	554	32	93	79
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.97	0.85
Flt Protected	0.95	1.00	1.00		0.96	1.00
Satd. Flow (prot)	1615	3420	3392		3251	1392
Flt Permitted	0.42	1.00	1.00		0.96	1.00
Satd. Flow (perm)	711	3420	3392		3251	1392
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	65	601	583	34	98	83
RTOR Reduction (vph)	0	0	5	0	25	51
Lane Group Flow (vph)	65	601	612	0	100	5
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	21.6	21.6	21.6		5.3	5.3
Effective Green, g (s)	19.6	19.6	19.6		3.3	3.3
Actuated g/C Ratio	0.55	0.55	0.55		0.09	0.09
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	388	1867	1852		299	128
v/s Ratio Prot		0.18	c0.18		c0.03	
v/s Ratio Perm	0.09					0.00
v/c Ratio	0.17	0.32	0.33		0.34	0.04
Uniform Delay, d1	4.1	4.5	4.5		15.3	14.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.1	0.1		0.7	0.1
Delay (s)	4.3	4.6	4.6		15.9	15.0
Level of Service	A	A	A		B	B
Approach Delay (s)		4.6	4.6		15.6	
Approach LOS		A	A		B	

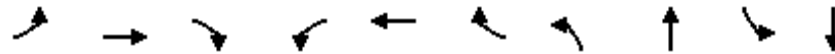
Intersection Summary

HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	35.9	Sum of lost time (s)	13.0
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

11/25/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	118	351	215	173	334	98	173	767	88	817
v/c Ratio	0.53	0.43	0.41	0.79	0.41	0.22	0.53	0.37	0.28	0.49
Control Delay	25.7	18.4	5.2	44.1	18.2	5.2	22.5	12.7	11.6	15.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.7	18.4	5.2	44.1	18.2	5.2	22.5	12.7	11.6	15.4
Queue Length 50th (ft)	32	49	0	51	46	0	28	68	13	80
Queue Length 95th (ft)	71	75	38	#121	71	26	#96	98	35	106
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	291	1064	624	286	1064	544	324	2071	319	1722
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	0.41	0.33	0.34	0.60	0.31	0.18	0.53	0.37	0.28	0.47

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑	↗	↘	↑↑↑		↘	↑↑↑	
Volume (vph)	112	333	204	164	317	93	164	627	102	84	673	104
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	7.0		5.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3420	1530	1615	3420	1530	1615	4811		1615	4816	
Flt Permitted	0.55	1.00	1.00	0.54	1.00	1.00	0.28	1.00		0.35	1.00	
Satd. Flow (perm)	936	3420	1530	920	3420	1530	472	4811		593	4816	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	118	351	215	173	334	98	173	660	107	88	708	109
RTOR Reduction (vph)	0	0	164	0	0	75	0	35	0	0	36	0
Lane Group Flow (vph)	118	351	51	173	334	23	173	732	0	88	781	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	15.1	15.1	15.1	15.1	15.1	15.1	29.9	23.9		23.6	20.6	
Effective Green, g (s)	13.1	13.1	13.1	13.1	13.1	13.1	26.2	21.9		19.6	18.6	
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24	0.24	0.48	0.40		0.36	0.34	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	223	815	364	219	815	364	314	1916		230	1629	
v/s Ratio Prot		0.10			0.10		c0.04	0.15		0.01	0.16	
v/s Ratio Perm	0.13		0.03	c0.19		0.02	c0.22			0.13		
v/c Ratio	0.53	0.43	0.14	0.79	0.41	0.06	0.55	0.38		0.38	0.48	
Uniform Delay, d1	18.3	17.8	16.5	19.7	17.7	16.2	8.6	11.7		12.4	14.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	0.4	0.2	17.1	0.3	0.1	2.1	0.6		1.1	1.0	
Delay (s)	20.5	18.2	16.7	36.7	18.0	16.3	10.7	12.3		13.5	15.4	
Level of Service	C	B	B	D	B	B	B	B		B	B	
Approach Delay (s)		18.1			23.1			12.0			15.2	
Approach LOS		B			C			B			B	

Intersection Summary

HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Waterman & E Orange Show

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	209	829	98	315	107	721	77	1180
v/c Ratio	0.72	0.75	0.92	0.30	0.62	0.57	0.26	0.91
Control Delay	36.3	20.9	97.5	16.8	32.4	20.8	13.0	33.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.3	20.9	97.5	16.8	32.4	20.8	13.0	33.8
Queue Length 50th (ft)	80	130	41	48	26	141	18	272
Queue Length 95th (ft)	#160	192	#128	77	#76	201	40	#426
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	373	1362	136	1324	173	1280	293	1325
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.61	0.72	0.24	0.62	0.56	0.26	0.89

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	199	434	353	93	249	50	102	638	47	73	946	175
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.93		1.00	0.97		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3190		1615	3334		1615	3385		1615	3340	
Flt Permitted	0.56	1.00		0.20	1.00		0.16	1.00		0.30	1.00	
Satd. Flow (perm)	953	3190		347	3334		267	3385		512	3340	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	209	457	372	98	262	53	107	672	49	77	996	184
RTOR Reduction (vph)	0	131	0	0	24	0	0	7	0	0	19	0
Lane Group Flow (vph)	209	698	0	98	291	0	107	714	0	77	1161	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	23.0	23.0		23.0	23.0		31.3	27.5		32.7	28.2	
Effective Green, g (s)	21.0	21.0		21.0	21.0		27.3	25.5		28.7	26.2	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.40	0.37		0.42	0.38	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	290	971		106	1015		141	1251		253	1268	
v/s Ratio Prot		0.22			0.09		c0.02	0.21		0.01	c0.35	
v/s Ratio Perm	0.22			c0.28			0.28			0.12		
v/c Ratio	0.72	0.72		0.92	0.29		0.76	0.57		0.30	0.92	
Uniform Delay, d1	21.4	21.4		23.2	18.3		19.9	17.4		12.6	20.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.5	2.6		63.3	0.2		20.6	0.6		0.7	10.3	
Delay (s)	29.9	23.9		86.6	18.5		40.5	18.0		13.3	30.7	
Level of Service	C	C		F	B		D	B		B	C	
Approach Delay (s)		25.1			34.6			20.9			29.6	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	26.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	69.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	95.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

11/25/2013

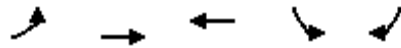


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	4	3	4	781	1387	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	4	3	4	822	1460	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					745	
pX, platoon unblocked	0.71	0.71	0.71			
vC, conflicting volume	1882	732	1464			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1420	0	830			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	100	99			
cM capacity (veh/h)	91	772	574			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	7	4	411	411	973	491
Volume Left	4	4	0	0	0	0
Volume Right	3	0	0	0	0	4
cSH	147	574	1700	1700	1700	1700
Volume to Capacity	0.05	0.01	0.24	0.24	0.57	0.29
Queue Length 95th (ft)	4	1	0	0	0	0
Control Delay (s)	30.9	11.3	0.0	0.0	0.0	0.0
Lane LOS	D	B				
Approach Delay (s)	30.9	0.1			0.0	
Approach LOS	D					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			50.6%		ICU Level of Service	A
Analysis Period (min)			15			

Queues

1: Mill St & Sierra Way

12/16/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	77	623	695	239	113
v/c Ratio	0.23	0.36	0.41	0.45	0.39
Control Delay	7.7	6.5	6.7	12.1	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.7	6.5	6.7	12.1	8.6
Queue Length 50th (ft)	7	33	37	12	0
Queue Length 95th (ft)	27	64	71	37	31
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	388	2015	2002	1886	854
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.20	0.31	0.35	0.13	0.13

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St & Sierra Way

12/16/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	73	592	622	38	136	199
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.94	0.85
Flt Protected	0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	1615	3420	3390		3186	1392
Flt Permitted	0.39	1.00	1.00		0.97	1.00
Satd. Flow (perm)	659	3420	3390		3186	1392
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	77	623	655	40	143	209
RTOR Reduction (vph)	0	0	6	0	82	97
Lane Group Flow (vph)	77	623	689	0	157	16
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	20.5	20.5	20.5		7.2	7.2
Effective Green, g (s)	18.5	18.5	18.5		5.2	5.2
Actuated g/C Ratio	0.50	0.50	0.50		0.14	0.14
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	332	1724	1709		451	197
v/s Ratio Prot		0.18	c0.20		c0.05	
v/s Ratio Perm	0.12					0.01
v/c Ratio	0.23	0.36	0.40		0.35	0.08
Uniform Delay, d1	5.1	5.5	5.7		14.2	13.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.4	0.1	0.2		0.5	0.2
Delay (s)	5.5	5.6	5.8		14.7	13.9
Level of Service	A	A	A		B	B
Approach Delay (s)		5.6	5.8		14.4	
Approach LOS		A	A		B	

Intersection Summary

HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	36.7	Sum of lost time (s)	13.0
Intersection Capacity Utilization	50.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

2: Waterman Ave & 9th St

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	139	393	144	373	105	1165	78	945
v/c Ratio	0.69	0.50	0.72	0.48	0.43	0.65	0.46	0.53
Control Delay	38.2	19.2	41.1	18.6	18.8	13.4	25.0	11.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.2	19.2	41.1	18.6	18.8	13.4	25.0	11.4
Queue Length 50th (ft)	46	56	48	52	21	142	16	105
Queue Length 95th (ft)	89	81	93	76	#87	250	#80	186
Internal Link Dist (ft)		852		841		893		996
Turn Bay Length (ft)	130		100		50		75	
Base Capacity (vph)	285	1085	281	1084	243	1780	168	1786
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.36	0.51	0.34	0.43	0.65	0.46	0.53

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2: Waterman Ave & 9th St

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	132	304	69	137	271	84	100	952	155	74	813	85
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	7.5	7.5		7.4	7.4		7.5	7.5		7.5	7.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.96		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3325		1615	3299		1615	3348		1615	3372	
Flt Permitted	0.53	1.00		0.52	1.00		0.27	1.00		0.19	1.00	
Satd. Flow (perm)	901	3325		884	3299		460	3348		319	3372	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	139	320	73	144	285	88	105	1002	163	78	856	89
RTOR Reduction (vph)	0	37	0	0	38	0	0	18	0	0	11	0
Lane Group Flow (vph)	139	356	0	144	335	0	105	1147	0	78	934	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	15.4	15.4		15.5	15.5		33.6	33.6		33.6	33.6	
Effective Green, g (s)	13.4	13.4		13.5	13.5		31.6	31.6		31.6	31.6	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.53	0.53		0.53	0.53	
Clearance Time (s)	5.5	5.5		5.4	5.4		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	201	743		199	742		242	1763		168	1776	
v/s Ratio Prot		0.11			0.10			c0.34			0.28	
v/s Ratio Perm	0.15			c0.16			0.23			0.24		
v/c Ratio	0.69	0.48		0.72	0.45		0.43	0.65		0.46	0.53	
Uniform Delay, d1	21.4	20.3		21.5	20.1		8.7	10.2		8.9	9.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.8	0.5		12.2	0.4		5.6	1.9		9.0	1.1	
Delay (s)	31.2	20.8		33.8	20.5		14.3	12.1		17.9	10.4	
Level of Service	C	C		C	C		B	B		B	B	
Approach Delay (s)		23.5			24.2			12.3			11.0	
Approach LOS		C			C			B			B	

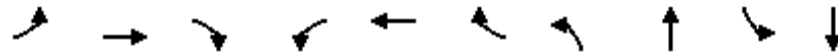
Intersection Summary

HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	14.9
Intersection Capacity Utilization	85.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	153	344	194	216	475	156	146	1027	117	1003
v/c Ratio	0.70	0.38	0.35	0.87	0.52	0.30	0.55	0.58	0.46	0.57
Control Delay	37.2	17.4	4.9	54.3	19.2	4.9	21.3	16.7	16.4	16.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	17.4	4.9	54.3	19.2	4.9	21.3	16.7	16.4	16.4
Queue Length 50th (ft)	43	46	0	65	66	0	26	104	20	98
Queue Length 95th (ft)	#116	75	37	#165	103	33	#72	145	#48	138
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	248	1038	600	281	1038	573	264	1777	252	1775
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.33	0.32	0.77	0.46	0.27	0.55	0.58	0.46	0.57

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	327	184	205	451	148	139	874	102	111	817	136
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	7.0		5.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3420	1530	1615	3420	1530	1615	4837		1615	4809	
Flt Permitted	0.48	1.00	1.00	0.55	1.00	1.00	0.24	1.00		0.23	1.00	
Satd. Flow (perm)	816	3420	1530	927	3420	1530	404	4837		398	4809	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	153	344	194	216	475	156	146	920	107	117	860	143
RTOR Reduction (vph)	0	0	142	0	0	114	0	24	0	0	38	0
Lane Group Flow (vph)	153	344	52	216	475	42	146	1003	0	117	965	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	17.0	17.0	17.0	17.0	17.0	17.0	26.2	21.7		25.8	21.5	
Effective Green, g (s)	15.0	15.0	15.0	15.0	15.0	15.0	22.2	19.7		21.8	19.5	
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.27	0.27	0.40	0.35		0.39	0.35	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	219	916	410	248	916	410	214	1702		205	1675	
v/s Ratio Prot		0.10			0.14		c0.03	0.21		0.02	0.20	
v/s Ratio Perm	0.19		0.03	c0.23		0.03	c0.24			0.20		
v/c Ratio	0.70	0.38	0.13	0.87	0.52	0.10	0.68	0.59		0.57	0.58	
Uniform Delay, d1	18.5	16.7	15.5	19.6	17.4	15.4	12.1	14.8		11.7	14.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.3	0.3	0.1	26.6	0.5	0.1	8.7	1.5		3.8	0.5	
Delay (s)	27.8	16.9	15.7	46.2	17.9	15.5	20.8	16.3		15.5	15.4	
Level of Service	C	B	B	D	B	B	C	B		B	B	
Approach Delay (s)		19.0			24.7			16.9			15.4	
Approach LOS		B			C			B			B	

Intersection Summary

HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	56.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Waterman & E Orange Show

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	207	773	161	617	231	1041	141	1100
v/c Ratio	0.92	0.89	0.94	0.75	0.97	0.86	0.82	0.97
Control Delay	69.8	46.9	81.9	39.6	78.1	37.6	55.3	54.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.8	46.9	81.9	39.6	78.1	37.6	55.3	54.4
Queue Length 50th (ft)	89	231	67	182	101	318	49	343
Queue Length 95th (ft)	#212	#325	#171	245	#258	#438	#151	#485
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	225	943	171	904	237	1212	171	1132
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.82	0.94	0.68	0.97	0.86	0.82	0.97

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	197	545	189	153	508	78	219	845	144	134	900	145
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	7.0		6.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	*1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3288		1615	3352		1615	3345		1615	3525	
Flt Permitted	0.24	1.00		0.17	1.00		0.11	1.00		0.13	1.00	
Satd. Flow (perm)	415	3288		287	3352		194	3345		220	3525	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	207	574	199	161	535	82	231	889	152	141	947	153
RTOR Reduction (vph)	0	35	0	0	12	0	0	13	0	0	14	0
Lane Group Flow (vph)	207	738	0	161	605	0	231	1028	0	141	1086	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	35.7	26.7		33.7	25.7		49.0	37.0		41.0	33.0	
Effective Green, g (s)	31.7	24.7		29.7	23.7		45.0	35.0		37.0	31.0	
Actuated g/C Ratio	0.32	0.25		0.30	0.24		0.46	0.36		0.38	0.32	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	221	831		169	813		235	1198		169	1118	
v/s Ratio Prot	c0.07	0.22		0.06	0.18		c0.10	c0.31		0.05	0.31	
v/s Ratio Perm	c0.24			0.23			c0.35			0.27		
v/c Ratio	0.94	0.89		0.95	0.74		0.98	0.86		0.83	0.97	
Uniform Delay, d1	29.5	35.2		30.2	34.2		25.1	29.0		22.6	32.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	42.8	11.3		55.0	3.7		53.6	6.3		28.3	20.3	
Delay (s)	72.3	46.5		85.2	37.9		78.6	35.3		50.9	53.2	
Level of Service	E	D		F	D		E	D		D	D	
Approach Delay (s)		51.9			47.7			43.2			52.9	
Approach LOS		D			D			D			D	

Intersection Summary

HCM Average Control Delay	48.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	97.7	Sum of lost time (s)	19.0
Intersection Capacity Utilization	98.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	2	6	21	1219	1344	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	6	22	1283	1415	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)	745					
pX, platoon unblocked						
vC, conflicting volume	2103	709	1419			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2103	709	1419			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	98	95			
cM capacity (veh/h)	43	381	486			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	8	22	642	642	943	476
Volume Left	2	22	0	0	0	0
Volume Right	6	0	0	0	0	4
cSH	129	486	1700	1700	1700	1700
Volume to Capacity	0.07	0.05	0.38	0.38	0.55	0.28
Queue Length 95th (ft)	5	4	0	0	0	0
Control Delay (s)	34.7	12.8	0.0	0.0	0.0	0.0
Lane LOS	D	B				
Approach Delay (s)	34.7	0.2	0.0			
Approach LOS	D					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			49.3%	ICU Level of Service	A	
Analysis Period (min)			15			

Queues

6: Waterman & Washington

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	442	717	5	1136	599	15	177	178	694
v/c Ratio	0.97	0.37	0.02	0.92	0.64	0.07	0.49	0.48	1.01
Control Delay	71.3	10.4	16.8	37.5	5.3	23.1	28.5	28.1	52.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.3	10.4	16.8	37.5	5.3	23.1	28.5	28.1	52.9
Queue Length 50th (ft)	111	95	2	280	0	5	75	75	~211
Queue Length 95th (ft)	#200	131	9	#410	66	17	141	140	#450
Internal Link Dist (ft)		433		239		527		537	
Turn Bay Length (ft)	225		100		200		125		
Base Capacity (vph)	456	1923	233	1240	936	517	362	372	690
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.97	0.37	0.02	0.92	0.64	0.03	0.49	0.48	1.01

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.

HCM Signalized Intersection Capacity Analysis

6: Waterman & Washington

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	420	676	5	5	1079	569	4	7	4	330	8	659
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1800	1800	1800	1700	1800	1800
Total Lost time (s)	4.0	6.0		6.0	6.0	6.0		4.0		5.0	5.0	5.0
Lane Util. Factor	*1.00	0.95		1.00	0.95	1.00		1.00		0.95	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	0.95	1.00
Satd. Flow (prot)	3040	3416		1615	3420	1530		1712		1534	1632	1530
Flt Permitted	0.95	1.00		0.38	1.00	1.00		0.95		0.75	0.72	1.00
Satd. Flow (perm)	3040	3416		644	3420	1530		1647		1208	1240	1530
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	442	712	5	5	1136	599	4	7	4	347	8	694
RTOR Reduction (vph)	0	0	0	0	0	382	0	3	0	0	0	231
Lane Group Flow (vph)	442	717	0	5	1136	217	0	12	0	177	178	463
Turn Type	Prot	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases				6		6	8			4		4
Actuated Green, G (s)	12.0	45.0		29.0	29.0	29.0		25.0		24.0	24.0	24.0
Effective Green, g (s)	12.0	45.0		29.0	29.0	29.0		25.0		24.0	24.0	24.0
Actuated g/C Ratio	0.15	0.56		0.36	0.36	0.36		0.31		0.30	0.30	0.30
Clearance Time (s)	4.0	6.0		6.0	6.0	6.0		4.0		5.0	5.0	5.0
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)	456	1922		233	1240	555		515		362	372	459
v/s Ratio Prot	c0.15	0.21			c0.33							
v/s Ratio Perm				0.01		0.14		0.01		0.15	0.14	c0.30
v/c Ratio	0.97	0.37		0.02	0.92	0.39		0.02		0.49	0.48	1.01
Uniform Delay, d1	33.8	9.7		16.4	24.3	18.9		19.0		23.0	22.9	28.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	33.8	0.6		0.2	12.0	2.1		0.0		1.0	1.0	44.2
Delay (s)	67.6	10.2		16.6	36.4	21.0		19.1		24.0	23.9	72.2
Level of Service	E	B		B	D	C		B		C	C	E
Approach Delay (s)		32.1			31.0			19.1			55.9	
Approach LOS		C			C			B			E	

Intersection Summary

HCM Average Control Delay	37.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	90.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

7: S Tippecanoe & E Victoria

12/16/2013



Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	4	52	26	1	1059	47	1049
v/c Ratio	0.03	0.31	0.08	0.00	0.44	0.15	0.39
Control Delay	19.5	28.9	0.5	7.0	8.1	4.2	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.5	28.9	0.5	7.0	8.1	4.2	4.4
Queue Length 50th (ft)	1	18	0	0	118	4	73
Queue Length 95th (ft)	8	44	0	2	193	14	128
Internal Link Dist (ft)	87		770		198		507
Turn Bay Length (ft)		100		150		115	
Base Capacity (vph)	386	468	550	330	2421	320	2709
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.11	0.05	0.00	0.44	0.15	0.39

Intersection Summary

HCM Signalized Intersection Capacity Analysis

7: S Tippecanoe & E Victoria

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕		↕	↕	
Volume (vph)	2	0	2	49	0	25	1	962	44	45	997	0
Ideal Flow (vphpl)	1800	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.0		6.0	6.0		7.5	7.5		6.0	7.5	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt		0.93		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1638		1615	1530		1615	3398		1615	3420	
Flt Permitted		0.83		1.00	1.00		0.27	1.00		0.21	1.00	
Satd. Flow (perm)		1399		1700	1530		464	3398		362	3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	2	0	2	52	0	26	1	1013	46	47	1049	0
RTOR Reduction (vph)	0	2	0	0	24	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	2	0	52	2	0	1	1055	0	47	1049	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.6		5.6	5.6		38.5	38.5		44.9	44.9	
Effective Green, g (s)		3.6		3.6	3.6		36.5	36.5		42.9	42.9	
Actuated g/C Ratio		0.06		0.06	0.06		0.61	0.61		0.71	0.71	
Clearance Time (s)		4.0		4.0	4.0		5.5	5.5		4.0	5.5	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		84		102	92		282	2067		267	2445	
v/s Ratio Prot					0.00			c0.31		0.00	c0.31	
v/s Ratio Perm		0.00		c0.03			0.00			0.12		
v/c Ratio		0.03		0.51	0.02		0.00	0.51		0.18	0.43	
Uniform Delay, d1		26.5		27.3	26.5		4.6	6.7		3.9	3.5	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1		4.0	0.1		0.0	0.9		0.3	0.6	
Delay (s)		26.7		31.3	26.6		4.6	7.6		4.2	4.1	
Level of Service		C		C	C		A	A		A	A	
Approach Delay (s)		26.7			29.7			7.6			4.1	
Approach LOS		C			C			A			A	

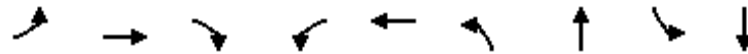
Intersection Summary

HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	283	326	537	168	162	509	1028	66	1170
v/c Ratio	0.91	0.76	0.68	0.89	0.30	0.92	0.36	0.43	0.71
Control Delay	71.8	49.1	10.6	82.1	28.3	80.1	11.4	45.1	37.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.8	49.1	10.6	82.1	28.3	80.1	11.4	45.1	37.9
Queue Length 50th (ft)	210	228	44	118	80	214	135	42	303
Queue Length 95th (ft)	#369	341	161	#244	135	#293	133	95	361
Internal Link Dist (ft)		517			1151		774		1167
Turn Bay Length (ft)	210			85		260		100	
Base Capacity (vph)	349	481	823	211	601	592	2821	154	1654
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.68	0.65	0.80	0.27	0.86	0.36	0.43	0.71

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
 8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖	↖	↖	↖		↖↖	↖↖↖		↖	↖↖↖	
Volume (vph)	353	225	510	160	109	45	484	915	62	63	960	151
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1600	1800	1800	1700	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		6.0	7.0		7.0	7.0	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		0.97	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99		1.00	0.98	
Flt Protected	0.95	0.99	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1534	1687	1530	1615	1722		2949	4867		1615	4814	
Flt Permitted	0.63	0.82	1.00	0.36	1.00		0.95	1.00		0.27	1.00	
Satd. Flow (perm)	1021	1409	1530	617	1722		2949	4867		453	4814	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	372	237	537	168	115	47	509	963	65	66	1011	159
RTOR Reduction (vph)	0	0	317	0	13	0	0	6	0	0	17	0
Lane Group Flow (vph)	283	326	220	168	149	0	509	1022	0	66	1154	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)	38.6	38.6	38.6	38.6	38.6		24.6	71.4		42.8	42.8	
Effective Green, g (s)	36.6	36.6	36.6	36.6	36.6		22.6	69.4		40.8	40.8	
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31		0.19	0.58		0.34	0.34	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		4.0	5.0		5.0	5.0	
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)	311	430	467	188	525		555	2815		154	1637	
v/s Ratio Prot					0.09		c0.17	0.21			c0.24	
v/s Ratio Perm	c0.28	0.23	0.14	0.27						0.15		
v/c Ratio	0.91	0.76	0.47	0.89	0.28		0.92	0.36		0.43	0.70	
Uniform Delay, d1	40.1	37.7	33.8	39.8	31.7		47.8	13.5		30.6	34.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.25	0.79		1.00	1.00	
Incremental Delay, d2	28.7	7.5	0.8	37.3	0.3		18.2	0.3		8.5	2.6	
Delay (s)	68.9	45.2	34.6	77.1	32.0		78.2	10.9		39.1	36.9	
Level of Service	E	D	C	E	C		E	B		D	D	
Approach Delay (s)		46.1			55.0			33.2			37.1	
Approach LOS		D			D			C			D	

Intersection Summary

HCM Average Control Delay	39.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	88.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Intersection has too many lanes per leg.

HCM All-Way analysis is limited to two lanes per leg.

Channelized right turn lanes are not counted.

Queues

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

12/16/2013



Lane Group	EBL	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	323	615	1254	528	1214
v/c Ratio	0.92	0.79	0.80	0.93	0.53
Control Delay	76.2	45.2	33.3	66.6	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	76.2	45.2	33.3	66.6	11.9
Queue Length 50th (ft)	238	188	417	221	260
Queue Length 95th (ft)	#390	253	521	#296	278
Internal Link Dist (ft)		1164	1201		347
Turn Bay Length (ft)	275				
Base Capacity (vph)	390	851	1561	627	2302
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.83	0.72	0.80	0.84	0.53

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	559	13	319	0	0	0	0	839	352	502	1153	0
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	6.0						7.0		6.0	7.0	
Lane Util. Factor	*1.00	*1.00						*1.00		0.97	0.95	
Frt	1.00	0.92						0.96		1.00	1.00	
Flt Protected	0.95	0.98						1.00		0.95	1.00	
Satd. Flow (prot)	1615	3235						3440		3133	3420	
Flt Permitted	0.95	0.98						1.00		0.95	1.00	
Satd. Flow (perm)	1615	3235						3440		3133	3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	588	14	336	0	0	0	0	883	371	528	1214	0
RTOR Reduction (vph)	0	71	0	0	0	0	0	40	0	0	0	0
Lane Group Flow (vph)	323	544	0	0	0	0	0	1214	0	528	1214	0
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	28.2	28.2						55.1		23.7	82.8	
Effective Green, g (s)	26.2	26.2						53.1		21.7	80.8	
Actuated g/C Ratio	0.22	0.22						0.44		0.18	0.67	
Clearance Time (s)	4.0	4.0						5.0		4.0	5.0	
Vehicle Extension (s)	2.0	2.0						2.0		2.0	2.0	
Lane Grp Cap (vph)	353	706						1522		567	2303	
v/s Ratio Prot								c0.35		c0.17	0.35	
v/s Ratio Perm	c0.20	0.17										
v/c Ratio	0.92	0.77						0.80		0.93	0.53	
Uniform Delay, d1	45.8	44.1						28.8		48.4	9.9	
Progression Factor	1.00	1.00						1.00		0.98	1.07	
Incremental Delay, d2	27.0	4.7						4.4		17.5	0.6	
Delay (s)	72.8	48.8						33.3		64.9	11.2	
Level of Service	E	D						C		E	B	
Approach Delay (s)		57.1			0.0			33.3			27.5	
Approach LOS		E			A			C			C	

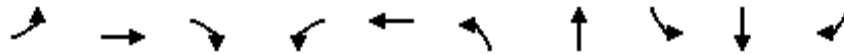
Intersection Summary

HCM Average Control Delay	36.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

11: Anderson & Academy

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	124	53	64	54	107	67	962	76	675	141
v/c Ratio	0.32	0.14	0.18	0.16	0.16	0.15	0.54	0.22	0.37	0.16
Control Delay	15.3	18.9	7.7	13.5	14.0	7.1	13.4	7.9	11.1	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	18.9	7.7	13.5	14.0	7.1	13.4	7.9	11.1	3.4
Queue Length 50th (ft)	26	14	0	11	9	9	123	10	78	0
Queue Length 95th (ft)	58	38	25	30	26	24	#223	26	126	28
Internal Link Dist (ft)		21			32		1375		514	
Turn Bay Length (ft)	75			100		100		100		
Base Capacity (vph)	383	951	839	345	1671	439	1795	344	1807	875
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	0.06	0.08	0.16	0.06	0.15	0.54	0.22	0.37	0.16

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

11: Anderson & Academy

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	118	50	61	51	66	36	64	856	58	72	641	134
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	4.0	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	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1615	1800	1530	1615	3238		1615	3387		1615	3420	1530
Flt Permitted	0.75	1.00	1.00	1.00	1.00		0.35	1.00		0.21	1.00	1.00
Satd. Flow (perm)	1283	1800	1530	1700	3238		595	3387		358	3420	1530
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	124	53	64	54	69	38	67	901	61	76	675	141
RTOR Reduction (vph)	0	0	56	0	35	0	0	7	0	0	0	80
Lane Group Flow (vph)	124	53	8	54	72	0	67	955	0	76	675	61
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)	9.1	5.3	5.3	5.3	3.4		20.9	19.0		20.9	19.0	19.0
Effective Green, g (s)	9.1	5.3	5.3	5.3	3.4		20.9	19.0		20.9	19.0	19.0
Actuated g/C Ratio	0.21	0.12	0.12	0.12	0.08		0.47	0.43		0.47	0.43	0.43
Clearance Time (s)	4.0	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	3.0
Lane Grp Cap (vph)	293	216	184	201	250		326	1459		224	1473	659
v/s Ratio Prot	c0.04	0.03		0.01	0.02		0.01	c0.28		c0.01	0.20	
v/s Ratio Perm	c0.05		0.01	0.02			0.09			0.15		0.04
v/c Ratio	0.42	0.25	0.04	0.27	0.29		0.21	0.65		0.34	0.46	0.09
Uniform Delay, d1	15.1	17.6	17.2	17.7	19.2		6.4	9.9		6.9	8.9	7.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.0	0.6	0.1	0.7	0.6		0.3	1.1		0.9	0.2	0.1
Delay (s)	16.1	18.2	17.2	18.4	19.8		6.7	11.0		7.8	9.1	7.5
Level of Service	B	B	B	B	B		A	B		A	A	A
Approach Delay (s)		16.8			19.4			10.7			8.8	
Approach LOS		B			B			B			A	

Intersection Summary

HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	44.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

12: California & WB I-10 Ramps

12/16/2013



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	453	126	712	531	826	792
v/c Ratio	1.04	0.28	1.15	0.24	0.60	0.99
Control Delay	93.8	7.7	112.2	6.2	36.2	45.5
Queue Delay	0.0	0.0	43.9	0.3	0.0	0.0
Total Delay	93.8	7.7	156.1	6.5	36.2	45.5
Queue Length 50th (ft)	~346	0	~460	46	184	252
Queue Length 95th (ft)	#545	48	#697	62	229	#538
Internal Link Dist (ft)	1118			276	113	
Turn Bay Length (ft)						
Base Capacity (vph)	437	458	619	2207	1385	797
Starvation Cap Reductn	0	0	50	979	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.04	0.28	1.25	0.43	0.60	0.99



















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.

HCM Signalized Intersection Capacity Analysis

12: California & WB I-10 Ramps

12/16/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	0	0	0	427	4	120	676	504	0	0	785	752	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800	
Total Lost time (s)					5.0	7.0	5.5	6.0			5.0	5.0	
Lane Util. Factor					1.00	1.00	1.00	0.95			0.91	1.00	
Frt					1.00	0.85	1.00	1.00			1.00	0.85	
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00	
Satd. Flow (prot)					1715	1530	1615	3420			4914	1530	
Flt Permitted					0.95	1.00	0.18	1.00			1.00	1.00	
Satd. Flow (perm)					1715	1530	299	3420			4914	1530	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	0	0	0	449	4	126	712	531	0	0	826	792	
RTOR Reduction (vph)	0	0	0	0	0	96	0	0	0	0	0	366	
Lane Group Flow (vph)	0	0	0	0	453	30	712	531	0	0	826	426	
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm	
Protected Phases					8		5	6			2		
Permitted Phases				8		8	6					2	
Actuated Green, G (s)					28.0	28.0	73.0	73.0			33.0	33.0	
Effective Green, g (s)					28.0	26.0	71.0	71.0			31.0	31.0	
Actuated g/C Ratio					0.25	0.24	0.65	0.65			0.28	0.28	
Clearance Time (s)					5.0	5.0	3.5	4.0			3.0	3.0	
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0	
Lane Grp Cap (vph)					437	362	618	2207			1385	431	
v/s Ratio Prot							c0.37	0.16			0.17		
v/s Ratio Perm					0.26	0.02	c0.37					0.28	
v/c Ratio					1.04	0.08	1.15	0.24			0.60	0.99	
Uniform Delay, d1					41.0	32.7	26.9	8.2			34.1	39.3	
Progression Factor					1.00	1.00	1.08	0.72			1.00	1.00	
Incremental Delay, d2					52.8	0.0	85.1	0.2			1.9	40.4	
Delay (s)					93.8	32.7	114.2	6.1			36.0	79.7	
Level of Service					F	C	F	A			D	E	
Approach Delay (s)		0.0			80.5			68.0			57.4		
Approach LOS		A			F			E			E		
Intersection Summary													
HCM Average Control Delay			65.1		HCM Level of Service						E		
HCM Volume to Capacity ratio			1.09										
Actuated Cycle Length (s)			110.0		Sum of lost time (s)					10.5			
Intersection Capacity Utilization			129.1%		ICU Level of Service					H			
Analysis Period (min)			15										
c Critical Lane Group													

Queues

13: EB I-10 Ramps & California

12/16/2013



Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	279	620	1043	667	301	754
v/c Ratio	0.74	1.23	0.29	0.54	0.95	0.33
Control Delay	53.6	142.3	7.8	2.3	53.9	7.0
Queue Delay	60.7	0.0	0.0	0.0	0.0	0.2
Total Delay	114.3	142.3	7.8	2.3	53.9	7.2
Queue Length 50th (ft)	185	-398	91	0	168	66
Queue Length 95th (ft)	#302	#622	110	36	m#313	m74
Internal Link Dist (ft)	1294		46			276
Turn Bay Length (ft)						
Base Capacity (vph)	375	505	3608	1244	318	2285
Starvation Cap Reductn	0	0	0	0	0	647
Spillback Cap Reductn	123	0	125	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.11	1.23	0.30	0.54	0.95	0.46






















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.

HCM Signalized Intersection Capacity Analysis

13: EB I-10 Ramps & California

12/16/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations								  			 		
Volume (vph)	257	8	589	0	0	0	0	991	634	286	716	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800	
Lane Width	12	12	8	12	12	12	12	12	12	12	12	12	
Total Lost time (s)		6.0	4.0					6.5	6.5	6.5	6.5		
Lane Util. Factor		1.00	1.00					*1.00	1.00	1.00	0.95		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		0.95	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		1717	1326					5400	1530	1615	3420		
Flt Permitted		0.95	1.00					1.00	1.00	0.28	1.00		
Satd. Flow (perm)		1717	1326					5400	1530	477	3420		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	271	8	620	0	0	0	0	1043	667	301	754	0	
RTOR Reduction (vph)	0	0	192	0	0	0	0	0	221	0	0	0	
Lane Group Flow (vph)	0	279	428	0	0	0	0	1043	446	301	754	0	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		4						2			6		
Permitted Phases	4		4						2	6			
Actuated Green, G (s)		26.0	26.0					75.5	75.5	75.5	75.5		
Effective Green, g (s)		24.0	26.0					73.5	73.5	73.5	73.5		
Actuated g/C Ratio		0.22	0.24					0.67	0.67	0.67	0.67		
Clearance Time (s)		4.0	4.0					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		2.0	2.0					2.0	2.0	2.0	2.0		
Lane Grp Cap (vph)		375	313					3608	1022	319	2285		
v/s Ratio Prot								0.19			0.22		
v/s Ratio Perm		0.16	c0.32						0.29	c0.63			
v/c Ratio		0.74	1.37					0.29	0.44	0.94	0.33		
Uniform Delay, d1		40.1	42.0					7.5	8.5	16.4	7.8		
Progression Factor		1.00	1.00					1.00	1.00	1.35	0.86		
Incremental Delay, d2		6.8	185.0					0.2	1.4	28.4	0.2		
Delay (s)		47.0	227.0					7.7	9.9	50.5	6.9		
Level of Service		D	F					A	A	D	A		
Approach Delay (s)		171.1			0.0			8.6			19.4		
Approach LOS		F			A			A			B		
Intersection Summary													
HCM Average Control Delay			51.6									HCM Level of Service	D
HCM Volume to Capacity ratio			1.05										
Actuated Cycle Length (s)			110.0									Sum of lost time (s)	10.5
Intersection Capacity Utilization			129.1%									ICU Level of Service	H
Analysis Period (min)			15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

14: California & Shopping Center

12/16/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	2	162	1494	55	381	982
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	171	1573	58	401	1034
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)			652		447	
pX, platoon unblocked	0.95	0.95			0.95	
vC, conflicting volume	2921	553			1631	
vC1, stage 1 conf vol	1602					
vC2, stage 2 conf vol	1319					
vCu, unblocked vol	2841	355			1486	
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 %	88	72			8	
cM capacity (veh/h)	17	617			436	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	173	629	629	372	401	517	517
Volume Left	2	0	0	0	401	0	0
Volume Right	171	0	0	58	0	0	0
cSH	432	1700	1700	1700	436	1700	1700
Volume to Capacity	0.40	0.37	0.37	0.22	0.92	0.30	0.30
Queue Length 95th (ft)	47	0	0	0	256	0	0
Control Delay (s)	18.8	0.0	0.0	0.0	56.2	0.0	0.0
Lane LOS	C				F		
Approach Delay (s)	18.8	0.0			15.7		
Approach LOS	C						

Intersection Summary			
Average Delay		8.0	
Intersection Capacity Utilization		76.1%	ICU Level of Service D
Analysis Period (min)		15	

Queues

15: California/California & W Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	222	831	139	597	638	66	638	433	571
v/c Ratio	0.94	0.87	0.87	0.70	0.90	0.38	0.87	1.06	0.36
Control Delay	74.7	46.8	74.1	41.8	29.7	42.8	54.0	89.4	16.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.7	46.8	74.1	41.8	29.7	42.8	54.0	89.4	16.8
Queue Length 50th (ft)	110	271	65	203	154	40	232	~305	122
Queue Length 95th (ft)	#255	348	#167	268	#391	85	302	#511	164
Internal Link Dist (ft)		1468		1180			268		572
Turn Bay Length (ft)	90		150		100			150	
Base Capacity (vph)	236	1111	159	1003	757	203	865	410	1734
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.75	0.87	0.60	0.84	0.33	0.74	1.06	0.33

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.

HCM Signalized Intersection Capacity Analysis

15: California/California & W Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	211	616	174	132	567	606	63	551	55	411	408	135
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.5	7.7		6.5	7.7	7.7	5.2	7.2		6.0	7.2	
Lane Util. Factor	1.00	*1.00		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3481		1615	3420	1530	1615	3373		1615	3292	
Flt Permitted	0.26	1.00		0.17	1.00	1.00	0.44	1.00		0.16	1.00	
Satd. Flow (perm)	439	3481		289	3420	1530	743	3373		265	3292	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	222	648	183	139	597	638	66	580	58	433	429	142
RTOR Reduction (vph)	0	26	0	0	0	328	0	7	0	0	28	0
Lane Group Flow (vph)	222	805	0	139	597	310	66	631	0	433	543	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			4		3	8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	40.2	30.6		36.2	28.6	28.6	25.1	25.1		53.3	53.3	
Effective Green, g (s)	36.2	28.6		32.2	26.6	26.6	25.1	23.1		51.3	51.3	
Actuated g/C Ratio	0.34	0.27		0.30	0.25	0.25	0.23	0.22		0.48	0.48	
Clearance Time (s)	4.5	5.7		4.5	5.7	5.7	5.2	5.2		4.0	5.2	
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)	232	931		157	851	381	174	729		408	1580	
v/s Ratio Prot	c0.07	0.23		0.05	0.17			0.19		c0.22	0.16	
v/s Ratio Perm	c0.26			0.22		0.20	0.09			c0.29		
v/c Ratio	0.96	0.87		0.89	0.70	0.81	0.38	0.87		1.06	0.34	
Uniform Delay, d1	32.2	37.3		32.5	36.5	37.8	34.4	40.4		29.6	17.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	46.6	8.4		40.2	2.6	12.6	1.4	10.5		61.7	0.1	
Delay (s)	78.7	45.8		72.7	39.2	50.4	35.7	50.9		91.3	17.4	
Level of Service	E	D		E	D	D	D	D		F	B	
Approach Delay (s)		52.7			47.8			49.5			49.3	
Approach LOS		D			D			D			D	

Intersection Summary

HCM Average Control Delay	49.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	106.9	Sum of lost time (s)	12.5
Intersection Capacity Utilization	98.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues

16: Alabama St & WB I-10 Ramps

12/16/2013



Lane Group	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	786	432	1194	1435
v/c Ratio	1.00	1.06	0.54	0.71
Control Delay	69.5	70.0	13.8	26.1
Queue Delay	0.0	0.0	2.9	0.0
Total Delay	69.5	70.0	16.6	26.1
Queue Length 50th (ft)	~232	~255	320	233
Queue Length 95th (ft)	#358	m#375	m380	282
Internal Link Dist (ft)	765		376	271
Turn Bay Length (ft)				
Base Capacity (vph)	783	407	2196	2035
Starvation Cap Reductn	0	0	858	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.00	1.06	0.89	0.71



























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.

HCM Signalized Intersection Capacity Analysis

16: Alabama St & WB I-10 Ramps

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					  		 	  			  	  
Volume (vph)	0	0	0	178	333	236	410	1134	0	0	916	447
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800
Total Lost time (s)					6.5		6.0	8.0			8.0	
Lane Util. Factor					*1.00		1.00	0.95			*1.00	
Flt					0.95		1.00	1.00			0.95	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					3389		1615	3420			5134	
Flt Permitted					0.99		0.11	1.00			1.00	
Satd. Flow (perm)					3389		183	3420			5134	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	187	351	248	432	1194	0	0	964	471
RTOR Reduction (vph)	0	0	0	0	61	0	0	0	0	0	74	0
Lane Group Flow (vph)	0	0	0	0	725	0	432	1194	0	0	1361	0
Turn Type				Perm	NA		pm+pt	NA			NA	
Protected Phases					4		1	6			2	
Permitted Phases				4			6					
Actuated Green, G (s)					23.3		66.2	66.2			40.2	
Effective Green, g (s)					21.3		64.2	64.2			38.2	
Actuated g/C Ratio					0.21		0.64	0.64			0.38	
Clearance Time (s)					4.5		4.0	6.0			6.0	
Vehicle Extension (s)					3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)					722		404	2196			1961	
v/s Ratio Prot							c0.21	0.35			0.27	
v/s Ratio Perm					0.21		c0.47					
v/c Ratio					1.00		1.07	0.54			0.69	
Uniform Delay, d1					39.4		28.5	9.8			26.0	
Progression Factor					1.00		0.64	1.32			1.00	
Incremental Delay, d2					34.4		52.2	0.5			2.1	
Delay (s)					73.7		70.5	13.5			28.0	
Level of Service					E		E	B			C	
Approach Delay (s)		0.0			73.7			28.7			28.0	
Approach LOS		A			E			C			C	
Intersection Summary												
HCM Average Control Delay			37.6		HCM Level of Service						D	
HCM Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			100.0		Sum of lost time (s)					12.5		
Intersection Capacity Utilization			95.2%		ICU Level of Service					F		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

17: EB I-10 Ramps & Alabama St

12/16/2013



Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	991	1525	281	967
v/c Ratio	1.01dr	0.81	0.96	0.51
Control Delay	48.7	32.8	50.7	14.8
Queue Delay	4.9	0.0	0.0	1.2
Total Delay	53.6	32.8	50.7	16.0
Queue Length 50th (ft)	276	288	140	284
Queue Length 95th (ft)	#399	345	m#257	m332
Internal Link Dist (ft)	622	505		376
Turn Bay Length (ft)				
Base Capacity (vph)	1075	1880	310	1912
Starvation Cap Reductn	0	0	0	668
Spillback Cap Reductn	55	1	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.97	0.81	0.91	0.78

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.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

HCM Signalized Intersection Capacity Analysis

17: EB I-10 Ramps & Alabama St

12/16/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		  						  		 	  		
Volume (vph)	412	8	522	0	0	0	0	1138	311	267	919	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800	
Total Lost time (s)		7.0						8.0		6.0	7.0		
Lane Util. Factor		*1.00						*1.00		1.00	0.95		
Frt		0.92						0.97		1.00	1.00		
Flt Protected		0.98						1.00		0.95	1.00		
Satd. Flow (prot)		3230						5226		1615	3420		
Flt Permitted		0.98						1.00		0.10	1.00		
Satd. Flow (perm)		3230						5226		162	3420		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	434	8	549	0	0	0	0	1198	327	281	967	0	
RTOR Reduction (vph)	0	74	0	0	0	0	0	48	0	0	0	0	
Lane Group Flow (vph)	0	917	0	0	0	0	0	1477	0	281	967	0	
Turn Type	Perm	NA						NA		pm+pt	NA		
Protected Phases		8						6		5	2		
Permitted Phases	8									2			
Actuated Green, G (s)		32.1						37.0		57.9	57.9		
Effective Green, g (s)		30.1						35.0		55.9	55.9		
Actuated g/C Ratio		0.30						0.35		0.56	0.56		
Clearance Time (s)		5.0						6.0		4.0	5.0		
Vehicle Extension (s)		2.0						2.0		2.0	2.0		
Lane Grp Cap (vph)		972						1829		293	1912		
v/s Ratio Prot								0.28		c0.13	0.28		
v/s Ratio Perm		0.28								c0.40			
v/c Ratio		1.01dr						0.81		0.96	0.51		
Uniform Delay, d1		34.1						29.4		28.2	13.6		
Progression Factor		1.00						1.00		0.52	1.01		
Incremental Delay, d2		16.6						3.9		33.1	0.7		
Delay (s)		50.8						33.4		47.7	14.4		
Level of Service		D						C		D	B		
Approach Delay (s)		50.8			0.0			33.4			21.9		
Approach LOS		D			A			C			C		
Intersection Summary													
HCM Average Control Delay			34.2									HCM Level of Service	C
HCM Volume to Capacity ratio			0.91										
Actuated Cycle Length (s)			100.0									Sum of lost time (s)	13.0
Intersection Capacity Utilization			95.2%									ICU Level of Service	F
Analysis Period (min)			15										
dr Defacto Right Lane. Recode with 1 though lane as a right lane.													
c Critical Lane Group													

Queues

18: Alabama St & Industrial Park

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	163	159	76	448	57	1147	352	982	151
v/c Ratio	0.84	0.27	0.36	0.92	0.40	0.74	0.95	0.54	0.18
Control Delay	61.8	20.7	39.5	43.3	37.5	33.4	63.7	16.1	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.8	20.7	39.5	43.3	37.5	33.4	63.7	16.1	7.4
Queue Length 50th (ft)	72	55	40	133	28	212	171	204	25
Queue Length 95th (ft)	#183	118	90	#332	69	266	#398	274	58
Internal Link Dist (ft)		298		379		236		505	
Turn Bay Length (ft)	100		50		150		215		55
Base Capacity (vph)	194	695	288	580	201	2173	369	2236	1024
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.23	0.26	0.77	0.28	0.53	0.95	0.44	0.15

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

18: Alabama St & Industrial Park

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	155	93	58	72	65	361	54	999	90	334	933	143
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	6.2		6.2	6.2		6.2	6.2		6.0	6.2	6.2
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	*1.00		1.00	0.95	1.00
Frt	1.00	0.94		1.00	0.87		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1615	1696		1615	1571		1615	5333		1615	3420	1530
Flt Permitted	0.17	1.00		0.66	1.00		0.29	1.00		0.12	1.00	1.00
Satd. Flow (perm)	282	1696		1116	1571		496	5333		206	3420	1530
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	163	98	61	76	68	380	57	1052	95	352	982	151
RTOR Reduction (vph)	0	21	0	0	189	0	0	11	0	0	0	31
Lane Group Flow (vph)	163	138	0	76	259	0	57	1136	0	352	982	120
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	3	8			4			6		5	2	
Permitted Phases	8			4			6			2		2
Actuated Green, G (s)	33.3	33.3		20.1	20.1		29.3	29.3		52.7	52.7	52.7
Effective Green, g (s)	31.3	31.3		18.1	18.1		27.3	27.3		50.7	50.7	50.7
Actuated g/C Ratio	0.33	0.33		0.19	0.19		0.29	0.29		0.54	0.54	0.54
Clearance Time (s)	4.0	4.2		4.2	4.2		4.2	4.2		4.0	4.2	4.2
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)	195	562		214	301		143	1542		370	1837	822
v/s Ratio Prot	c0.06	0.08			0.16			0.21		c0.18	0.29	
v/s Ratio Perm	c0.21			0.07			0.11			c0.34		0.08
v/c Ratio	0.84	0.25		0.36	0.86		0.40	0.74		0.95	0.53	0.15
Uniform Delay, d1	25.8	23.0		33.1	36.9		27.0	30.3		25.7	14.2	11.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	25.5	0.2		1.0	21.3		1.8	1.9		34.2	0.3	0.1
Delay (s)	51.3	23.2		34.1	58.2		28.8	32.2		59.8	14.5	11.1
Level of Service	D	C		C	E		C	C		E	B	B
Approach Delay (s)		37.4			54.7			32.0			24.9	
Approach LOS		D			D			C			C	

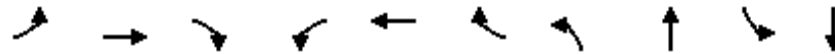
Intersection Summary

HCM Average Control Delay	32.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	94.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	100.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues

19: Alabama St & W Redlands

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	317	769	91	124	441	244	135	808	196	967
v/c Ratio	0.77	0.88	0.18	0.52	0.55	0.47	0.78	0.60	0.74	0.92
Control Delay	48.7	43.0	6.5	45.5	32.8	10.6	70.5	28.3	56.1	42.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.7	43.0	6.5	45.5	32.8	10.6	70.5	28.3	56.1	42.9
Queue Length 50th (ft)	84	207	0	32	105	21	37	129	52	244
Queue Length 95th (ft)	133	#294	34	62	155	86	#92	189	#110	#415
Internal Link Dist (ft)		1247			345			380		164
Turn Bay Length (ft)	240			290			115		125	
Base Capacity (vph)	521	878	494	625	1090	629	174	1356	278	1049
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	0.61	0.88	0.18	0.20	0.40	0.39	0.78	0.60	0.71	0.92

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

19: Alabama St & W Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↖	↖↗	↑↑	↖	↖↗	↑↑↖		↖↗	↑↖	
Volume (vph)	301	731	86	118	419	232	128	662	105	186	686	233
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Total Lost time (s)	5.0	6.9	4.9	6.9	6.9	4.9	5.0	6.2		5.0	6.2	
Lane Util. Factor	0.97	0.95	1.00	0.97	*1.00	*1.00	0.97	0.91		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2949	3420	1530	2949	3600	1530	2949	4813		2949	3290	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	2949	3420	1530	2949	3600	1530	2949	4813		2949	3290	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	317	769	91	124	441	244	135	697	111	196	722	245
RTOR Reduction (vph)	0	0	66	0	0	146	0	22	0	0	34	0
Lane Group Flow (vph)	317	769	25	124	441	98	135	786	0	196	933	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	13.8	23.8	23.8	8.9	20.8	20.8	7.0	25.6		9.7	28.3	
Effective Green, g (s)	11.8	21.8	23.8	6.9	18.8	20.8	5.0	23.6		7.7	26.3	
Actuated g/C Ratio	0.14	0.26	0.28	0.08	0.22	0.24	0.06	0.28		0.09	0.31	
Clearance Time (s)	3.0	4.9	4.9	4.9	4.9	4.9	3.0	4.2		3.0	4.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	409	877	428	239	796	374	173	1336		267	1018	
v/s Ratio Prot	c0.11	c0.22		0.04	0.12		0.05	0.16		c0.07	c0.28	
v/s Ratio Perm			0.02			0.06						
v/c Ratio	0.78	0.88	0.06	0.52	0.55	0.26	0.78	0.59		0.73	0.92	
Uniform Delay, d1	35.3	30.3	22.4	37.5	29.4	25.9	39.5	26.5		37.7	28.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.9	9.8	0.1	1.9	0.8	0.4	20.0	1.9		10.0	14.1	
Delay (s)	44.2	40.1	22.5	39.4	30.2	26.3	59.5	28.4		47.6	42.4	
Level of Service	D	D	C	D	C	C	E	C		D	D	
Approach Delay (s)		39.9			30.4			32.9			43.3	
Approach LOS		D			C			C			D	

Intersection Summary

HCM Average Control Delay	37.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	23.1
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

20: Tennessee & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	353	961	46	527	754	727
v/c Ratio	0.88	0.65	0.52	0.78	0.78	0.88
Control Delay	43.1	19.9	52.9	31.7	28.2	36.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.1	19.9	52.9	31.7	28.2	36.1
Queue Length 50th (ft)	124	197	22	101	167	171
Queue Length 95th (ft)	#293	271	59	159	264	#303
Internal Link Dist (ft)		2241		737	458	48
Turn Bay Length (ft)	145		140			
Base Capacity (vph)	422	1843	135	960	1169	1010
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.52	0.34	0.55	0.64	0.72

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

20: Tennessee & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Volume (vph)	335	813	100	44	299	201	72	593	51	110	551	29
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.5	6.9		6.9	6.9			6.9			6.9	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frt	1.00	0.98		1.00	0.94			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1615	3364		1615	3214			3366			3371	
Flt Permitted	0.21	1.00		0.30	1.00			0.74			0.64	
Satd. Flow (perm)	361	3364		506	3214			2501			2160	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	353	856	105	46	315	212	76	624	54	116	580	31
RTOR Reduction (vph)	0	11	0	0	115	0	0	6	0	0	4	0
Lane Group Flow (vph)	353	950	0	46	412	0	0	748	0	0	723	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	35.8	35.8		15.6	15.6			31.7			31.7	
Effective Green, g (s)	33.8	33.8		13.6	13.6			29.7			29.7	
Actuated g/C Ratio	0.44	0.44		0.18	0.18			0.38			0.38	
Clearance Time (s)	3.5	4.9		4.9	4.9			4.9			4.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	396	1471		89	565			961			830	
v/s Ratio Prot	c0.17	0.28			0.13							
v/s Ratio Perm	c0.22			0.09				0.30			c0.33	
v/c Ratio	0.89	0.65		0.52	0.73			0.78			0.87	
Uniform Delay, d1	16.9	17.1		28.9	30.1			20.9			22.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	21.4	1.0		5.0	4.7			4.0			9.9	
Delay (s)	38.3	18.0		33.9	34.8			24.9			32.0	
Level of Service	D	B		C	C			C			C	
Approach Delay (s)		23.5			34.7			24.9			32.0	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	27.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	77.3	Sum of lost time (s)	12.4
Intersection Capacity Utilization	99.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

21: Texas & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	3	11	56	21	16	19	19	544	29	17	298	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	3	12	59	22	17	20	20	573	31	18	314	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	711	999	164	885	991	302	327			603		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	711	999	164	885	991	302	327			603		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	95	93	90	93	97	98			98		
cM capacity (veh/h)	290	237	858	212	240	700	1244			984		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	74	59	306	317	175	171
Volume Left	3	22	20	0	18	0
Volume Right	59	20	0	31	0	14
cSH	574	290	1244	1700	984	1700
Volume to Capacity	0.13	0.20	0.02	0.19	0.02	0.10
Queue Length 95th (ft)	11	19	1	0	1	0
Control Delay (s)	12.2	20.5	0.7	0.0	1.1	0.0
Lane LOS	B	C	A		A	
Approach Delay (s)	12.2	20.5	0.3		0.5	
Approach LOS	B	C				

Intersection Summary		
Average Delay		2.3
Intersection Capacity Utilization	51.5%	ICU Level of Service
Analysis Period (min)	15	A

HCM Unsignalized Intersection Capacity Analysis

22: Texas & Oriental

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	4	1	3	17	1	10	1	558	12	5	299	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	4	1	3	18	1	11	1	587	13	5	315	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	632	927	157	767	921	300	315			600		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	632	927	157	767	921	300	315			600		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	94	100	99	100			99		
cM capacity (veh/h)	361	269	866	292	271	702	1257			987		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	8	29	295	306	163	157
Volume Left	4	18	1	0	5	0
Volume Right	3	11	0	13	0	0
cSH	438	367	1257	1700	987	1700
Volume to Capacity	0.02	0.08	0.00	0.18	0.01	0.09
Queue Length 95th (ft)	1	7	0	0	0	0
Control Delay (s)	13.4	15.7	0.0	0.0	0.3	0.0
Lane LOS	B	C	A		A	
Approach Delay (s)	13.4	15.7	0.0		0.2	
Approach LOS	B	C				

Intersection Summary		
Average Delay		0.7
Intersection Capacity Utilization	27.4%	ICU Level of Service
Analysis Period (min)	15	A

Queues

23: Eureka & EB I-10 off/Pearl

12/16/2013



Lane Group	EBT	EBR	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	883	524	42	19	142	264	75
v/c Ratio	0.92	0.49	0.39	0.02	0.27	0.44	0.16
Control Delay	33.5	2.6	21.7	3.4	30.0	13.4	23.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.5	2.6	21.7	3.4	30.0	13.4	23.8
Queue Length 50th (ft)	354	0	10	0	67	36	29
Queue Length 95th (ft)	#623	40	42	8	110	91	63
Internal Link Dist (ft)	447				545		418
Turn Bay Length (ft)				75			
Base Capacity (vph)	1001	1090	114	888	518	596	473
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.48	0.37	0.02	0.27	0.44	0.16

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

23: Eureka & EB I-10 off/Pearl

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗	↖		↗		↑	↗		↖	
Volume (vph)	182	656	498	40	0	18	0	135	251	18	53	0
Ideal Flow (vphpl)	1800	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		7.0	7.0	6.0		6.0		7.0	7.0		7.0	
Lane Util. Factor		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.99	1.00	0.95		1.00		1.00	1.00		0.99	
Satd. Flow (prot)		1781	1530	1615		1530		1800	1530		1777	
Flt Permitted		0.99	1.00	0.12		1.00		1.00	1.00		0.92	
Satd. Flow (perm)		1781	1530	200		1530		1800	1530		1647	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	192	691	524	42	0	19	0	142	264	19	56	0
RTOR Reduction (vph)	0	0	242	0	0	9	0	0	156	0	0	0
Lane Group Flow (vph)	0	883	282	42	0	10	0	142	108	0	75	0
Turn Type	Perm	NA	Perm	custom		custom		NA	Perm	Perm	NA	
Protected Phases		4						2				6
Permitted Phases	4		4	8		8			2	6		
Actuated Green, G (s)		45.0	45.0	46.0		46.0		25.0	25.0		25.0	
Effective Green, g (s)		43.0	43.0	44.0		44.0		23.0	23.0		23.0	
Actuated g/C Ratio		0.54	0.54	0.55		0.55		0.29	0.29		0.29	
Clearance Time (s)		5.0	5.0	4.0		4.0		5.0	5.0		5.0	
Vehicle Extension (s)		2.0	2.0	3.0		3.0		2.0	2.0		2.0	
Lane Grp Cap (vph)		957	822	110		842		518	440		474	
v/s Ratio Prot								c0.08				
v/s Ratio Perm		0.50	0.18	0.21		0.01			0.07		0.05	
v/c Ratio		0.92	0.34	0.38		0.01		0.27	0.25		0.16	
Uniform Delay, d1		17.0	10.5	10.3		8.2		22.0	21.8		21.3	
Progression Factor		1.00	1.00	1.00		1.00		1.21	1.80		1.00	
Incremental Delay, d2		13.8	0.1	2.2		0.0		1.3	1.3		0.7	
Delay (s)		30.7	10.6	12.5		8.2		28.0	40.5		22.0	
Level of Service		C	B	B		A		C	D		C	
Approach Delay (s)		23.2			11.1			36.2			22.0	
Approach LOS		C			B			D			C	

Intersection Summary

HCM Average Control Delay	25.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

24: Eureka & Stuart

12/16/2013



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	51	73	17	439	43	556
v/c Ratio	0.24	0.38	0.04	0.23	0.09	0.29
Control Delay	14.9	20.0	5.0	4.0	4.4	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.9	20.0	5.0	4.0	4.4	4.4
Queue Length 50th (ft)	8	14	1	15	3	23
Queue Length 95th (ft)	27	37	8	36	m10	44
Internal Link Dist (ft)	380	399		136		545
Turn Bay Length (ft)			20		20	
Base Capacity (vph)	538	494	427	1904	478	1927
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.15	0.04	0.23	0.09	0.29

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

24: Eureka & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕		↗	↕	
Volume (vph)	14	23	11	41	23	6	16	320	97	41	498	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00			1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.97			0.99		1.00	0.97		1.00	0.99	
Flt Protected		0.99			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1708			1722		1615	3283		1612	3390	
Flt Permitted		0.87			0.79		0.44	1.00		0.50	1.00	
Satd. Flow (perm)		1516			1400		754	3283		844	3390	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	15	24	12	43	24	6	17	337	102	43	524	32
RTOR Reduction (vph)	0	10	0	0	5	0	0	44	0	0	7	0
Lane Group Flow (vph)	0	41	0	0	68	0	17	395	0	43	549	0
Confl. Peds. (#/hr)	9		6	6		9			3	3		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.3			7.3		24.7	24.7		24.7	24.7	
Effective Green, g (s)		5.3			5.3		22.7	22.7		22.7	22.7	
Actuated g/C Ratio		0.13			0.13		0.57	0.57		0.57	0.57	
Clearance Time (s)		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	
Lane Grp Cap (vph)		201			186		428	1863		479	1924	
v/s Ratio Prot								0.12			c0.16	
v/s Ratio Perm		0.03			c0.05		0.02			0.05		
v/c Ratio		0.20			0.36		0.04	0.21		0.09	0.29	
Uniform Delay, d1		15.5			15.8		3.8	4.3		3.9	4.5	
Progression Factor		1.00			1.00		1.00	1.00		0.87	0.87	
Incremental Delay, d2		0.5			1.2		0.2	0.3		0.3	0.3	
Delay (s)		16.0			17.0		4.0	4.5		3.8	4.2	
Level of Service		B			B		A	A		A	A	
Approach Delay (s)		16.0			17.0			4.5			4.2	
Approach LOS		B			B			A			A	

Intersection Summary

HCM Average Control Delay	5.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
25: Eureka & Oriental

12/16/2013



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	39	31	8	438	36	587
v/c Ratio	0.16	0.12	0.02	0.29	0.10	0.39
Control Delay	10.5	8.8	5.2	5.9	5.9	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.5	8.8	5.2	5.9	5.9	6.6
Queue Length 50th (ft)	4	2	1	20	3	28
Queue Length 95th (ft)	16	13	4	34	11	47
Internal Link Dist (ft)	432	448		184		93
Turn Bay Length (ft)			25		40	
Base Capacity (vph)	465	491	418	1939	481	1945
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.06	0.02	0.23	0.07	0.30

Intersection Summary

HCM Signalized Intersection Capacity Analysis

25: Eureka & Oriental

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (vph)	15	9	13	5	7	18	8	392	24	34	538	20
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.2			6.2		6.2	6.2		6.2	6.2	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		0.99			0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Frt		0.95			0.92		1.00	0.99		1.00	0.99	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1659			1610		1614	3386		1609	3399	
Flt Permitted		0.85			0.93		0.43	1.00		0.50	1.00	
Satd. Flow (perm)		1443			1517		732	3386		843	3399	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	9	14	5	7	19	8	413	25	36	566	21
RTOR Reduction (vph)	0	12	0	0	16	0	0	11	0	0	7	0
Lane Group Flow (vph)	0	27	0	0	15	0	8	427	0	36	580	0
Confl. Peds. (#/hr)	8		2	2		8	1		6	6		1
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			5			7				3
Permitted Phases	1			5			7			3		
Actuated Green, G (s)		7.0			7.0		15.8	15.8		15.8	15.8	
Effective Green, g (s)		5.0			5.0		13.8	13.8		13.8	13.8	
Actuated g/C Ratio		0.16			0.16		0.44	0.44		0.44	0.44	
Clearance Time (s)		4.2			4.2		4.2	4.2		4.2	4.2	
Vehicle Extension (s)		2.5			2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		231			243		324	1498		373	1503	
v/s Ratio Prot								0.13				c0.17
v/s Ratio Perm		c0.02			0.01		0.01			0.04		
v/c Ratio		0.12			0.06		0.02	0.28		0.10	0.39	
Uniform Delay, d1		11.2			11.1		4.9	5.6		5.1	5.9	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.1		0.0	0.1		0.1	0.1	
Delay (s)		11.4			11.2		4.9	5.6		5.2	6.0	
Level of Service		B			B		A	A		A	A	
Approach Delay (s)		11.4			11.2			5.6			5.9	
Approach LOS		B			B			A			A	

Intersection Summary

HCM Average Control Delay	6.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	31.2	Sum of lost time (s)	12.4
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

26: Eureka & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	77	828	51	454	351	572
v/c Ratio	0.26	0.61	0.36	0.63	0.36	0.67
Control Delay	11.7	13.8	25.2	20.6	12.0	18.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	13.8	25.2	20.6	12.0	18.3
Queue Length 50th (ft)	12	90	12	56	31	64
Queue Length 95th (ft)	35	155	40	102	69	132
Internal Link Dist (ft)		660		354	209	138
Turn Bay Length (ft)	35		40			
Base Capacity (vph)	299	1943	254	1294	1311	1171
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.43	0.20	0.35	0.27	0.49

Intersection Summary

HCM Signalized Intersection Capacity Analysis

26: Eureka & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	731	56	48	374	57	30	242	61	129	373	41
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7	6.6		6.6	6.6			6.2			6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.97			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1615	3379		1612	3346			3300			3335	
Flt Permitted	0.31	1.00		0.39	1.00			0.87			0.78	
Satd. Flow (perm)	534	3379		666	3346			2895			2619	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	77	769	59	51	394	60	32	255	64	136	393	43
RTOR Reduction (vph)	0	10	0	0	23	0	0	32	0	0	10	0
Lane Group Flow (vph)	77	818	0	51	431	0	0	319	0	0	562	0
Confl. Peds. (#/hr)	2		7	7		2	4		9	9		4
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			4				4
Permitted Phases	6			2			4			4		
Actuated Green, G (s)	21.3	21.3		12.2	12.2			17.5			17.5	
Effective Green, g (s)	19.3	19.3		10.2	10.2			15.5			15.5	
Actuated g/C Ratio	0.41	0.41		0.21	0.21			0.33			0.33	
Clearance Time (s)	3.7	4.6		4.6	4.6			4.2			4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	294	1370		143	717			943			853	
v/s Ratio Prot	0.02	c0.24			0.13							
v/s Ratio Perm	0.09			0.08				0.11			c0.21	
v/c Ratio	0.26	0.60		0.36	0.60			0.34			0.66	
Uniform Delay, d1	9.2	11.1		15.9	16.9			12.2			13.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.5	0.7		1.5	1.4			0.2			1.9	
Delay (s)	9.7	11.8		17.4	18.3			12.4			15.6	
Level of Service	A	B		B	B			B			B	
Approach Delay (s)		11.6			18.2			12.4			15.6	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	14.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	47.6	Sum of lost time (s)	12.8
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Queues
27: Orange & Colton

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	180	646	168	265	121	72	447	96	559
v/c Ratio	0.35	0.72	0.67	0.29	0.14	0.42	0.50	0.45	0.64
Control Delay	11.4	16.6	29.3	9.4	2.7	24.0	15.2	23.2	20.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.4	16.6	29.3	9.4	2.7	24.0	15.2	23.2	20.0
Queue Length 50th (ft)	30	128	34	42	0	19	50	25	77
Queue Length 95th (ft)	83	#349	#144	101	23	50	83	60	118
Internal Link Dist (ft)		502		260			472		133
Turn Bay Length (ft)	50		65		65	50		75	
Base Capacity (vph)	529	920	257	939	856	270	1384	340	1381
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.70	0.65	0.28	0.14	0.27	0.32	0.28	0.40
























Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

27: Orange & Colton

12/16/2013

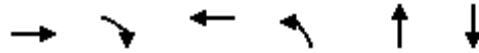
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	171	438	176	160	252	115	68	323	102	91	485	46
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	1723		1615	1800	1530	1615	3297		1615	3376	
Flt Permitted	0.60	1.00		0.29	1.00	1.00	0.39	1.00		0.49	1.00	
Satd. Flow (perm)	1013	1723		494	1800	1530	665	3297		839	3376	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	180	461	185	168	265	121	72	340	107	96	511	48
RTOR Reduction (vph)	0	21	0	0	0	59	0	57	0	0	13	0
Lane Group Flow (vph)	180	625	0	168	265	62	72	390	0	96	546	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	28.7	28.7		28.7	28.7	28.7	15.4	15.4		15.4	15.4	
Effective Green, g (s)	26.7	26.7		26.7	26.7	26.7	13.4	13.4		13.4	13.4	
Actuated g/C Ratio	0.51	0.51		0.51	0.51	0.51	0.26	0.26		0.26	0.26	
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	3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	519	883		253	922	784	171	848		216	868	
v/s Ratio Prot		c0.36			0.15			0.12			c0.16	
v/s Ratio Perm	0.18			0.34		0.04	0.11			0.11		
v/c Ratio	0.35	0.71		0.66	0.29	0.08	0.42	0.46		0.44	0.63	
Uniform Delay, d1	7.5	9.7		9.4	7.3	6.5	16.1	16.3		16.2	17.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	2.6		6.4	0.2	0.0	2.0	0.5		1.7	1.5	
Delay (s)	7.9	12.3		15.8	7.4	6.5	18.1	16.8		17.9	18.6	
Level of Service	A	B		B	A	A	B	B		B	B	
Approach Delay (s)		11.4			9.8			17.0			18.5	
Approach LOS		B			A			B			B	

Intersection Summary

HCM Average Control Delay	14.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	52.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues
28: Pearl & Orange

12/16/2013



Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	773	263	363	22	1079	472
v/c Ratio	1.05	0.29	0.55	0.11	1.04	0.71
Control Delay	68.6	8.3	15.5	25.5	72.1	35.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.6	8.3	15.5	25.5	72.1	35.6
Queue Length 50th (ft)	~484	53	115	9	~334	125
Queue Length 95th (ft)	#703	96	199	28	#456	183
Internal Link Dist (ft)	445		279		526	472
Turn Bay Length (ft)		20		75		
Base Capacity (vph)	736	908	655	198	1035	662
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.05	0.29	0.55	0.11	1.04	0.71

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.

HCM Signalized Intersection Capacity Analysis

28: Pearl & Orange

12/16/2013



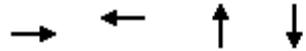
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↖	↕			↕	
Volume (vph)	299	435	250	50	45	250	21	946	79	27	413	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	*1.00			0.95	
Frt		1.00	0.85		0.90		1.00	0.99			1.00	
Flt Protected		0.98	1.00		0.99		0.95	1.00			1.00	
Satd. Flow (prot)		1764	1530		1612		1615	3558			3400	
Flt Permitted		0.71	1.00		0.69		0.40	1.00			0.67	
Satd. Flow (perm)		1274	1530		1127		685	3558			2284	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	315	458	263	53	47	263	22	996	83	28	435	9
RTOR Reduction (vph)	0	0	24	0	4	0	0	7	0	0	1	0
Lane Group Flow (vph)	0	773	239	0	359	0	22	1072	0	0	471	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2				2
Permitted Phases	4		4	4			2			2		
Actuated Green, G (s)		54.0	54.0		54.0		28.0	28.0			28.0	
Effective Green, g (s)		52.0	52.0		52.0		26.0	26.0			26.0	
Actuated g/C Ratio		0.58	0.58		0.58		0.29	0.29			0.29	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.5	3.5			3.5	
Lane Grp Cap (vph)		736	884		651		198	1028			660	
v/s Ratio Prot								c0.30				
v/s Ratio Perm		c0.61	0.16		0.32		0.03				0.21	
v/c Ratio		1.05	0.27		0.55		0.11	1.04			0.71	
Uniform Delay, d1		19.0	9.5		11.8		23.5	32.0			28.7	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		47.1	0.2		1.0		0.3	39.8			3.8	
Delay (s)		66.1	9.7		12.8		23.8	71.8			32.4	
Level of Service		E	A		B		C	E			C	
Approach Delay (s)		51.8			12.8			70.9			32.4	
Approach LOS		D			B			E			C	

Intersection Summary

HCM Average Control Delay	51.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	112.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues
29: Orange & Stuart

12/16/2013



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	217	277	1005	644
v/c Ratio	0.54	0.72	0.76	0.57
Control Delay	18.0	24.3	15.0	12.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	18.0	24.3	15.0	12.4
Queue Length 50th (ft)	38	50	92	55
Queue Length 95th (ft)	104	137	203	127
Internal Link Dist (ft)	305	198	150	526
Turn Bay Length (ft)				
Base Capacity (vph)	740	708	2116	1827
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.29	0.39	0.47	0.35

Intersection Summary

HCM Signalized Intersection Capacity Analysis

29: Orange & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	77	83	47	137	50	76	9	792	154	54	546	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.2			6.2			6.2			6.2	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frbp, ped/bikes		0.99			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.97			0.96			0.98			1.00	
Flt Protected		0.98			0.97			1.00			1.00	
Satd. Flow (prot)		1694			1659			3313			3392	
Flt Permitted		0.80			0.77			0.95			0.80	
Satd. Flow (perm)		1381			1314			3144			2733	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	81	87	49	144	53	80	9	834	162	57	575	12
RTOR Reduction (vph)	0	19	0	0	27	0	0	28	0	0	2	0
Lane Group Flow (vph)	0	198	0	0	250	0	0	977	0	0	642	0
Confl. Peds. (#/hr)	33		35	35		33	12		21	21		12
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		14.0			14.0			20.0			20.0	
Effective Green, g (s)		12.0			12.0			18.0			18.0	
Actuated g/C Ratio		0.28			0.28			0.42			0.42	
Clearance Time (s)		4.2			4.2			4.2			4.2	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		391			372			1335			1160	
v/s Ratio Prot												
v/s Ratio Perm		0.14			0.19			0.31			0.23	
v/c Ratio		0.51			0.67			0.73			0.55	
Uniform Delay, d1		12.7			13.5			10.2			9.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.0			4.8			2.1			0.6	
Delay (s)		13.7			18.2			12.3			9.8	
Level of Service		B			B			B			A	
Approach Delay (s)		13.7			18.2			12.3			9.8	
Approach LOS		B			B			B			A	

Intersection Summary

HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	42.4	Sum of lost time (s)	12.4
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

30: Orange & Oriental

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	45	21	11	893	694	32
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	47	22	12	940	731	34
Pedestrians	16			24	1	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	1			2	0	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				464	395	
pX, platoon unblocked	0.89					
vC, conflicting volume	1258	422	780			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1036	422	780			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	76	96	99			
cM capacity (veh/h)	199	566	835			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	69	325	627	487	277
Volume Left	47	12	0	0	0
Volume Right	22	0	0	0	34
cSH	251	835	1700	1700	1700
Volume to Capacity	0.28	0.01	0.37	0.29	0.16
Queue Length 95th (ft)	27	1	0	0	0
Control Delay (s)	24.8	0.5	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	24.8	0.2		0.0	
Approach LOS	C				

Intersection Summary					
Average Delay			1.1		
Intersection Capacity Utilization	50.4%		ICU Level of Service	A	
Analysis Period (min)	15				

Queues

31: Orange & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	207	693	58	625	72	535	167	535
v/c Ratio	0.70	0.51	0.46	0.75	0.44	0.73	0.63	0.41
Control Delay	28.3	14.6	34.0	18.5	30.3	27.8	26.5	13.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	14.6	34.0	18.5	30.3	27.8	26.5	13.4
Queue Length 50th (ft)	48	89	18	59	22	91	39	63
Queue Length 95th (ft)	#129	149	54	118	62	152	#102	112
Internal Link Dist (ft)		387		273		223		384
Turn Bay Length (ft)	60		60		75		60	
Base Capacity (vph)	299	1713	198	1146	236	1052	266	1613
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.40	0.29	0.55	0.31	0.51	0.63	0.33

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

31: Orange & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	197	567	91	55	330	264	68	463	46	159	407	102
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	5.5	6.2		6.2	6.2		6.2	6.2		5.5	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.93		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1614	3336		1605	3153		1598	3364		1612	3295	
Flt Permitted	0.23	1.00		0.39	1.00		0.45	1.00		0.26	1.00	
Satd. Flow (perm)	395	3336		656	3153		762	3364		441	3295	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	207	597	96	58	347	278	72	487	48	167	428	107
RTOR Reduction (vph)	0	19	0	0	222	0	0	11	0	0	32	0
Lane Group Flow (vph)	207	674	0	58	403	0	72	524	0	167	503	0
Confl. Peds. (#/hr)	16		15	15		16	26		23	23		26
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	25.8	25.8		13.7	13.7		15.0	15.0		25.1	25.1	
Effective Green, g (s)	23.8	23.8		11.7	11.7		13.0	13.0		23.1	23.1	
Actuated g/C Ratio	0.40	0.40		0.20	0.20		0.22	0.22		0.39	0.39	
Clearance Time (s)	3.5	4.2		4.2	4.2		4.2	4.2		3.5	4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	294	1339		129	622		167	737		263	1284	
v/s Ratio Prot	c0.08	0.20			0.13			0.16		c0.05	0.15	
v/s Ratio Perm	c0.20			0.09			0.09			c0.20		
v/c Ratio	0.70	0.50		0.45	0.65		0.43	0.71		0.63	0.39	
Uniform Delay, d1	13.3	13.3		21.0	21.9		20.0	21.4		13.0	13.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.4	0.3		2.5	2.3		1.8	3.2		4.9	0.2	
Delay (s)	20.7	13.6		23.4	24.2		21.7	24.7		17.9	13.2	
Level of Service	C	B		C	C		C	C		B	B	
Approach Delay (s)		15.2			24.2			24.3			14.4	
Approach LOS		B			C			C			B	

Intersection Summary

HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	59.3	Sum of lost time (s)	11.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

32: 6th St & WB I-10 Ramp

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↖	↗			↑			↖	↗
Volume (veh/h)	0	0	0	212	11	179	0	353	0	0	508	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	223	12	188	0	372	0	0	535	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1101	906	535	906	906	372	535			372		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1101	906	535	906	906	372	535			372		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	14	96	72	100			100		
cM capacity (veh/h)	134	278	549	259	278	679	1043			1198		



















Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	223	200	372	535
Volume Left	223	0	0	0
Volume Right	0	188	0	0
cSH	259	626	1700	1700
Volume to Capacity	0.86	0.32	0.22	0.31
Queue Length 95th (ft)	179	34	0	0
Control Delay (s)	67.5	13.4	0.0	0.0
Lane LOS	F	B		
Approach Delay (s)	41.9		0.0	0.0
Approach LOS	E			

Intersection Summary			
Average Delay		13.3	
Intersection Capacity Utilization	48.0%		ICU Level of Service
Analysis Period (min)		15	A

HCM Unsignalized Intersection Capacity Analysis

33: 6th St & EB I-10 Ramp

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	145	233	199	0	0	0	204	181	129	259	272	119
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	153	245	209	0	0	0	215	191	136	273	286	125
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2						
Volume Total (vph)	398	209	215	326	273	412						
Volume Left (vph)	153	0	215	0	273	0						
Volume Right (vph)	0	209	0	136	0	125						
Hadj (s)	0.19	-0.70	0.50	-0.29	0.50	-0.21						
Departure Headway (s)	7.9	7.0	8.4	7.6	8.2	7.4						
Degree Utilization, x	0.88	0.41	0.50	0.68	0.62	0.85						
Capacity (veh/h)	446	496	411	461	425	478						
Control Delay (s)	44.7	13.6	18.2	24.2	22.2	38.3						
Approach Delay (s)	34.0		21.8		31.9							
Approach LOS	D		C		D							
Intersection Summary												
Delay			29.6									
HCM Level of Service			D									
Intersection Capacity Utilization			66.8%	ICU Level of Service	C							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

34: 6th St & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Volume (veh/h)	23	17	46	22	11	68	64	498	21	39	349	38
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	24	18	48	23	12	72	67	524	22	41	367	40
Pedestrians		2			2			4			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1210	1155	210	999	1163	539	409			548		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1210	1155	210	999	1163	539	409			548		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	77	90	94	86	93	85	94			96		
cM capacity (veh/h)	105	179	798	160	177	490	1158			1030		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	91	106	67	546	41	245	162
Volume Left	24	23	67	0	41	0	0
Volume Right	48	72	0	22	0	0	40
cSH	232	299	1158	1700	1030	1700	1700
Volume to Capacity	0.39	0.36	0.06	0.32	0.04	0.14	0.10
Queue Length 95th (ft)	44	39	5	0	3	0	0
Control Delay (s)	30.2	23.6	8.3	0.0	8.6	0.0	0.0
Lane LOS	D	C	A		A		
Approach Delay (s)	30.2	23.6	0.9		0.8		
Approach LOS	D	C					

Intersection Summary			
Average Delay		4.9	
Intersection Capacity Utilization	50.9%		ICU Level of Service
Analysis Period (min)		15	A

Queues

35: Redlands Blvd & Citrus Ave

12/16/2013



Lane Group	EBT	WBT	SET	SER	NWT
Lane Group Flow (vph)	677	371	698	115	441
v/c Ratio	0.80	0.70	0.79	0.19	0.53
Control Delay	30.5	30.1	30.8	7.4	21.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	30.5	30.1	30.8	7.4	21.7
Queue Length 50th (ft)	129	63	143	6	75
Queue Length 95th (ft)	206	112	#288	44	145
Internal Link Dist (ft)	399	463	375		430
Turn Bay Length (ft)				100	
Base Capacity (vph)	1120	901	911	622	858
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.60	0.41	0.77	0.18	0.51

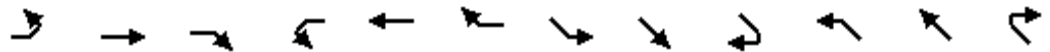
Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

35: Redlands Blvd & Citrus Ave

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕↕			↕↕			↕↕	↗		↕↕	
Volume (vph)	135	312	197	48	188	116	167	496	109	76	285	58
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.2			6.2	6.2		6.2	
Lane Util. Factor		0.95			0.95			0.95	1.00		0.95	
Frt		0.95			0.95			1.00	0.85		0.98	
Flt Protected		0.99			0.99			0.99	1.00		0.99	
Satd. Flow (prot)		3229			3229			3377	1530		3319	
Flt Permitted		0.99			0.99			0.73	1.00		0.69	
Satd. Flow (perm)		3229			3229			2480	1530		2297	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	142	328	207	51	198	122	176	522	115	80	300	61
RTOR Reduction (vph)	0	61	0	0	77	0	0	0	61	0	14	0
Lane Group Flow (vph)	0	616	0	0	294	0	0	698	54	0	427	0
Turn Type	Split	NA		Split	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	4	4		1	1			2			2	
Permitted Phases							2		2	2		
Actuated Green, G (s)		19.2			11.9			27.2	27.2		27.2	
Effective Green, g (s)		17.2			9.9			25.2	25.2		25.2	
Actuated g/C Ratio		0.24			0.14			0.36	0.36		0.36	
Clearance Time (s)		4.0			4.2			4.2	4.2		4.2	
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		786			452			884	545		819	
v/s Ratio Prot		c0.19			c0.09							
v/s Ratio Perm								c0.28	0.04		0.19	
v/c Ratio		0.78			0.65			0.79	0.10		0.52	
Uniform Delay, d1		25.0			28.8			20.4	15.2		18.0	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		5.1			3.2			4.7	0.1		0.6	
Delay (s)		30.1			32.0			25.1	15.3		18.6	
Level of Service		C			C			C	B		B	
Approach Delay (s)		30.1			32.0			23.7			18.6	
Approach LOS		C			C			C			B	

Intersection Summary

HCM Average Control Delay	26.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	70.7	Sum of lost time (s)	18.4
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

36: Stuart & Church

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	68	31	13	357	281	19
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	72	33	14	376	296	20
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	521	158	316			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	521	158	316			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	96	99			
cM capacity (veh/h)	485	866	1256			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	104	139	251	197	119
Volume Left	72	14	0	0	0
Volume Right	33	0	0	0	20
cSH	562	1256	1700	1700	1700
Volume to Capacity	0.19	0.01	0.15	0.12	0.07
Queue Length 95th (ft)	17	1	0	0	0
Control Delay (s)	12.9	0.9	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	12.9	0.3		0.0	
Approach LOS	B				

Intersection Summary					
Average Delay			1.8		
Intersection Capacity Utilization	33.1%		ICU Level of Service	A	
Analysis Period (min)	15				

HCM Unsignalized Intersection Capacity Analysis

37: Universtiy & WB I-10 Ramp/E Central

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↔			↔	
Volume (veh/h)	0	0	0	2	24	17	330	646	45	11	194	458
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	2	25	18	347	680	47	12	204	482
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1534	1891	343	1524	2108	364	686			727		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1534	1891	343	1524	2108	364	686			727		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	96	21	97	62			99		
cM capacity (veh/h)	20	43	659	58	32	639	917			885		

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	45	687	387	114	584
Volume Left	2	347	0	12	0
Volume Right	18	0	47	0	482
cSH	53	917	1700	885	1700
Volume to Capacity	0.86	0.38	0.23	0.01	0.34
Queue Length 95th (ft)	92	45	0	1	0
Control Delay (s)	207.3	8.4	0.0	1.0	0.0
Lane LOS	F	A		A	
Approach Delay (s)	207.3	5.3		0.2	
Approach LOS	F				

Intersection Summary		
Average Delay		8.4
Intersection Capacity Utilization	65.4%	ICU Level of Service
Analysis Period (min)		15
		C

HCM Unsignalized Intersection Capacity Analysis

38: Universtiy & EB I-10 Ramp

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	480	620	0	551	213	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	505	653	0	580	224	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	12					
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	514	112	224			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	514	112	224			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	30	100			
cM capacity (veh/h)	495	926	1356			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	1158	290	290	112	112	
Volume Left	505	0	0	0	0	
Volume Right	653	0	0	0	0	
cSH	1134	1700	1700	1700	1700	
Volume to Capacity	1.02	0.17	0.17	0.07	0.07	
Queue Length 95th (ft)	560	0	0	0	0	
Control Delay (s)	42.7	0.0	0.0	0.0	0.0	
Lane LOS	E					
Approach Delay (s)	42.7	0.0		0.0		
Approach LOS	E					
Intersection Summary						
Average Delay	25.2					
Intersection Capacity Utilization	53.4%			ICU Level of Service	A	
Analysis Period (min)	15					

Queues

39: Tippecanoe & Harriman PI

12/16/2013



Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	216	724	326	291	265	284	989	538	1587
v/c Ratio	0.82	0.77	0.77	0.85	0.69	0.76	0.38	0.50	0.69
Control Delay	72.2	21.5	62.1	65.6	34.0	60.8	22.0	7.5	26.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.2	21.5	62.1	65.6	34.0	60.8	22.0	7.5	26.1
Queue Length 50th (ft)	160	110	125	209	110	119	198	65	177
Queue Length 95th (ft)	#266	189	175	#344	210	m154	253	m172	240
Internal Link Dist (ft)				532			378		774
Turn Bay Length (ft)	280		300		300	225		500	
Base Capacity (vph)	296	1011	467	381	417	397	2636	1070	2307
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.72	0.70	0.76	0.64	0.72	0.38	0.50	0.69

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.

HCM Signalized Intersection Capacity Analysis

39: Tippecanoe & Harriman PI

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖		↖↖	↖↖	↖	↖	↖↖	↑↑↑	↖		↑↑↑	
Volume (vph)	205	0	688	310	179	350	270	940	511	0	1293	215
Ideal Flow (vphpl)	1700	1800	1800	1600	1800	1800	1600	1800	1800	1800	1800	1800
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		0.88	0.97	0.95	0.95	0.97	0.91	1.00		0.86	
Frt	1.00		0.85	1.00	0.95	0.85	1.00	1.00	0.85		0.98	
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (prot)	1615		2693	2949	1619	1454	2949	4914	1530		6060	
Flt Permitted	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (perm)	1615		2693	2949	1619	1454	2949	4914	1530		6060	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	216	0	724	326	188	368	284	989	538	0	1361	226
RTOR Reduction (vph)	0	0	351	0	17	93	0	0	249	0	23	0
Lane Group Flow (vph)	216	0	373	326	274	172	284	989	289	0	1564	0
Turn Type	Prot		custom	Prot	NA	Perm	Prot	NA	Perm		NA	
Protected Phases	7			3	8		5	2				6
Permitted Phases			4			8			2			
Actuated Green, G (s)	19.6		26.4	17.2	24.0	24.0	15.2	64.4	64.4		45.2	
Effective Green, g (s)	19.6		26.4	17.2	24.0	24.0	15.2	64.4	64.4		45.2	
Actuated g/C Ratio	0.16		0.22	0.14	0.20	0.20	0.13	0.54	0.54		0.38	
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)	264		592	423	324	291	374	2637	821		2283	
v/s Ratio Prot	c0.13			0.11	c0.17		c0.10	0.20			c0.26	
v/s Ratio Perm			0.14			0.12			0.19			
v/c Ratio	0.82		0.63	0.77	0.85	0.59	0.76	0.38	0.35		0.69	
Uniform Delay, d1	48.5		42.4	49.5	46.2	43.6	50.6	16.1	15.9		31.4	
Progression Factor	1.00		1.00	1.00	1.00	1.00	0.99	1.26	4.06		0.77	
Incremental Delay, d2	17.6		2.2	8.4	18.0	3.2	6.6	0.3	0.9		1.2	
Delay (s)	66.1		44.6	57.9	64.3	46.8	56.6	20.7	65.4		25.5	
Level of Service	E		D	E	E	D	E	C	E		C	
Approach Delay (s)		49.5			56.7			39.6			25.5	
Approach LOS		D			E			D			C	

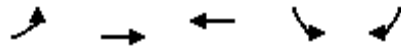
Intersection Summary

HCM Average Control Delay	40.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

1: Mill St & Sierra Way

11/25/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	77	796	931	239	113
v/c Ratio	0.28	0.44	0.51	0.47	0.47
Control Delay	9.3	7.0	7.6	15.5	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	9.3	7.0	7.6	15.5	16.6
Queue Length 50th (ft)	8	48	58	20	14
Queue Length 95th (ft)	32	92	112	42	49
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	283	1864	1856	1670	743
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.27	0.43	0.50	0.14	0.15

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St & Sierra Way

11/25/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	73	756	846	38	136	199
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.94	0.85
Flt Protected	0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	1615	3420	3398		3186	1392
Flt Permitted	0.31	1.00	1.00		0.97	1.00
Satd. Flow (perm)	520	3420	3398		3186	1392
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	77	796	891	40	143	209
RTOR Reduction (vph)	0	0	4	0	41	41
Lane Group Flow (vph)	77	796	927	0	198	72
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	23.8	23.8	23.8		7.9	7.9
Effective Green, g (s)	21.8	21.8	21.8		5.9	5.9
Actuated g/C Ratio	0.54	0.54	0.54		0.14	0.14
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	279	1832	1820		462	202
v/s Ratio Prot		0.23	c0.27		c0.06	
v/s Ratio Perm	0.15					0.05
v/c Ratio	0.28	0.43	0.51		0.43	0.36
Uniform Delay, d1	5.1	5.7	6.0		15.9	15.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.5	0.2	0.2		0.6	1.1
Delay (s)	5.7	5.9	6.3		16.5	16.8
Level of Service	A	A	A		B	B
Approach Delay (s)		5.9	6.3		16.6	
Approach LOS		A	A		B	

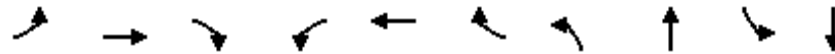
Intersection Summary

HCM Average Control Delay	7.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	40.7	Sum of lost time (s)	13.0
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

11/25/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	244	371	248	216	475	156	264	1251	117	1416
v/c Ratio	0.93	0.62	0.53	0.72	0.82	0.43	0.91	0.64	0.55	0.90
Control Delay	68.0	39.3	8.9	37.7	48.3	13.6	57.5	24.1	22.4	37.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.0	39.3	8.9	37.7	48.3	13.6	57.5	24.1	22.4	37.4
Queue Length 50th (ft)	103	102	0	89	136	16	101	215	33	273
Queue Length 95th (ft)	#211	147	62	#155	190	69	#259	271	63	#369
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	262	646	490	307	646	389	289	1970	229	1575
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	0.93	0.57	0.51	0.70	0.74	0.40	0.91	0.64	0.51	0.90

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

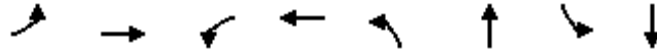
11/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	232	352	236	205	451	148	251	1087	102	111	1097	248
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	7.0	7.0	6.0	7.0	7.0	5.0	7.0		5.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3420	1530	1615	3420	1530	1615	4851		1615	4778	
Flt Permitted	0.31	1.00	1.00	0.47	1.00	1.00	0.12	1.00		0.18	1.00	
Satd. Flow (perm)	530	3420	1530	805	3420	1530	200	4851		300	4778	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	244	371	248	216	475	156	264	1144	107	117	1155	261
RTOR Reduction (vph)	0	0	205	0	0	102	0	11	0	0	40	0
Lane Group Flow (vph)	244	371	43	216	475	54	264	1240	0	117	1376	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	28.7	17.6	17.6	27.9	17.2	17.2	47.7	37.8		37.9	31.0	
Effective Green, g (s)	24.7	15.6	15.6	23.9	15.2	15.2	45.7	35.8		33.9	29.0	
Actuated g/C Ratio	0.27	0.17	0.17	0.27	0.17	0.17	0.51	0.40		0.38	0.32	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	255	593	265	292	578	258	286	1930		185	1540	
v/s Ratio Prot	c0.10	0.11		0.07	0.14		c0.12	0.26		0.03	0.29	
v/s Ratio Perm	c0.17		0.03	0.12		0.04	c0.35			0.20		
v/c Ratio	0.96	0.63	0.16	0.74	0.82	0.21	0.92	0.64		0.63	0.89	
Uniform Delay, d1	29.6	34.5	31.6	28.4	36.1	32.2	22.8	21.9		19.0	29.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	44.1	2.1	0.3	9.4	9.2	0.4	33.5	1.7		6.9	7.0	
Delay (s)	73.7	36.6	31.9	37.8	45.3	32.6	56.2	23.6		25.9	36.1	
Level of Service	E	D	C	D	D	C	E	C		C	D	
Approach Delay (s)		45.7			41.0			29.3			35.3	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM Average Control Delay			36.3			HCM Level of Service		D				
HCM Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)		11.0				
Intersection Capacity Utilization			92.1%			ICU Level of Service		F				
Analysis Period (min)			15									
c Critical Lane Group												

Queues

4: Waterman & E Orange Show

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	299	854	161	617	279	1086	141	1343
v/c Ratio	1.12	0.97	0.96	0.92	1.10	0.80	0.73	1.09
Control Delay	125.2	68.0	94.8	69.6	122.3	39.5	42.2	93.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	125.2	68.0	94.8	69.6	122.3	39.5	42.2	93.3
Queue Length 50th (ft)	~241	357	92	265	~221	421	60	~627
Queue Length 95th (ft)	#428	#492	#230	#373	#404	514	#131	#762
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	267	892	167	682	253	1355	207	1230
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.12	0.96	0.96	0.90	1.10	0.80	0.68	1.09

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.

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	284	570	241	153	508	78	265	887	144	134	953	323
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	7.0		6.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	*1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3267		1615	3352		1615	3348		1615	3463	
Flt Permitted	0.13	1.00		0.16	1.00		0.08	1.00		0.13	1.00	
Satd. Flow (perm)	218	3267		266	3352		133	3348		229	3463	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	299	600	254	161	535	82	279	934	152	141	1003	340
RTOR Reduction (vph)	0	36	0	0	10	0	0	10	0	0	28	0
Lane Group Flow (vph)	299	818	0	161	607	0	279	1076	0	141	1315	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	50.6	35.6		38.6	27.6		69.0	54.1		57.9	47.0	
Effective Green, g (s)	48.6	33.6		34.6	25.6		67.0	52.1		53.9	45.0	
Actuated g/C Ratio	0.38	0.26		0.27	0.20		0.52	0.40		0.42	0.35	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	265	847		165	662		252	1346		190	1202	
v/s Ratio Prot	c0.15	0.25		0.07	0.18		c0.14	0.32		0.05	0.38	
v/s Ratio Perm	c0.27			0.19			c0.44			0.26		
v/c Ratio	1.13	0.97		0.98	0.92		1.11	0.80		0.74	1.09	
Uniform Delay, d1	37.3	47.4		42.4	51.0		41.7	34.2		26.9	42.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	94.3	22.6		62.3	17.6		88.4	3.4		14.4	55.5	
Delay (s)	131.6	70.1		104.7	68.5		130.1	37.6		41.4	97.8	
Level of Service	F	E		F	E		F	D		D	F	
Approach Delay (s)		86.0			76.0			56.5			92.5	
Approach LOS		F			E			E			F	

Intersection Summary

HCM Average Control Delay	78.0	HCM Level of Service	E
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	129.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	111.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

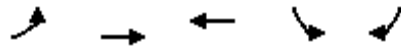
11/25/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	2	6	21	1297	1449	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	6	22	1365	1525	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					745	
pX, platoon unblocked						
vC, conflicting volume	2254	765	1529			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2254	765	1529			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	98	95			
cM capacity (veh/h)	34	350	441			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	8	22	683	683	1017	513
Volume Left	2	22	0	0	0	0
Volume Right	6	0	0	0	0	4
cSH	106	441	1700	1700	1700	1700
Volume to Capacity	0.08	0.05	0.40	0.40	0.60	0.30
Queue Length 95th (ft)	6	4	0	0	0	0
Control Delay (s)	42.0	13.6	0.0	0.0	0.0	0.0
Lane LOS	E	B				
Approach Delay (s)	42.0	0.2			0.0	
Approach LOS	E					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			52.4%		ICU Level of Service	A
Analysis Period (min)			15			

Queues
1: Mill St

12/16/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	62	448	388	104	48
v/c Ratio	0.12	0.23	0.20	0.23	0.21
Control Delay	6.3	5.6	5.2	11.2	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	5.6	5.2	11.2	7.4
Queue Length 50th (ft)	5	21	16	5	0
Queue Length 95th (ft)	18	40	33	19	17
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	691	2664	2637	2151	934
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.09	0.17	0.15	0.05	0.05

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St

12/16/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	59	426	338	30	77	67
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.97	0.85
Flt Protected	0.95	1.00	1.00		0.96	1.00
Satd. Flow (prot)	1615	3420	3378		3250	1392
Flt Permitted	0.52	1.00	1.00		0.96	1.00
Satd. Flow (perm)	888	3420	3378		3250	1392
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	62	448	356	32	81	71
RTOR Reduction (vph)	0	0	10	0	21	43
Lane Group Flow (vph)	62	448	378	0	83	5
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	18.9	18.9	18.9		5.2	5.2
Effective Green, g (s)	16.9	16.9	16.9		3.2	3.2
Actuated g/C Ratio	0.51	0.51	0.51		0.10	0.10
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	453	1746	1725		314	135
v/s Ratio Prot		c0.13	0.11		c0.03	
v/s Ratio Perm	0.07					0.00
v/c Ratio	0.14	0.26	0.22		0.27	0.03
Uniform Delay, d1	4.3	4.6	4.5		13.9	13.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.1	0.1		0.5	0.1
Delay (s)	4.4	4.6	4.5		14.3	13.7
Level of Service	A	A	A		B	B
Approach Delay (s)		4.6	4.5		14.1	
Approach LOS		A	A		B	

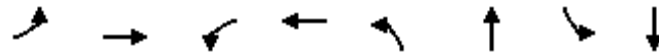
Intersection Summary

HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	33.1	Sum of lost time (s)	13.0
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

2: Waterman Ave & 9th St

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	52	257	102	328	52	559	84	893
v/c Ratio	0.23	0.30	0.41	0.38	0.28	0.44	0.30	0.70
Control Delay	16.3	11.6	19.7	12.3	13.7	10.1	12.4	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.3	11.6	19.7	12.3	13.7	10.1	12.4	13.9
Queue Length 50th (ft)	9	18	19	24	7	39	11	73
Queue Length 95th (ft)	33	46	58	57	31	87	42	154
Internal Link Dist (ft)		852		841		893		996
Turn Bay Length (ft)	130		100		50		75	
Base Capacity (vph)	458	1637	493	1652	266	1820	403	1827
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.16	0.21	0.20	0.20	0.31	0.21	0.49

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: Waterman Ave & 9th St

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	49	193	51	97	249	63	49	474	57	80	797	51
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	7.5	7.5		7.4	7.4		7.5	7.5		7.5	7.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.97		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3312		1615	3317		1615	3365		1615	3389	
Flt Permitted	0.55	1.00		0.59	1.00		0.29	1.00		0.44	1.00	
Satd. Flow (perm)	941	3312		1008	3317		496	3365		752	3389	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	52	203	54	102	262	66	52	499	60	84	839	54
RTOR Reduction (vph)	0	41	0	0	47	0	0	17	0	0	9	0
Lane Group Flow (vph)	52	216	0	102	281	0	52	542	0	84	884	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	11.8	11.8		11.9	11.9		17.1	17.1		17.1	17.1	
Effective Green, g (s)	9.8	9.8		9.9	9.9		15.1	15.1		15.1	15.1	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.38	0.38		0.38	0.38	
Clearance Time (s)	5.5	5.5		5.4	5.4		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	231	813		250	823		188	1273		285	1283	
v/s Ratio Prot		0.07			0.08			0.16			c0.26	
v/s Ratio Perm	0.06			c0.10			0.10			0.11		
v/c Ratio	0.23	0.27		0.41	0.34		0.28	0.43		0.29	0.69	
Uniform Delay, d1	12.0	12.1		12.5	12.3		8.6	9.2		8.7	10.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.2		1.1	0.2		0.8	0.2		0.6	1.6	
Delay (s)	12.5	12.3		13.6	12.6		9.4	9.4		9.3	12.0	
Level of Service	B	B		B	B		A	A		A	B	
Approach Delay (s)		12.4			12.8			9.4			11.8	
Approach LOS		B			B			A			B	

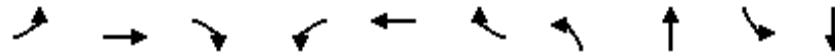
Intersection Summary

HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	39.9	Sum of lost time (s)	14.9
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	99	332	137	179	342	100	102	755	91	754
v/c Ratio	0.44	0.40	0.29	0.80	0.42	0.23	0.27	0.39	0.24	0.39
Control Delay	23.8	19.4	5.0	44.8	19.6	5.2	10.5	14.8	10.2	15.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.8	19.4	5.0	44.8	19.6	5.2	10.5	14.8	10.2	15.4
Queue Length 50th (ft)	30	52	0	59	53	0	16	69	14	72
Queue Length 95th (ft)	61	74	31	#113	76	26	43	110	39	113
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	309	1140	601	312	1140	577	377	1952	374	1944
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	0.29	0.23	0.57	0.30	0.17	0.27	0.39	0.24	0.39

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗↗	↘	↘	↗↗	↘	↘	↗↗↗		↘	↗↗↗	
Volume (vph)	94	315	130	170	325	95	97	615	103	86	646	70
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	7.0		5.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3420	1530	1615	3420	1530	1615	4809		1615	4842	
Flt Permitted	0.55	1.00	1.00	0.55	1.00	1.00	0.35	1.00		0.35	1.00	
Satd. Flow (perm)	928	3420	1530	938	3420	1530	601	4809		601	4842	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	99	332	137	179	342	100	102	647	108	91	680	74
RTOR Reduction (vph)	0	0	104	0	0	76	0	33	0	0	19	0
Lane Group Flow (vph)	99	332	33	179	342	24	102	722	0	91	735	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	16.4	16.4	16.4	16.4	16.4	16.4	30.6	25.1		30.6	25.1	
Effective Green, g (s)	14.4	14.4	14.4	14.4	14.4	14.4	26.6	23.1		26.6	23.1	
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24	0.24	0.44	0.39		0.44	0.39	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	223	821	367	225	821	367	326	1851		326	1864	
v/s Ratio Prot		0.10			0.10		c0.02	0.15		0.02	c0.15	
v/s Ratio Perm	0.11		0.02	c0.19		0.02	0.12			0.11		
v/c Ratio	0.44	0.40	0.09	0.80	0.42	0.07	0.31	0.39		0.28	0.39	
Uniform Delay, d1	19.4	19.2	17.7	21.4	19.3	17.6	9.9	13.4		9.9	13.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.4	0.3	0.1	17.4	0.3	0.1	0.6	0.6		0.5	0.6	
Delay (s)	20.8	19.5	17.8	38.8	19.6	17.7	10.5	14.0		10.3	14.0	
Level of Service	C	B	B	D	B	B	B	B		B	B	
Approach Delay (s)		19.3			24.8			13.6			13.6	
Approach LOS		B			C			B			B	

Intersection Summary

HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Waterman & E Orange Show

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	186	739	97	314	80	691	77	1044
v/c Ratio	0.65	0.67	0.73	0.31	0.41	0.56	0.24	0.82
Control Delay	34.7	19.2	57.0	18.7	18.5	21.6	12.7	27.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.7	19.2	57.0	18.7	18.5	21.6	12.7	27.6
Queue Length 50th (ft)	75	114	40	53	17	130	16	219
Queue Length 95th (ft)	151	182	#118	89	48	223	46	362
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	496	1761	228	1746	196	1654	342	1755
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.42	0.43	0.18	0.41	0.42	0.23	0.59

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	177	410	292	92	248	50	76	610	47	73	885	106
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.94		1.00	0.97		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3207		1615	3333		1615	3384		1615	3365	
Flt Permitted	0.56	1.00		0.26	1.00		0.16	1.00		0.31	1.00	
Satd. Flow (perm)	954	3207		440	3333		267	3384		531	3365	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	186	432	307	97	261	53	80	642	49	77	932	112
RTOR Reduction (vph)	0	138	0	0	21	0	0	6	0	0	10	0
Lane Group Flow (vph)	186	601	0	97	293	0	80	685	0	77	1034	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	23.3	23.3		23.3	23.3		31.9	27.5		33.7	28.4	
Effective Green, g (s)	21.3	21.3		21.3	21.3		27.9	25.5		29.7	26.4	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.40	0.36		0.42	0.38	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	290	974		134	1013		152	1231		276	1267	
v/s Ratio Prot		0.19			0.09		c0.02	0.20		0.01	c0.31	
v/s Ratio Perm	0.19			c0.22			0.19			0.11		
v/c Ratio	0.64	0.62		0.72	0.29		0.53	0.56		0.28	0.82	
Uniform Delay, d1	21.1	20.9		21.8	18.6		14.5	17.8		12.4	19.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.8	1.2		17.5	0.2		3.3	0.5		0.6	4.2	
Delay (s)	25.9	22.1		39.3	18.8		17.7	18.3		13.0	23.8	
Level of Service	C	C		D	B		B	B		B	C	
Approach Delay (s)		22.8			23.6			18.3			23.1	
Approach LOS		C			C			B			C	

Intersection Summary

HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	70.1	Sum of lost time (s)	13.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	4	3	4	735	1082	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	4	3	4	774	1139	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					87	
pX, platoon unblocked	0.97	0.97	0.97			
vC, conflicting volume	1536	572	1143			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1497	506	1093			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	99	99			
cM capacity (veh/h)	112	503	629			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	7	4	387	387	759	384
Volume Left	4	4	0	0	0	0
Volume Right	3	0	0	0	0	4
cSH	168	629	1700	1700	1700	1700
Volume to Capacity	0.04	0.01	0.23	0.23	0.45	0.23
Queue Length 95th (ft)	3	1	0	0	0	0
Control Delay (s)	27.5	10.8	0.0	0.0	0.0	0.0
Lane LOS	D	B				
Approach Delay (s)	27.5	0.1			0.0	
Approach LOS	D					

Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			41.7%		ICU Level of Service	A
Analysis Period (min)			15			

Queues

6: Waterman & Washington

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	602	1195	13	609	416	2	264	264	215
v/c Ratio	1.02	0.63	0.11	0.58	0.55	0.01	0.71	0.69	0.35
Control Delay	76.2	15.9	28.6	29.5	6.4	21.0	33.8	32.6	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.2	15.9	28.6	29.5	6.4	21.0	33.8	32.6	4.0
Queue Length 50th (ft)	~161	197	5	134	0	1	122	121	0
Queue Length 95th (ft)	#267	353	23	#273	80	4	169	167	37
Internal Link Dist (ft)		433		239		527		537	
Turn Bay Length (ft)	225		100		200		125		
Base Capacity (vph)	590	1904	123	1049	758	754	535	549	790
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.02	0.63	0.11	0.58	0.55	0.00	0.49	0.48	0.27

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.

HCM Signalized Intersection Capacity Analysis

6: Waterman & Washington

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	572	1133	2	12	579	395	1	1	0	491	10	204
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1800	1800	1800	1700	1800	1800
Total Lost time (s)	4.0	6.0		6.0	6.0	6.0		4.0		5.0	5.0	5.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00		1.00		0.95	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98		0.95	0.95	1.00
Satd. Flow (prot)	2949	3419		1615	3420	1530		1756		1534	1632	1530
Flt Permitted	0.95	1.00		0.24	1.00	1.00		0.93		0.76	0.73	1.00
Satd. Flow (perm)	2949	3419		401	3420	1530		1676		1222	1255	1530
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	602	1193	2	13	609	416	1	1	0	517	11	215
RTOR Reduction (vph)	0	0	0	0	0	289	0	0	0	0	0	149
Lane Group Flow (vph)	602	1195	0	13	609	127	0	2	0	264	264	66
Turn Type	Prot	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2			6			8				4
Permitted Phases				6		6	8			4		4
Actuated Green, G (s)	16.0	44.5		24.5	24.5	24.5		25.5		24.5	24.5	24.5
Effective Green, g (s)	16.0	44.5		24.5	24.5	24.5		25.5		24.5	24.5	24.5
Actuated g/C Ratio	0.20	0.56		0.31	0.31	0.31		0.32		0.31	0.31	0.31
Clearance Time (s)	4.0	6.0		6.0	6.0	6.0		4.0		5.0	5.0	5.0
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)	590	1902		123	1047	469		534		374	384	469
v/s Ratio Prot	c0.20	c0.35			0.18					c0.22	0.21	0.04
v/s Ratio Perm				0.03		0.08		0.00			0.21	0.04
v/c Ratio	1.02	0.63		0.11	0.58	0.27		0.00		0.71	0.69	0.14
Uniform Delay, d1	32.0	12.1		19.9	23.4	21.0		18.6		24.6	24.4	20.1
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	42.3	1.6		1.7	2.4	1.4		0.0		6.0	5.1	0.1
Delay (s)	74.3	13.7		21.6	25.8	22.4		18.6		30.5	29.4	20.3
Level of Service	E	B		C	C	C		B		C	C	C
Approach Delay (s)		34.0			24.4			18.6			27.2	
Approach LOS		C			C			B			C	

Intersection Summary

HCM Average Control Delay	29.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

7: S Tippecanoe & E Victoria

12/16/2013























Lane Group	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	71	37	571	25	1033
v/c Ratio	0.33	0.17	0.22	0.05	0.41
Control Delay	23.3	9.5	4.4	5.2	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	23.3	9.5	4.4	5.2	5.5
Queue Length 50th (ft)	20	0	33	2	73
Queue Length 95th (ft)	45	19	65	12	136
Internal Link Dist (ft)		770	198		507
Turn Bay Length (ft)	100			115	
Base Capacity (vph)	544	516	2540	554	2550
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.13	0.07	0.22	0.05	0.41

Intersection Summary

HCM Signalized Intersection Capacity Analysis

7: S Tippecanoe & E Victoria

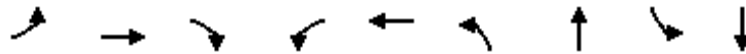
12/16/2013

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Volume (vph)	0	0	0	67	1	34	0	523	19	24	979	2		
Ideal Flow (vphpl)	1800	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800		
Total Lost time (s)				6.0	6.0			7.5		7.5	7.5			
Lane Util. Factor				1.00	1.00			0.95		1.00	0.95			
Frt				1.00	0.85			0.99		1.00	1.00			
Flt Protected				0.95	1.00			1.00		0.95	1.00			
Satd. Flow (prot)				1615	1537			3402		1615	3419			
Flt Permitted				1.00	1.00			1.00		0.44	1.00			
Satd. Flow (perm)				1700	1537			3402		743	3419			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Adj. Flow (vph)	0	0	0	71	1	36	0	551	20	25	1031	2		
RTOR Reduction (vph)	0	0	0	0	33	0	0	3	0	0	0	0		
Lane Group Flow (vph)	0	0	0	71	4	0	0	568	0	25	1033	0		
Turn Type	Perm			Perm	NA		Perm	NA		Perm	NA			
Protected Phases		4			8			2			6			
Permitted Phases	4			8			2			6				
Actuated Green, G (s)				5.8	5.8			34.7		34.7	34.7			
Effective Green, g (s)				3.8	3.8			32.7		32.7	32.7			
Actuated g/C Ratio				0.08	0.08			0.65		0.65	0.65			
Clearance Time (s)				4.0	4.0			5.5		5.5	5.5			
Vehicle Extension (s)				3.0	3.0			3.0		3.0	3.0			
Lane Grp Cap (vph)				129	117			2225		486	2236			
v/s Ratio Prot					0.00			0.17			c0.30			
v/s Ratio Perm				c0.04						0.03				
v/c Ratio				0.55	0.03			0.26		0.05	0.46			
Uniform Delay, d1				22.3	21.4			3.6		3.1	4.3			
Progression Factor				1.00	1.00			1.00		1.00	1.00			
Incremental Delay, d2				5.0	0.1			0.3		0.2	0.7			
Delay (s)				27.3	21.5			3.9		3.3	5.0			
Level of Service				C	C			A		A	A			
Approach Delay (s)		0.0			25.3			3.9			4.9			
Approach LOS		A			C			A			A			
Intersection Summary														
HCM Average Control Delay			5.9									HCM Level of Service	A	
HCM Volume to Capacity ratio			0.47											
Actuated Cycle Length (s)			50.0								13.5			
Intersection Capacity Utilization			44.0%										ICU Level of Service	A
Analysis Period (min)			15											
c	Critical Lane Group													

Queues

8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	60	67	93	102	216	579	759	69	755
v/c Ratio	0.46	0.36	0.30	0.55	0.74	0.84	0.23	0.34	0.46
Control Delay	35.6	28.8	8.5	36.1	36.8	39.0	3.4	25.6	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.6	28.8	8.5	36.1	36.8	39.0	3.4	25.6	18.6
Queue Length 50th (ft)	23	25	0	38	68	114	25	21	82
Queue Length 95th (ft)	54	56	32	76	124	#179	34	#68	130
Internal Link Dist (ft)		517			1151		771		1167
Turn Bay Length (ft)	210			85		260		100	
Base Capacity (vph)	184	264	403	260	397	777	3239	202	1655
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.25	0.23	0.39	0.54	0.75	0.23	0.34	0.46

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
 8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖	↖	↖	↖		↖↖	↖↖↖		↖	↖↖↖	
Volume (vph)	85	36	88	97	135	70	550	671	50	66	640	77
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1600	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		0.97	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	0.98	
Flt Protected	0.95	0.98	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1534	1674	1530	1615	1708		2949	4863		1615	4835	
Flt Permitted	0.53	0.72	1.00	0.71	1.00		0.95	1.00		0.35	1.00	
Satd. Flow (perm)	852	1225	1530	1209	1708		2949	4863		598	4835	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	89	38	93	102	142	74	579	706	53	69	674	81
RTOR Reduction (vph)	0	0	79	0	31	0	0	11	0	0	20	0
Lane Group Flow (vph)	60	67	14	102	185	0	579	748	0	69	735	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)	11.9	11.9	11.9	11.9	11.9		17.1	45.1		24.0	24.0	
Effective Green, g (s)	9.9	9.9	9.9	9.9	9.9		15.1	43.1		22.0	22.0	
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15		0.23	0.66		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)	130	187	233	184	260		685	3225		202	1636	
v/s Ratio Prot					c0.11		c0.20	0.15			c0.15	
v/s Ratio Perm	0.07	0.05	0.01	0.08						0.12		
v/c Ratio	0.46	0.36	0.06	0.55	0.71		0.85	0.23		0.34	0.45	
Uniform Delay, d1	25.1	24.7	23.6	25.5	26.2		23.8	4.4		16.1	16.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.15	0.69		1.00	1.00	
Incremental Delay, d2	2.6	1.2	0.1	3.6	8.8		9.0	0.2		4.6	0.9	
Delay (s)	27.7	25.9	23.7	29.1	35.0		36.4	3.2		20.6	17.7	
Level of Service	C	C	C	C	C		D	A		C	B	
Approach Delay (s)		25.4			33.1			17.6			17.9	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	20.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Intersection has too many lanes per leg.

HCM All-Way analysis is limited to two lanes per leg.

Channelized right turn lanes are not counted.

Queues

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

12/16/2013



Lane Group	EBL	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	242	449	907	119	902
v/c Ratio	0.82	0.67	0.61	0.49	0.45
Control Delay	45.1	20.8	15.4	34.8	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	45.1	20.8	15.4	34.8	8.6
Queue Length 50th (ft)	90	58	129	21	90
Queue Length 95th (ft)	#181	98	191	#51	141
Internal Link Dist (ft)		1164	1201		347
Turn Bay Length (ft)	275				
Base Capacity (vph)	368	809	1500	246	1993
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.66	0.56	0.60	0.48	0.45

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↔						↕		↗	↕	↘
Volume (vph)	353	0	303	0	0	0	0	642	219	113	857	0
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	6.0						7.0		6.0	7.0	
Lane Util. Factor	0.91	0.91						0.95		0.97	0.95	
Frt	1.00	0.89						0.96		1.00	1.00	
Flt Protected	0.95	0.99						1.00		0.95	1.00	
Satd. Flow (prot)	1470	2885						3289		3133	3420	
Flt Permitted	0.95	0.99						1.00		0.95	1.00	
Satd. Flow (perm)	1470	2885						3289		3133	3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	372	0	319	0	0	0	0	676	231	119	902	0
RTOR Reduction (vph)	0	94	0	0	0	0	0	51	0	0	0	0
Lane Group Flow (vph)	242	355	0	0	0	0	0	856	0	119	902	0
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	14.0	14.0						27.5		5.5	37.0	
Effective Green, g (s)	12.0	12.0						25.5		3.5	35.0	
Actuated g/C Ratio	0.20	0.20						0.42		0.06	0.58	
Clearance Time (s)	4.0	4.0						5.0		4.0	5.0	
Vehicle Extension (s)	2.0	2.0						2.0		3.0	2.0	
Lane Grp Cap (vph)	294	577						1398		183	1995	
v/s Ratio Prot								c0.26		0.04	c0.26	
v/s Ratio Perm	c0.16	0.12										
v/c Ratio	0.82	0.62						0.61		0.65	0.45	
Uniform Delay, d1	23.0	21.9						13.4		27.7	7.1	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	16.0	1.4						2.0		8.0	0.7	
Delay (s)	39.0	23.3						15.4		35.7	7.8	
Level of Service	D	C						B		D	A	
Approach Delay (s)		28.8			0.0			15.4			11.1	
Approach LOS		C			A			B			B	

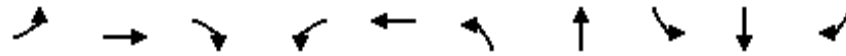
Intersection Summary

HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

11: Anderson & Academy

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	304	156	249	93	315	198	510	31	1166	441
v/c Ratio	0.92	0.26	0.40	0.65	0.70	0.82	0.28	0.10	0.89	0.51
Control Delay	55.2	15.2	6.6	48.5	31.1	39.8	7.6	12.1	27.2	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.2	15.2	6.6	48.5	31.1	39.8	7.6	12.1	27.2	4.0
Queue Length 50th (ft)	81	37	13	30	48	31	43	6	181	0
Queue Length 95th (ft)	#178	75	57	#91	#97	#101	66	21	#300	47
Internal Link Dist (ft)		21			32		1375		514	
Turn Bay Length (ft)	75			100		100		100		
Base Capacity (vph)	329	589	628	142	450	241	1799	301	1306	857
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	0.92	0.26	0.40	0.65	0.70	0.82	0.28	0.10	0.89	0.51

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

11: Anderson & Academy

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	289	148	237	88	257	42	188	468	16	29	1108	419
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	4.0	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	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1615	1800	1530	1615	3348		1615	3403		1615	3420	1530
Flt Permitted	0.36	1.00	1.00	0.66	1.00		0.16	1.00		0.46	1.00	1.00
Satd. Flow (perm)	618	1800	1530	1119	3348		272	3403		789	3420	1530
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	304	156	249	93	271	44	198	493	17	31	1166	441
RTOR Reduction (vph)	0	0	127	0	24	0	0	4	0	0	0	273
Lane Group Flow (vph)	304	156	122	93	291	0	198	506	0	31	1166	168
Turn Type	pm+pt	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)	18.0	18.0	18.0	7.0	7.0		29.0	29.0		21.0	21.0	21.0
Effective Green, g (s)	18.0	18.0	18.0	7.0	7.0		29.0	29.0		21.0	21.0	21.0
Actuated g/C Ratio	0.33	0.33	0.33	0.13	0.13		0.53	0.53		0.38	0.38	0.38
Clearance Time (s)	4.0	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	3.0
Lane Grp Cap (vph)	329	589	501	142	426		241	1794		301	1306	584
v/s Ratio Prot	c0.12	0.09			0.09		c0.06	0.15			0.34	
v/s Ratio Perm	c0.18		0.08	0.08			c0.37			0.04		0.11
v/c Ratio	0.92	0.26	0.24	0.65	0.68		0.82	0.28		0.10	0.89	0.29
Uniform Delay, d1	16.5	13.6	13.5	22.9	22.9		10.6	7.2		10.9	15.9	11.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	30.6	0.2	0.3	10.4	4.5		19.7	0.1		0.2	8.1	0.3
Delay (s)	47.1	13.9	13.8	33.2	27.4		30.3	7.3		11.1	24.0	12.1
Level of Service	D	B	B	C	C		C	A		B	C	B
Approach Delay (s)		28.1			28.8			13.7			20.6	
Approach LOS		C			C			B			C	

Intersection Summary

HCM Average Control Delay	21.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

12: California & WB I-10 Ramps

12/16/2013



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	538	439	573	783	269	251
v/c Ratio	0.91	0.74	0.81	0.43	0.29	0.51
Control Delay	48.7	25.9	30.3	12.4	33.2	8.7
Queue Delay	0.0	0.0	0.2	0.3	0.1	0.0
Total Delay	48.7	25.9	30.5	12.7	33.3	8.7
Queue Length 50th (ft)	278	143	169	115	49	0
Queue Length 95th (ft)	#462	258	#328	163	75	64
Internal Link Dist (ft)	1118			276	113	
Turn Bay Length (ft)						
Base Capacity (vph)	630	622	706	1820	923	491
Starvation Cap Reductn	0	0	8	423	0	0
Spillback Cap Reductn	0	0	0	0	96	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.71	0.82	0.56	0.33	0.51

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

12: California & WB I-10 Ramps

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕	↗	↘	↕			↕	↗
Volume (vph)	0	0	0	491	20	417	544	744	0	0	256	238
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800
Total Lost time (s)					5.0	7.0	6.0	6.0			5.0	5.0
Lane Util. Factor					1.00	1.00	1.00	0.95			0.91	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1717	1530	1615	3420			4914	1530
Flt Permitted					0.95	1.00	0.58	1.00			1.00	1.00
Satd. Flow (perm)					1717	1530	985	3420			4914	1530
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	517	21	439	573	783	0	0	269	251
RTOR Reduction (vph)	0	0	0	0	0	98	0	0	0	0	0	204
Lane Group Flow (vph)	0	0	0	0	538	341	573	783	0	0	269	47
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases					8		1	6			2	
Permitted Phases				8		8	6					2
Actuated Green, G (s)					31.1	31.1	49.9	49.9			18.9	18.9
Effective Green, g (s)					31.1	29.1	47.9	47.9			16.9	16.9
Actuated g/C Ratio					0.35	0.32	0.53	0.53			0.19	0.19
Clearance Time (s)					5.0	5.0	4.0	4.0			3.0	3.0
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					593	495	706	1820			923	287
v/s Ratio Prot							c0.23	0.23			0.05	
v/s Ratio Perm					0.31	0.22	c0.20					0.03
v/c Ratio					0.91	0.69	0.81	0.43			0.29	0.16
Uniform Delay, d1					28.1	26.5	17.2	12.8			31.4	30.6
Progression Factor					1.00	1.00	0.94	0.87			1.00	1.00
Incremental Delay, d2					17.2	3.2	6.4	0.7			0.8	1.2
Delay (s)					45.3	29.7	22.6	11.9			32.2	31.9
Level of Service					D	C	C	B			C	C
Approach Delay (s)		0.0			38.3			16.4			32.0	
Approach LOS		A			D			B			C	

Intersection Summary

HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues

13: EB I-10 Ramps & California

12/16/2013



Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	489	480	728	332	84	781
v/c Ratio	0.73	0.83	0.31	0.37	0.30	0.48
Control Delay	29.4	32.2	16.8	3.7	31.6	27.7
Queue Delay	0.2	0.0	44.6	3.3	0.0	1.0
Total Delay	29.6	32.2	61.5	7.0	31.6	28.7
Queue Length 50th (ft)	226	204	93	0	49	248
Queue Length 95th (ft)	282	281	146	54	m72	m286
Internal Link Dist (ft)	1294		46			276
Turn Bay Length (ft)						
Base Capacity (vph)	857	721	2321	898	280	1615
Starvation Cap Reductn	0	0	1647	459	0	541
Spillback Cap Reductn	42	0	48	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.67	1.08	0.76	0.30	0.73






















Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

13: EB I-10 Ramps & California

12/16/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations								  			 		
Volume (vph)	464	1	456	0	0	0	0	692	315	80	742	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800	
Lane Width	12	12	8	12	12	12	12	12	12	12	12	12	
Total Lost time (s)		6.0	4.0					6.5	6.5	6.5	6.5		
Lane Util. Factor		1.00	1.00					0.91	1.00	1.00	0.95		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		0.95	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		1714	1326					4914	1530	1615	3420		
Flt Permitted		0.95	1.00					1.00	1.00	0.35	1.00		
Satd. Flow (perm)		1714	1326					4914	1530	592	3420		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	488	1	480	0	0	0	0	728	332	84	781	0	
RTOR Reduction (vph)	0	0	35	0	0	0	0	0	175	0	0	0	
Lane Group Flow (vph)	0	489	445	0	0	0	0	728	157	84	781	0	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		4						2			6		
Permitted Phases	4		4						2	6			
Actuated Green, G (s)		37.0	37.0					44.5	44.5	44.5	44.5		
Effective Green, g (s)		35.0	37.0					42.5	42.5	42.5	42.5		
Actuated g/C Ratio		0.39	0.41					0.47	0.47	0.47	0.47		
Clearance Time (s)		4.0	4.0					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		2.0	2.0					2.0	2.0	2.0	2.0		
Lane Grp Cap (vph)		667	545					2321	723	280	1615		
v/s Ratio Prot								0.15			c0.23		
v/s Ratio Perm		0.29	c0.34						0.10	0.14			
v/c Ratio		0.73	0.82					0.31	0.22	0.30	0.48		
Uniform Delay, d1		23.5	23.5					14.7	14.0	14.6	16.2		
Progression Factor		1.00	1.00					1.00	1.00	1.50	1.46		
Incremental Delay, d2		3.6	8.7					0.4	0.7	2.2	0.8		
Delay (s)		27.1	32.2					15.1	14.7	24.1	24.5		
Level of Service		C	C					B	B	C	C		
Approach Delay (s)		29.6			0.0			14.9			24.5		
Approach LOS		C			A			B			C		
Intersection Summary													
HCM Average Control Delay			22.7									HCM Level of Service	C
HCM Volume to Capacity ratio			0.64										
Actuated Cycle Length (s)			90.0									Sum of lost time (s)	10.5
Intersection Capacity Utilization			92.4%									ICU Level of Service	F
Analysis Period (min)			15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

14: California & Shopping Center

12/16/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	1	62	828	19	194	713
Sign Control	Stop		Free		Free	Free
Grade	0%		0%		0%	0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	65	872	20	204	751
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)			652		321	
pX, platoon unblocked	0.98					
vC, conflicting volume	1665	301			892	
vC1, stage 1 conf vol	882					
vC2, stage 2 conf vol	784					
vCu, unblocked vol	1636	301			892	
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 %	100	91			73	
cM capacity (veh/h)	243	702			769	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	66	349	349	194	204	375	375
Volume Left	1	0	0	0	204	0	0
Volume Right	65	0	0	20	0	0	0
cSH	681	1700	1700	1700	769	1700	1700
Volume to Capacity	0.10	0.21	0.21	0.11	0.27	0.22	0.22
Queue Length 95th (ft)	8	0	0	0	27	0	0
Control Delay (s)	10.9	0.0	0.0	0.0	11.4	0.0	0.0
Lane LOS	B				B		
Approach Delay (s)	10.9	0.0			2.4		
Approach LOS	B						

Intersection Summary			
Average Delay		1.6	
Intersection Capacity Utilization	43.5%		ICU Level of Service A
Analysis Period (min)		15	

Queues

15: California/California & W Redlands

12/16/2013

























Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	134	473	47	302	327	153	596	332	433
v/c Ratio	0.65	0.59	0.29	0.41	0.56	0.60	0.65	0.74	0.23
Control Delay	44.0	20.6	31.8	27.2	7.7	34.8	27.2	20.8	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.0	20.6	31.8	27.2	7.7	34.8	27.2	20.8	7.7
Queue Length 50th (ft)	48	57	15	53	0	51	107	67	36
Queue Length 95th (ft)	148	149	60	131	69	154	234	173	86
Internal Link Dist (ft)		1468		1180			268		572
Turn Bay Length (ft)	90		150		100			150	
Base Capacity (vph)	519	1793	411	1837	973	516	1962	745	2998
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.26	0.11	0.16	0.34	0.30	0.30	0.45	0.14

Intersection Summary

HCM Signalized Intersection Capacity Analysis

15: California/California & W Redlands

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	127	260	189	45	287	311	145	547	19	315	327	85
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	7.7	7.7		7.7	7.7	7.7	5.2	7.2		7.2	7.2	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3204		1615	3420	1530	1615	3403		1615	3315	
Flt Permitted	0.57	1.00		0.45	1.00	1.00	0.50	1.00		0.26	1.00	
Satd. Flow (perm)	965	3204		764	3420	1530	850	3403		442	3315	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	134	274	199	47	302	327	153	576	20	332	344	89
RTOR Reduction (vph)	0	121	0	0	0	255	0	2	0	0	20	0
Lane Group Flow (vph)	134	352	0	47	302	72	153	594	0	332	413	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		2			6			4		3	8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	17.3	17.3		17.3	17.3	17.3	21.7	21.7		41.3	41.3	
Effective Green, g (s)	15.3	15.3		15.3	15.3	15.3	21.7	19.7		39.3	39.3	
Actuated g/C Ratio	0.22	0.22		0.22	0.22	0.22	0.31	0.28		0.57	0.57	
Clearance Time (s)	5.7	5.7		5.7	5.7	5.7	5.2	5.2		5.2	5.2	
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)	212	705		168	753	337	265	965		459	1875	
v/s Ratio Prot		0.11			0.09			0.17		c0.13	0.12	
v/s Ratio Perm	c0.14			0.06		0.05	0.18			c0.28		
v/c Ratio	0.63	0.50		0.28	0.40	0.21	0.58	0.62		0.72	0.22	
Uniform Delay, d1	24.6	23.7		22.5	23.2	22.2	20.1	21.6		9.7	7.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.0	0.6		0.9	0.4	0.3	3.0	1.2		5.6	0.1	
Delay (s)	30.6	24.3		23.4	23.5	22.5	23.1	22.8		15.3	7.6	
Level of Service	C	C		C	C	C	C	C		B	A	
Approach Delay (s)		25.7			23.0			22.8			10.9	
Approach LOS		C			C			C			B	
Intersection Summary												
HCM Average Control Delay			20.2									HCM Level of Service C
HCM Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			69.5									Sum of lost time (s) 14.9
Intersection Capacity Utilization			81.6%									ICU Level of Service D
Analysis Period (min)			15									
c	Critical Lane Group											

Queues

16: Alabama St & WB I-10 Ramps

12/16/2013



Lane Group	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	1052	441	562	573
v/c Ratio	0.94	0.92	0.33	0.49
Control Delay	41.2	47.1	8.1	21.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	41.2	47.1	8.1	21.3
Queue Length 50th (ft)	221	131	52	66
Queue Length 95th (ft)	#344	m#290	67	98
Internal Link Dist (ft)	765		376	271
Turn Bay Length (ft)				
Base Capacity (vph)	1119	481	1692	1167
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.94	0.92	0.33	0.49

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.

HCM Signalized Intersection Capacity Analysis

16: Alabama St & WB I-10 Ramps

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	328	410	261	419	534	0	0	392	152
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800
Total Lost time (s)					6.5		6.0	8.0			8.0	
Lane Util. Factor					*1.00		1.00	0.95			0.91	
Frt					0.96		1.00	1.00			0.96	
Flt Protected					0.98		0.95	1.00			1.00	
Satd. Flow (prot)					3403		1615	3420			4708	
Flt Permitted					0.98		0.32	1.00			1.00	
Satd. Flow (perm)					3403		536	3420			4708	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	345	432	275	441	562	0	0	413	160
RTOR Reduction (vph)	0	0	0	0	53	0	0	0	0	0	93	0
Lane Group Flow (vph)	0	0	0	0	999	0	441	562	0	0	480	0
Turn Type				Perm	NA		pm+pt	NA			NA	
Protected Phases					4		1	6			2	
Permitted Phases				4			6					
Actuated Green, G (s)					25.4		39.1	39.1			19.1	
Effective Green, g (s)					23.4		37.1	37.1			17.1	
Actuated g/C Ratio					0.31		0.49	0.49			0.23	
Clearance Time (s)					4.5		4.0	6.0			6.0	
Vehicle Extension (s)					3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)					1062		467	1692			1073	
v/s Ratio Prot							c0.18	0.16			0.10	
v/s Ratio Perm					0.29		c0.29					
v/c Ratio					0.94		0.94	0.33			0.45	
Uniform Delay, d1					25.1		13.9	11.5			24.9	
Progression Factor					1.00		1.76	0.66			1.00	
Incremental Delay, d2					15.4		25.8	0.5			1.3	
Delay (s)					40.5		50.3	8.0			26.2	
Level of Service					D		D	A			C	
Approach Delay (s)		0.0			40.5			26.6			26.2	
Approach LOS		A			D			C			C	
Intersection Summary												
HCM Average Control Delay			32.1		HCM Level of Service						C	
HCM Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			75.0		Sum of lost time (s)						12.5	
Intersection Capacity Utilization			85.5%		ICU Level of Service						E	
Analysis Period (min)			15									
c Critical Lane Group												

Queues

17: EB I-10 Ramps & Alabama St

12/16/2013



Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	711	1017	62	688
v/c Ratio	0.88	0.41	0.22	0.33
Control Delay	32.6	12.3	7.6	7.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	32.6	12.3	7.6	7.4
Queue Length 50th (ft)	119	103	11	88
Queue Length 95th (ft)	173	151	m22	m108
Internal Link Dist (ft)	622	505		376
Turn Bay Length (ft)				
Base Capacity (vph)	966	2508	282	2059
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.74	0.41	0.22	0.33




















Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

17: EB I-10 Ramps & Alabama St

12/16/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	256	2	418	0	0	0	0	802	164	59	654	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800	
Total Lost time (s)		7.0						8.0		6.0	7.0		
Lane Util. Factor		0.95						0.91		1.00	0.95		
Frt		0.91						0.97		1.00	1.00		
Flt Protected		0.98						1.00		0.95	1.00		
Satd. Flow (prot)		3045						4789		1615	3420		
Flt Permitted		0.98						1.00		0.22	1.00		
Satd. Flow (perm)		3045						4789		377	3420		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	269	2	440	0	0	0	0	844	173	62	688	0	
RTOR Reduction (vph)	0	167	0	0	0	0	0	36	0	0	0	0	
Lane Group Flow (vph)	0	544	0	0	0	0	0	981	0	62	688	0	
Turn Type	Perm	NA						NA		pm+pt	NA		
Protected Phases		8						6		5	2		
Permitted Phases	8									2			
Actuated Green, G (s)		17.8						39.2		47.2	47.2		
Effective Green, g (s)		15.8						37.2		45.2	45.2		
Actuated g/C Ratio		0.21						0.50		0.60	0.60		
Clearance Time (s)		5.0						6.0		4.0	5.0		
Vehicle Extension (s)		2.0						2.0		2.0	2.0		
Lane Grp Cap (vph)		641						2375		244	2061		
v/s Ratio Prot								c0.20		0.00	c0.20		
v/s Ratio Perm		0.18								0.15			
v/c Ratio		0.85						0.41		0.25	0.33		
Uniform Delay, d1		28.5						12.0		7.2	7.4		
Progression Factor		1.00						1.00		0.90	0.87		
Incremental Delay, d2		9.8						0.5		0.1	0.3		
Delay (s)		38.3						12.5		6.6	6.7		
Level of Service		D						B		A	A		
Approach Delay (s)		38.3			0.0			12.5			6.7		
Approach LOS		D			A			B			A		
Intersection Summary													
HCM Average Control Delay			18.2									HCM Level of Service	B
HCM Volume to Capacity ratio			0.57										
Actuated Cycle Length (s)			75.0									Sum of lost time (s)	22.0
Intersection Capacity Utilization			85.5%									ICU Level of Service	E
Analysis Period (min)			15										
c	Critical Lane Group												

Queues

18: Alabama St & Industrial Park

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	64	49	21	79	29	955	79	853	122
v/c Ratio	0.23	0.17	0.08	0.26	0.08	0.28	0.24	0.25	0.11
Control Delay	15.8	9.2	14.4	9.3	6.0	4.7	8.1	4.7	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.8	9.2	14.4	9.3	6.0	4.7	8.1	4.7	1.8
Queue Length 50th (ft)	9	2	3	3	2	34	8	30	0
Queue Length 95th (ft)	39	23	18	31	12	65	32	58	15
Internal Link Dist (ft)		298		379		236		505	
Turn Bay Length (ft)	100		50		150		215		55
Base Capacity (vph)	1268	1204	1268	1210	473	4263	426	4287	1350
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.04	0.02	0.07	0.06	0.22	0.19	0.20	0.09

Intersection Summary

HCM Signalized Intersection Capacity Analysis

18: Alabama St & Industrial Park

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	12	34	20	20	55	28	872	35	75	810	116
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.2	6.2		6.2	6.2		6.2	6.2		6.2	6.2	6.2
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.91		1.00	0.91	1.00
Frt	1.00	0.89		1.00	0.89		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1615	1602		1615	1602		1615	4885		1615	4914	1530
Flt Permitted	1.00	1.00		1.00	1.00		0.32	1.00		0.29	1.00	1.00
Satd. Flow (perm)	1700	1602		1700	1602		543	4885		489	4914	1530
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	64	13	36	21	21	58	29	918	37	79	853	122
RTOR Reduction (vph)	0	33	0	0	54	0	0	5	0	0	0	52
Lane Group Flow (vph)	64	16	0	21	25	0	29	950	0	79	853	70
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		8			4			6			2	
Permitted Phases	8			4			6			2		2
Actuated Green, G (s)	4.7	4.7		4.7	4.7		22.0	22.0		22.0	22.0	22.0
Effective Green, g (s)	2.7	2.7		2.7	2.7		20.0	20.0		20.0	20.0	20.0
Actuated g/C Ratio	0.08	0.08		0.08	0.08		0.57	0.57		0.57	0.57	0.57
Clearance Time (s)	4.2	4.2		4.2	4.2		4.2	4.2		4.2	4.2	4.2
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)	131	123		131	123		309	2783		279	2800	872
v/s Ratio Prot		0.01			0.02			c0.19			0.17	
v/s Ratio Perm	c0.04			0.01			0.05			0.16		0.05
v/c Ratio	0.49	0.13		0.16	0.21		0.09	0.34		0.28	0.30	0.08
Uniform Delay, d1	15.5	15.1		15.1	15.2		3.4	4.0		3.9	3.9	3.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.9	0.5		0.6	0.8		0.1	0.1		0.6	0.1	0.0
Delay (s)	18.4	15.6		15.7	16.0		3.6	4.1		4.4	4.0	3.4
Level of Service	B	B		B	B		A	A		A	A	A
Approach Delay (s)		17.2			16.0			4.1			4.0	
Approach LOS		B			B			A			A	

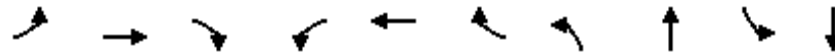
Intersection Summary

HCM Average Control Delay	5.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	35.1	Sum of lost time (s)	12.4
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

19: Alabama St & W Redlands

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	197	325	60	79	324	101	91	510	86	745
v/c Ratio	0.56	0.50	0.16	0.32	0.62	0.28	0.48	0.32	0.46	0.66
Control Delay	34.4	26.2	7.2	33.6	31.3	7.9	41.6	17.5	40.4	21.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2
Total Delay	34.4	26.2	7.2	33.6	31.3	7.9	41.6	17.5	40.4	25.1
Queue Length 50th (ft)	38	61	0	15	64	0	18	52	17	121
Queue Length 95th (ft)	73	100	25	37	107	35	#50	93	#46	214
Internal Link Dist (ft)		1247			345			380		164
Turn Bay Length (ft)	240		240	290			115		125	
Base Capacity (vph)	517	953	517	935	1423	741	188	1618	188	1128
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	276
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	0.38	0.34	0.12	0.08	0.23	0.14	0.48	0.32	0.46	0.87

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

19: Alabama St & W Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↖	↖↗	↑↑	↖	↖↗	↑↑↔		↖↗	↑↔	
Volume (vph)	187	309	57	75	308	96	86	432	52	82	513	195
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Total Lost time (s)	5.0	6.9	4.9	5.0	6.9	4.9	5.0	6.2		5.0	6.2	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2949	3420	1530	2949	3420	1530	2949	4835		2949	3279	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	2949	3420	1530	2949	3420	1530	2949	4835		2949	3279	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	197	325	60	79	324	101	91	455	55	86	540	205
RTOR Reduction (vph)	0	0	47	0	0	82	0	15	0	0	41	0
Lane Group Flow (vph)	197	325	13	79	324	19	91	495	0	86	704	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	9.6	14.2	14.2	7.3	11.9	11.9	4.6	23.2		4.6	23.2	
Effective Green, g (s)	7.6	12.2	14.2	5.3	9.9	11.9	2.6	21.2		2.6	21.2	
Actuated g/C Ratio	0.12	0.19	0.22	0.08	0.15	0.18	0.04	0.33		0.04	0.33	
Clearance Time (s)	3.0	4.9	4.9	3.0	4.9	4.9	3.0	4.2		3.0	4.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	348	648	337	243	526	283	119	1592		119	1079	
v/s Ratio Prot	c0.07	c0.10		0.03	0.09		c0.03	0.10		0.03	c0.21	
v/s Ratio Perm			0.01			0.01						
v/c Ratio	0.57	0.50	0.04	0.33	0.62	0.07	0.76	0.31		0.72	0.65	
Uniform Delay, d1	26.8	23.4	19.7	27.9	25.5	21.7	30.6	16.1		30.5	18.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.1	0.6	0.0	0.8	2.1	0.1	24.8	0.5		19.4	3.1	
Delay (s)	29.0	24.0	19.8	28.6	27.6	21.8	55.4	16.6		49.9	21.5	
Level of Service	C	C	B	C	C	C	E	B		D	C	
Approach Delay (s)		25.2			26.6			22.5			24.5	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	24.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	64.4	Sum of lost time (s)	16.2
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

20: Tennessee & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	13	140	39	285	703	764
v/c Ratio	0.07	0.23	0.20	0.45	0.55	0.71
Control Delay	16.3	13.3	18.0	13.9	9.3	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.5
Total Delay	16.3	13.3	18.0	13.9	9.3	13.1
Queue Length 50th (ft)	2	9	7	19	46	55
Queue Length 95th (ft)	15	33	30	57	93	115
Internal Link Dist (ft)		2241		737	458	48
Turn Bay Length (ft)	145		140			
Base Capacity (vph)	539	1770	598	1781	2172	1831
Starvation Cap Reductn	0	0	0	0	0	610
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.08	0.07	0.16	0.32	0.63

Intersection Summary

HCM Signalized Intersection Capacity Analysis

20: Tennessee & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↗	↖
Volume (vph)	12	104	29	37	203	67	51	597	20	134	574	18
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.9	6.9		6.9	6.9			6.9			6.9	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frt	1.00	0.97		1.00	0.96			1.00			1.00	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1615	3306		1615	3292			3392			3376	
Flt Permitted	0.60	1.00		0.66	1.00			0.85			0.71	
Satd. Flow (perm)	1015	3306		1127	3292			2880			2429	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	13	109	31	39	214	71	54	628	21	141	604	19
RTOR Reduction (vph)	0	25	0	0	58	0	0	4	0	0	3	0
Lane Group Flow (vph)	13	115	0	39	227	0	0	699	0	0	761	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	8.7	8.7		8.7	8.7			18.6			18.6	
Effective Green, g (s)	6.7	6.7		6.7	6.7			16.6			16.6	
Actuated g/C Ratio	0.18	0.18		0.18	0.18			0.45			0.45	
Clearance Time (s)	4.9	4.9		4.9	4.9			4.9			4.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	183	597		204	595			1289			1087	
v/s Ratio Prot		0.03			c0.07							
v/s Ratio Perm	0.01			0.03				0.24			c0.31	
v/c Ratio	0.07	0.19		0.19	0.38			0.54			0.70	
Uniform Delay, d1	12.6	12.9		12.9	13.4			7.5			8.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	0.2		0.5	0.4			0.5			2.1	
Delay (s)	12.8	13.1		13.4	13.8			7.9			10.3	
Level of Service	B	B		B	B			A			B	
Approach Delay (s)		13.0			13.7			7.9			10.3	
Approach LOS		B			B			A			B	

Intersection Summary

HCM Average Control Delay	10.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	37.1	Sum of lost time (s)	13.8
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

21: Texas & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	26	4	29	16	30	13	61	297	20	32	463	100
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	27	4	31	17	32	14	64	313	21	34	487	105
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)							193					
pX, platoon unblocked												
vC, conflicting volume	922	1069	296	795	1112	167	593				334	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	922	1069	296	795	1112	167	593				334	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	85	98	96	93	84	98	94				97	
cM capacity (veh/h)	183	203	706	247	192	854	993				1237	

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	62	62	221	177	277	349
Volume Left	27	17	64	0	34	0
Volume Right	31	14	0	21	0	105
cSH	291	249	993	1700	1237	1700
Volume to Capacity	0.21	0.25	0.06	0.10	0.03	0.21
Queue Length 95th (ft)	20	24	5	0	2	0
Control Delay (s)	20.7	24.1	3.0	0.0	1.2	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	20.7	24.1	1.7		0.5	
Approach LOS	C	C				

Intersection Summary		
Average Delay		3.3
Intersection Capacity Utilization	50.1%	ICU Level of Service
Analysis Period (min)		15
		A

HCM Unsignalized Intersection Capacity Analysis

22: Texas & Oriental

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	36	17	30	64	3	36	2	599	17	6	516	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	38	18	32	67	3	38	2	631	18	6	543	5
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)											212	
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99		0.99					
vC, conflicting volume	917	1211	274	968	1205	324	548			648		
vC1, stage 1 conf vol	558	558		644	644							
vC2, stage 2 conf vol	359	653		325	561							
vCu, unblocked vol	898	1194	249	949	1188	324	525			648		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	95	96	82	99	94	100			99		
cM capacity (veh/h)	418	376	751	385	380	677	1042			947		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	87	108	317	333	278	277
Volume Left	38	67	2	0	6	0
Volume Right	32	38	0	18	0	5
cSH	484	453	1042	1700	947	1700
Volume to Capacity	0.18	0.24	0.00	0.20	0.01	0.16
Queue Length 95th (ft)	16	23	0	0	1	0
Control Delay (s)	14.1	15.4	0.1	0.0	0.3	0.0
Lane LOS	B	C	A		A	
Approach Delay (s)	14.1	15.4	0.0		0.1	
Approach LOS	B	C				

Intersection Summary		
Average Delay		2.1
Intersection Capacity Utilization	35.7%	ICU Level of Service
Analysis Period (min)		15
		A

Queues

23: Eureka & EB I-10 off/Pearl

12/16/2013



Lane Group	EBT	EBR	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	596	565	63	15	37	75	73
v/c Ratio	0.85	0.60	0.52	0.03	0.05	0.12	0.11
Control Delay	29.8	4.1	29.6	5.0	15.0	5.1	15.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.8	4.1	29.6	5.0	15.0	5.1	15.4
Queue Length 50th (ft)	198	0	16	0	9	0	19
Queue Length 95th (ft)	296	48	44	8	28	25	46
Internal Link Dist (ft)	447				545		418
Turn Bay Length (ft)				75			
Base Capacity (vph)	824	1010	187	738	705	645	695
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.56	0.34	0.02	0.05	0.12	0.11

Intersection Summary

HCM Signalized Intersection Capacity Analysis

23: Eureka & EB I-10 off/Pearl

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗	↖		↗		↑	↗		↖	
Volume (vph)	90	476	537	60	0	14	0	35	71	6	64	0
Ideal Flow (vphpl)	1800	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		7.0	7.0	6.0		6.0		7.0	7.0		7.0	
Lane Util. Factor		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.99	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1786	1530	1615		1530		1800	1530		1793	
Flt Permitted		0.99	1.00	0.23		1.00		1.00	1.00		0.99	
Satd. Flow (perm)		1786	1530	393		1530		1800	1530		1775	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	501	565	63	0	15	0	37	75	6	67	0
RTOR Reduction (vph)	0	0	343	0	0	9	0	0	46	0	0	0
Lane Group Flow (vph)	0	596	222	63	0	6	0	37	29	0	73	0
Turn Type	Perm	NA	Perm	custom		custom		NA	Perm	Perm	NA	
Protected Phases		8						2				6
Permitted Phases	8		8	3		3			2	6		
Actuated Green, G (s)		27.5	27.5	28.5		28.5		27.5	27.5		27.5	
Effective Green, g (s)		25.5	25.5	26.5		26.5		25.5	25.5		25.5	
Actuated g/C Ratio		0.39	0.39	0.41		0.41		0.39	0.39		0.39	
Clearance Time (s)		5.0	5.0	4.0		4.0		5.0	5.0		5.0	
Vehicle Extension (s)		2.0	2.0	2.0		2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)		701	600	160		624		706	600		696	
v/s Ratio Prot								0.02				
v/s Ratio Perm		0.33	0.14	0.16		0.00			0.02		c0.04	
v/c Ratio		0.85	0.37	0.39		0.01		0.05	0.05		0.10	
Uniform Delay, d1		18.0	14.0	13.6		11.4		12.3	12.2		12.5	
Progression Factor		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Incremental Delay, d2		9.3	0.1	0.6		0.0		0.1	0.2		0.3	
Delay (s)		27.4	14.2	14.2		11.4		12.4	12.4		12.8	
Level of Service		C	B	B		B		B	B		B	
Approach Delay (s)		20.9			13.6			12.4			12.8	
Approach LOS		C			B			B			B	

Intersection Summary

HCM Average Control Delay	19.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

24: Eureka & Stuart

12/16/2013



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	43	29	9	101	26	629
v/c Ratio	0.17	0.12	0.03	0.08	0.06	0.51
Control Delay	11.9	10.8	5.3	5.1	5.4	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.9	10.8	5.3	5.1	5.4	7.6
Queue Length 50th (ft)	4	3	1	3	2	27
Queue Length 95th (ft)	20	15	4	10	8	52
Internal Link Dist (ft)	380	399		136		545
Turn Bay Length (ft)			20		20	
Base Capacity (vph)	1178	1172	724	3392	1168	3376
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.02	0.01	0.03	0.02	0.19

Intersection Summary

HCM Signalized Intersection Capacity Analysis

24: Eureka & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (vph)	19	19	3	11	11	5	9	91	5	25	545	52
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.98		1.00	0.99		1.00	0.99	
Flt Protected		0.98			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1741			1718		1615	3391		1614	3375	
Flt Permitted		0.84			0.85		0.43	1.00		0.69	1.00	
Satd. Flow (perm)		1491			1484		723	3391		1169	3375	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	20	20	3	12	12	5	9	96	5	26	574	55
RTOR Reduction (vph)	0	2	0	0	4	0	0	3	0	0	14	0
Lane Group Flow (vph)	0	41	0	0	25	0	9	98	0	26	615	0
Confl. Peds. (#/hr)	1		2	2		1			1	1		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.3			6.3		11.4	11.4		11.4	11.4	
Effective Green, g (s)		4.3			4.3		9.4	9.4		9.4	9.4	
Actuated g/C Ratio		0.17			0.17		0.37	0.37		0.37	0.37	
Clearance Time (s)		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	
Lane Grp Cap (vph)		249			248		264	1240		428	1234	
v/s Ratio Prot								0.03			c0.18	
v/s Ratio Perm		c0.03			0.02		0.01			0.02		
v/c Ratio		0.16			0.10		0.03	0.08		0.06	0.50	
Uniform Delay, d1		9.2			9.1		5.2	5.3		5.3	6.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			0.2		0.1	0.0		0.1	0.3	
Delay (s)		9.5			9.2		5.3	5.4		5.3	6.6	
Level of Service		A			A		A	A		A	A	
Approach Delay (s)		9.5			9.2			5.3			6.6	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	25.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	31.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

25: Eureka & Oriental

12/16/2013



Lane Group	EBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	14	6	104	9	572
v/c Ratio	0.07	0.02	0.06	0.02	0.33
Control Delay	11.8	4.5	4.5	4.4	5.5
Queue Delay	0.0	0.0	0.0	0.0	1.2
Total Delay	11.8	4.5	4.5	4.4	6.7
Queue Length 50th (ft)	1	1	4	1	27
Queue Length 95th (ft)	10	3	10	4	45
Internal Link Dist (ft)	432		184		93
Turn Bay Length (ft)		25		40	
Base Capacity (vph)	601	377	1737	592	1726
Starvation Cap Reductn	0	0	0	0	885
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.02	0.02	0.06	0.02	0.68

Intersection Summary

HCM Signalized Intersection Capacity Analysis

25: Eureka & Oriental

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (vph)	6	2	6	0	0	0	6	98	1	9	497	47
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.2					6.2	6.2		6.2	6.2	
Lane Util. Factor		1.00					1.00	0.95		1.00	0.95	
Frbp, ped/bikes		0.99					1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99					1.00	1.00		1.00	1.00	
Frt		0.94					1.00	1.00		1.00	0.99	
Flt Protected		0.98					0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1641					1614	3414		1614	3370	
Flt Permitted		0.86					0.44	1.00		0.69	1.00	
Satd. Flow (perm)		1444					742	3414		1166	3370	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	2	6	0	0	0	6	103	1	9	523	49
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	13	0
Lane Group Flow (vph)	0	9	0	0	0	0	6	104	0	9	559	0
Confl. Peds. (#/hr)	6		1	1		6	2		1	1		2
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	
Protected Phases		1			5			7				3
Permitted Phases	1			5			7			3		
Actuated Green, G (s)		7.0					20.0	20.0		20.0	20.0	
Effective Green, g (s)		5.0					18.0	18.0		18.0	18.0	
Actuated g/C Ratio		0.14					0.51	0.51		0.51	0.51	
Clearance Time (s)		4.2					4.2	4.2		4.2	4.2	
Vehicle Extension (s)		2.5					2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		204					377	1736		593	1714	
v/s Ratio Prot								0.03			c0.17	
v/s Ratio Perm		c0.01					0.01			0.01		
v/c Ratio		0.04					0.02	0.06		0.02	0.33	
Uniform Delay, d1		13.1					4.3	4.4		4.3	5.1	
Progression Factor		1.00					1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1					0.0	0.0		0.0	0.1	
Delay (s)		13.2					4.3	4.4		4.3	5.2	
Level of Service		B					A	A		A	A	
Approach Delay (s)		13.2			0.0			4.4			5.2	
Approach LOS		B			A			A			A	

Intersection Summary

HCM Average Control Delay	5.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	35.4	Sum of lost time (s)	12.4
Intersection Capacity Utilization	32.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

26: Eureka & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	11	192	13	424	133	479
v/c Ratio	0.05	0.22	0.05	0.50	0.15	0.51
Control Delay	10.3	9.7	10.2	12.1	7.2	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.3	9.7	10.2	12.1	7.2	9.3
Queue Length 50th (ft)	1	11	1	27	5	23
Queue Length 95th (ft)	10	32	10	67	20	60
Internal Link Dist (ft)		660		354	209	138
Turn Bay Length (ft)	35		40			
Base Capacity (vph)	535	2033	640	2037	2065	2073
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.09	0.02	0.21	0.06	0.23

Intersection Summary

HCM Signalized Intersection Capacity Analysis

26: Eureka & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	171	11	12	385	18	13	94	19	62	302	91
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.6	6.6		6.6	6.6			6.2			6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.98			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1614	3385		1611	3395			3319			3286	
Flt Permitted	0.53	1.00		0.63	1.00			0.89			0.89	
Satd. Flow (perm)	894	3385		1070	3395			2956			2943	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	180	12	13	405	19	14	99	20	65	318	96
RTOR Reduction (vph)	0	9	0	0	7	0	0	14	0	0	51	0
Lane Group Flow (vph)	11	183	0	13	417	0	0	119	0	0	428	0
Confl. Peds. (#/hr)	3		7	7		3	2		1	1		2
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			4	
Permitted Phases	6			2			4			4		
Actuated Green, G (s)	9.6	9.6		9.6	9.6			11.3			11.3	
Effective Green, g (s)	7.6	7.6		7.6	7.6			9.3			9.3	
Actuated g/C Ratio	0.26	0.26		0.26	0.26			0.31			0.31	
Clearance Time (s)	4.6	4.6		4.6	4.6			4.2			4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	229	866		274	869			926			922	
v/s Ratio Prot		0.05			c0.12							
v/s Ratio Perm	0.01			0.01				0.04			c0.15	
v/c Ratio	0.05	0.21		0.05	0.48			0.13			0.46	
Uniform Delay, d1	8.3	8.7		8.3	9.4			7.3			8.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	0.1		0.1	0.4			0.1			0.4	
Delay (s)	8.4	8.8		8.4	9.8			7.4			8.6	
Level of Service	A	A		A	A			A			A	
Approach Delay (s)		8.8			9.7			7.4			8.6	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	8.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	29.7	Sum of lost time (s)	12.8
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
27: Orange & Colton

12/16/2013


























Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	64	232	234	279	98	15	248	87	694
v/c Ratio	0.24	0.43	0.78	0.53	0.19	0.05	0.14	0.17	0.40
Control Delay	15.7	13.5	36.0	20.0	3.9	11.7	8.7	12.1	11.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.7	13.5	36.0	20.0	3.9	11.7	8.7	12.1	11.4
Queue Length 50th (ft)	17	49	76	83	0	3	19	16	73
Queue Length 95th (ft)	35	79	121	114	22	14	48	50	145
Internal Link Dist (ft)		502		260			472		133
Turn Bay Length (ft)	50		65		65	50		75	
Base Capacity (vph)	389	772	445	780	719	319	1716	516	1722
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.30	0.53	0.36	0.14	0.05	0.14	0.17	0.40

Intersection Summary

HCM Signalized Intersection Capacity Analysis

27: Orange & Colton

12/16/2013

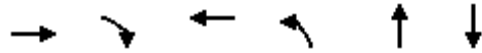
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	143	77	222	265	93	14	200	35	83	596	64
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	1706		1615	1800	1530	1615	3343		1615	3370	
Flt Permitted	0.53	1.00		0.60	1.00	1.00	0.37	1.00		0.60	1.00	
Satd. Flow (perm)	897	1706		1027	1800	1530	627	3343		1017	3370	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	64	151	81	234	279	98	15	211	37	87	627	67
RTOR Reduction (vph)	0	40	0	0	0	69	0	18	0	0	10	0
Lane Group Flow (vph)	64	192	0	234	279	29	15	230	0	87	684	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	19.5	19.5		19.5	19.5	19.5	32.5	32.5		32.5	32.5	
Effective Green, g (s)	17.5	17.5		17.5	17.5	17.5	30.5	30.5		30.5	30.5	
Actuated g/C Ratio	0.29	0.29		0.29	0.29	0.29	0.51	0.51		0.51	0.51	
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	3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	262	498		300	525	446	319	1699		517	1713	
v/s Ratio Prot		0.11			0.15			0.07			c0.20	
v/s Ratio Perm	0.07			c0.23		0.02	0.02			0.09		
v/c Ratio	0.24	0.38		0.78	0.53	0.06	0.05	0.14		0.17	0.40	
Uniform Delay, d1	16.2	17.0		19.5	17.8	15.3	7.4	7.8		7.9	9.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.5		12.3	1.0	0.1	0.3	0.2		0.7	0.7	
Delay (s)	16.7	17.5		31.8	18.9	15.4	7.7	8.0		8.6	9.8	
Level of Service	B	B		C	B	B	A	A		A	A	
Approach Delay (s)		17.3			23.3			7.9			9.7	
Approach LOS		B			C			A			A	

Intersection Summary

HCM Average Control Delay	14.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
28: Pearl & Orange

12/16/2013



Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	498	121	335	2	769	343
v/c Ratio	0.86	0.18	0.49	0.01	0.71	0.34
Control Delay	31.1	6.4	11.5	12.5	19.4	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.1	6.4	11.5	12.5	19.4	14.2
Queue Length 50th (ft)	131	12	59	1	112	42
Queue Length 95th (ft)	#290	36	116	4	165	70
Internal Link Dist (ft)	445		279		526	472
Turn Bay Length (ft)		20		75		
Base Capacity (vph)	721	839	847	356	1310	1212
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.14	0.40	0.01	0.59	0.28

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

28: Pearl & Orange

12/16/2013



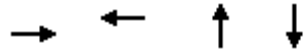
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↖	↕			↕	↖
Volume (vph)	183	290	115	18	45	256	2	718	12	10	299	16
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95			0.95	
Frt		1.00	0.85		0.89		1.00	1.00			0.99	
Flt Protected		0.98	1.00		1.00		0.95	1.00			1.00	
Satd. Flow (prot)		1766	1530		1600		1615	3411			3389	
Flt Permitted		0.75	1.00		0.96		0.55	1.00			0.93	
Satd. Flow (perm)		1353	1530		1547		928	3411			3142	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	193	305	121	19	47	269	2	756	13	11	315	17
RTOR Reduction (vph)	0	0	30	0	28	0	0	2	0	0	7	0
Lane Group Flow (vph)	0	498	91	0	307	0	2	767	0	0	336	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4			2			2		
Actuated Green, G (s)		23.0	23.0		23.0		17.7	17.7			17.7	
Effective Green, g (s)		21.0	21.0		21.0		15.7	15.7			15.7	
Actuated g/C Ratio		0.43	0.43		0.43		0.32	0.32			0.32	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.5	3.5			3.5	
Lane Grp Cap (vph)		583	660		667		299	1100			1013	
v/s Ratio Prot								c0.22				
v/s Ratio Perm		c0.37	0.06		0.20		0.00				0.11	
v/c Ratio		0.85	0.14		0.46		0.01	0.70			0.33	
Uniform Delay, d1		12.5	8.4		9.8		11.2	14.4			12.5	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		11.7	0.1		0.5		0.0	2.0			0.2	
Delay (s)		24.1	8.5		10.3		11.2	16.4			12.7	
Level of Service		C	A		B		B	B			B	
Approach Delay (s)		21.1			10.3			16.4			12.7	
Approach LOS		C			B			B			B	

Intersection Summary

HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	48.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues
29: Orange & Stuart

12/16/2013



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	40	85	785	384
v/c Ratio	0.15	0.31	0.63	0.31
Control Delay	9.3	11.8	9.5	6.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.3	11.8	9.5	6.7
Queue Length 50th (ft)	2	7	40	17
Queue Length 95th (ft)	18	33	82	38
Internal Link Dist (ft)	305	198	150	526
Turn Bay Length (ft)				
Base Capacity (vph)	1090	1052	2474	2484
Starvation Cap Reductn	0	0	76	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.04	0.08	0.33	0.15
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

29: Orange & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	10	7	21	40	10	30	5	686	55	3	355	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.2			6.2			6.2			6.2	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frbp, ped/bikes		0.99			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.93			0.95			0.99			1.00	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1632			1658			3376			3408	
Flt Permitted		0.88			0.82			0.95			0.95	
Satd. Flow (perm)		1452			1398			3214			3232	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	7	22	42	11	32	5	722	58	3	374	7
RTOR Reduction (vph)	0	18	0	0	26	0	0	11	0	0	2	0
Lane Group Flow (vph)	0	22	0	0	59	0	0	774	0	0	382	0
Confl. Peds. (#/hr)	4		2	2		4	3		2	2		3
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.1			7.1			13.2			13.2	
Effective Green, g (s)		5.1			5.1			11.2			11.2	
Actuated g/C Ratio		0.18			0.18			0.39			0.39	
Clearance Time (s)		4.2			4.2			4.2			4.2	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		258			248			1254			1261	
v/s Ratio Prot												
v/s Ratio Perm		0.02			0.04			0.24			0.12	
v/c Ratio		0.08			0.24			0.62			0.30	
Uniform Delay, d1		9.9			10.1			7.0			6.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.5			0.9			0.1	
Delay (s)		10.0			10.6			7.9			6.2	
Level of Service		A			B			A			A	
Approach Delay (s)		10.0			10.6			7.9			6.2	
Approach LOS		A			B			A			A	

Intersection Summary

HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	28.7	Sum of lost time (s)	12.4
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

30: Orange & Oriental

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	3	1	1	722	396	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	3	1	1	760	417	1
Pedestrians	2			1		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	4.0			4.0		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				464	165	
pX, platoon unblocked	0.94	0.99	0.99			
vC, conflicting volume	801	212	420			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	617	193	402			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	398	815	1158			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	4	254	507	278	140
Volume Left	3	1	0	0	0
Volume Right	1	0	0	0	1
cSH	456	1158	1700	1700	1700
Volume to Capacity	0.01	0.00	0.30	0.16	0.08
Queue Length 95th (ft)	1	0	0	0	0
Control Delay (s)	13.0	0.0	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	13.0	0.0		0.0	
Approach LOS	B				

Intersection Summary					
Average Delay			0.1		
Intersection Capacity Utilization			32.1%	ICU Level of Service	A
Analysis Period (min)			15		

Queues

31: Orange & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	47	157	18	357	37	626	51	338
v/c Ratio	0.20	0.21	0.07	0.45	0.12	0.57	0.21	0.31
Control Delay	12.0	8.3	10.5	8.4	7.9	9.9	9.4	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.0	8.3	10.5	8.4	7.9	9.9	9.4	7.0
Queue Length 50th (ft)	5	6	2	13	3	32	5	14
Queue Length 95th (ft)	23	23	12	41	15	71	20	35
Internal Link Dist (ft)		387		273		223		384
Turn Bay Length (ft)	60		60		75		60	
Base Capacity (vph)	738	2186	738	2174	685	2508	550	2472
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.07	0.02	0.16	0.05	0.25	0.09	0.14

Intersection Summary

HCM Signalized Intersection Capacity Analysis

31: Orange & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	109	40	17	218	122	35	578	17	48	279	42
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.2	6.2		6.2	6.2		6.2	6.2		6.2	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.95		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3283		1615	3222		1614	3404		1615	3347	
Flt Permitted	0.66	1.00		0.66	1.00		0.55	1.00		0.44	1.00	
Satd. Flow (perm)	1114	3283		1115	3222		931	3404		747	3347	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	115	42	18	229	128	37	608	18	51	294	44
RTOR Reduction (vph)	0	33	0	0	100	0	0	5	0	0	26	0
Lane Group Flow (vph)	47	124	0	18	257	0	37	621	0	51	312	0
Confl. Peds. (#/hr)	1					1	3		1	1		3
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	8.1	8.1		8.1	8.1		11.1	11.1		11.1	11.1	
Effective Green, g (s)	6.1	6.1		6.1	6.1		9.1	9.1		9.1	9.1	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.33	0.33		0.33	0.33	
Clearance Time (s)	4.2	4.2		4.2	4.2		4.2	4.2		4.2	4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	246	726		246	712		307	1122		246	1104	
v/s Ratio Prot		0.04			c0.08			c0.18			0.09	
v/s Ratio Perm	0.04			0.02			0.04			0.07		
v/c Ratio	0.19	0.17		0.07	0.36		0.12	0.55		0.21	0.28	
Uniform Delay, d1	8.7	8.7		8.5	9.1		6.5	7.6		6.7	6.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.1		0.1	0.3		0.2	0.6		0.4	0.1	
Delay (s)	9.1	8.8		8.6	9.4		6.6	8.2		7.1	7.0	
Level of Service	A	A		A	A		A	A		A	A	
Approach Delay (s)		8.9			9.4			8.1			7.0	
Approach LOS		A			A			A			A	

Intersection Summary

















HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	27.6	Sum of lost time (s)	12.4
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis



















32: 6th St & WB I-10 Ramp

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	276	26	287	0	191	0	0	308	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	291	27	302	0	201	0	0	324	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	841	525	324	525	525	201	324			201		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	841	525	324	525	525	201	324			201		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	38	94	64	100			100		
cM capacity (veh/h)	176	460	721	466	460	845	1247			1383		
Direction, Lane #	WB 1	WB 2	NB 1	SB 1								
Volume Total	291	329	201	324								
Volume Left	291	0	0	0								
Volume Right	0	302	0	0								
cSH	466	790	1700	1700								
Volume to Capacity	0.62	0.42	0.12	0.19								
Queue Length 95th (ft)	104	52	0	0								
Control Delay (s)	24.7	12.8	0.0	0.0								
Lane LOS	C	B										
Approach Delay (s)	18.3		0.0	0.0								
Approach LOS	C											
Intersection Summary												
Average Delay			9.9									
Intersection Capacity Utilization			43.9%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 33: 6th St & EB I-10 Ramp




















12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	72	38	186	0	0	0	220	96	33	132	287	103
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	76	40	196	0	0	0	232	101	35	139	302	108
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2						
Volume Total (vph)	116	196	232	136	139	411						
Volume Left (vph)	76	0	232	0	139	0						
Volume Right (vph)	0	196	0	35	0	108						
Hadj (s)	0.33	-0.70	0.50	-0.18	0.50	-0.18						
Departure Headway (s)	7.1	6.1	6.7	6.1	6.5	5.8						
Degree Utilization, x	0.23	0.33	0.43	0.23	0.25	0.67						
Capacity (veh/h)	475	553	517	568	530	595						
Control Delay (s)	11.0	10.9	13.6	9.6	10.5	18.5						
Approach Delay (s)	10.9		12.1		16.5							
Approach LOS	B		B		C							
Intersection Summary												
Delay			13.8									
HCM Level of Service			B									
Intersection Capacity Utilization			52.5%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

34: 6th St & Stuart

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	4	6	10	22	10	86	9	253	6	80	343	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	4	6	11	23	11	91	9	266	6	84	361	14
Pedestrians		1						1			2	
Lane Width (ft)		12.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								231				
pX, platoon unblocked	0.99	0.99		0.99	0.99	0.99				0.99		
vC, conflicting volume	920	829	189	652	833	271	376			273		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	915	823	189	644	826	260	376			261		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	98	99	93	96	88	99			94		
cM capacity (veh/h)	184	286	825	328	284	737	1193			1303		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3					
Volume Total	21	124	9	273	84	241	134					
Volume Left	4	23	9	0	84	0	0					
Volume Right	11	91	0	6	0	0	14					
cSH	364	539	1193	1700	1303	1700	1700					
Volume to Capacity	0.06	0.23	0.01	0.16	0.06	0.14	0.08					
Queue Length 95th (ft)	5	22	1	0	5	0	0					
Control Delay (s)	15.5	13.7	8.0	0.0	8.0	0.0	0.0					
Lane LOS	C	B	A		A							
Approach Delay (s)	15.5	13.7	0.3		1.5							
Approach LOS	C	B										
Intersection Summary												
Average Delay			3.1									
Intersection Capacity Utilization			39.5%	ICU Level of Service	A							
Analysis Period (min)			15									

Queues

35: Redlands Blvd & Citrus Ave

12/16/2013



Lane Group	EBT	WBT	SET	SER	NWT
Lane Group Flow (vph)	367	618	333	33	668
v/c Ratio	0.67	0.77	0.49	0.06	0.76
Control Delay	28.6	25.5	20.9	7.0	26.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	28.6	25.5	20.9	7.0	26.5
Queue Length 50th (ft)	63	95	53	0	119
Queue Length 95th (ft)	110	163	106	18	#218
Internal Link Dist (ft)	399	463	375		430
Turn Bay Length (ft)				100	
Base Capacity (vph)	1245	1036	812	647	1050
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.29	0.60	0.41	0.05	0.64

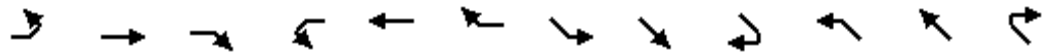
Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

35: Redlands Blvd & Citrus Ave

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕↕			↕↕			↕↕	↗		↕↕	
Volume (vph)	19	232	98	55	301	231	131	185	31	181	415	38
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.2			6.2	6.2		6.2	
Lane Util. Factor		0.95			0.95			0.95	1.00		0.95	
Frt		0.96			0.94			1.00	0.85		0.99	
Flt Protected		1.00			1.00			0.98	1.00		0.99	
Satd. Flow (prot)		3267			3203			3351	1530		3342	
Flt Permitted		1.00			1.00			0.58	1.00		0.75	
Satd. Flow (perm)		3267			3203			1981	1530		2549	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	20	244	103	58	317	243	138	195	33	191	437	40
RTOR Reduction (vph)	0	56	0	0	125	0	0	0	22	0	5	0
Lane Group Flow (vph)	0	311	0	0	493	0	0	333	11	0	663	0
Turn Type	Split	NA		Split	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	4	4		1	1			2			2	
Permitted Phases							2		2	2		
Actuated Green, G (s)		11.9			15.7			24.2	24.2		24.2	
Effective Green, g (s)		9.9			13.7			22.2	22.2		22.2	
Actuated g/C Ratio		0.15			0.21			0.35	0.35		0.35	
Clearance Time (s)		4.0			4.2			4.2	4.2		4.2	
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		504			684			685	529		881	
v/s Ratio Prot		c0.10			c0.15							
v/s Ratio Perm								0.17	0.01		c0.26	
v/c Ratio		0.62			0.72			0.49	0.02		0.75	
Uniform Delay, d1		25.4			23.5			16.5	13.8		18.6	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		2.3			3.7			0.5	0.0		3.7	
Delay (s)		27.6			27.2			17.1	13.9		22.2	
Level of Service		C			C			B	B		C	
Approach Delay (s)		27.6			27.2			16.8			22.2	
Approach LOS		C			C			B			C	

Intersection Summary

HCM Average Control Delay	23.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	64.2	Sum of lost time (s)	18.4
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
 36: Stuart & Church

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	27	43	43	299	360	64
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	28	45	45	315	379	67
Pedestrians					40	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					3	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				203		
pX, platoon unblocked	0.99					
vC, conflicting volume	701	223	446			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	688	223	446			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	94	96			
cM capacity (veh/h)	355	786	1125			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	74	150	210	253	194
Volume Left	28	45	0	0	0
Volume Right	45	0	0	0	67
cSH	535	1125	1700	1700	1700
Volume to Capacity	0.14	0.04	0.12	0.15	0.11
Queue Length 95th (ft)	12	3	0	0	0
Control Delay (s)	12.8	2.8	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	12.8	1.2		0.0	
Approach LOS	B				

Intersection Summary					
Average Delay			1.5		
Intersection Capacity Utilization			37.1%	ICU Level of Service	A
Analysis Period (min)			15		

HCM Unsignalized Intersection Capacity Analysis
 37: Universtiy & WB I-10 Ramp/E Central

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↔			↔	
Volume (veh/h)	0	0	0	0	6	23	476	423	22	6	142	945
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	0	6	24	501	445	23	6	149	995
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												563
pX, platoon unblocked	0.97	0.97	0.97	0.97	0.97		0.97					
vC, conflicting volume	1912	2130	572	1546	2616	234	1144			468		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1881	2106	505	1506	2605	234	1093			468		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	100	100	0	97	20			99		
cM capacity (veh/h)	0	10	504	28	5	774	629			1104		
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2							
Volume Total	31	724	246	81	1069							
Volume Left	0	501	0	6	0							
Volume Right	24	0	23	0	995							
cSH	23	629	1700	1104	1700							
Volume to Capacity	1.32	0.80	0.14	0.01	0.63							
Queue Length 95th (ft)	97	197	0	0	0							
Control Delay (s)	543.7	28.6	0.0	0.7	0.0							
Lane LOS	F	D		A								
Approach Delay (s)	543.7	21.4		0.0								
Approach LOS	F											
Intersection Summary												
Average Delay			17.4									
Intersection Capacity Utilization			77.8%		ICU Level of Service				D			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

38: Universtiy & EB I-10 Ramp

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	296	457	0	679	142	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	312	481	0	715	149	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	12					
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)	1022					
pX, platoon unblocked						
vC, conflicting volume	507	75	149			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	507	75	149			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	38	51	100			
cM capacity (veh/h)	500	978	1444			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	793	357	357	75	75	
Volume Left	312	0	0	0	0	
Volume Right	481	0	0	0	0	
cSH	1272	1700	1700	1700	1700	
Volume to Capacity	0.62	0.21	0.21	0.04	0.04	
Queue Length 95th (ft)	115	0	0	0	0	
Control Delay (s)	16.6	0.0	0.0	0.0	0.0	
Lane LOS	C					
Approach Delay (s)	16.6	0.0		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay	7.9					
Intersection Capacity Utilization	44.8%			ICU Level of Service	A	
Analysis Period (min)	15					

Queues

39: Tippecanoe & Harriman PI

12/16/2013



Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	85	226	684	270	258	232	815	384	972
v/c Ratio	0.44	0.41	1.03	0.54	0.53	0.42	0.34	0.41	0.61
Control Delay	34.2	6.1	72.1	12.9	12.5	27.3	11.5	3.1	30.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.2	6.1	72.1	12.9	12.5	27.3	11.5	3.1	30.0
Queue Length 50th (ft)	32	0	~147	37	33	42	62	0	81
Queue Length 95th (ft)	70	26	#250	90	86	77	115	48	154
Internal Link Dist (ft)				564			381		771
Turn Bay Length (ft)	280		300		300	225		500	
Base Capacity (vph)	210	947	663	669	643	558	2387	941	1586
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.24	1.03	0.40	0.40	0.42	0.34	0.41	0.61

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.

HCM Signalized Intersection Capacity Analysis

39: Tippecanoe & Harriman PI

12/16/2013



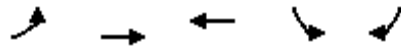
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖		↖↖	↖↖	↖	↖	↖↖	↖↖↖	↖		↖↖↖	
Volume (vph)	81	0	215	650	71	430	220	774	365	0	844	80
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00		0.88	0.97	0.95	0.95	0.97	0.91	1.00		0.86	
Frt	1.00		0.85	1.00	0.89	0.85	1.00	1.00	0.85		0.99	
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (prot)	1710		2693	3317	1525	1454	3317	4914	1530		6112	
Flt Permitted	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (perm)	1710		2693	3317	1525	1454	3317	4914	1530		6112	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	85	0	226	684	75	453	232	815	384	0	888	84
RTOR Reduction (vph)	0	0	194	0	127	127	0	0	202	0	22	0
Lane Group Flow (vph)	85	0	32	684	143	131	232	815	182	0	950	0
Turn Type	Prot		custom	Prot	NA	Perm	Prot	NA	Perm		NA	
Protected Phases	7			3	8		5	2				6
Permitted Phases			4			8			2			
Actuated Green, G (s)	6.2		9.2	13.0	16.0	16.0	10.9	30.8	30.8		15.9	
Effective Green, g (s)	6.2		9.2	13.0	16.0	16.0	10.9	30.8	30.8		15.9	
Actuated g/C Ratio	0.10		0.14	0.20	0.25	0.25	0.17	0.47	0.47		0.24	
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)	163		381	663	375	358	556	2328	725		1495	
v/s Ratio Prot	0.05			c0.21	c0.09		c0.07	0.17			c0.16	
v/s Ratio Perm			0.01			0.09			0.12			
v/c Ratio	0.52		0.08	1.03	0.38	0.37	0.42	0.35	0.25		0.64	
Uniform Delay, d1	28.0		24.2	26.0	20.4	20.3	24.2	10.8	10.2		22.0	
Progression Factor	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.32	
Incremental Delay, d2	3.0		0.1	43.3	0.7	0.6	0.5	0.4	0.8		2.0	
Delay (s)	31.0		24.3	69.3	21.0	20.9	24.7	11.2	11.0		30.9	
Level of Service	C		C	E	C	C	C	B	B		C	
Approach Delay (s)		26.2			48.3			13.4			30.9	
Approach LOS		C			D			B			C	

Intersection Summary

HCM Average Control Delay	29.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Mill St

11/25/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	62	561	489	104	48
v/c Ratio	0.13	0.27	0.24	0.24	0.22
Control Delay	5.8	5.3	5.0	13.0	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	5.3	5.0	13.0	8.6
Queue Length 50th (ft)	5	27	22	6	0
Queue Length 95th (ft)	19	51	43	23	20
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	555	2356	2338	2003	872
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.11	0.24	0.21	0.05	0.06

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St

11/25/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	59	533	434	30	77	67
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.97	0.85
Flt Protected	0.95	1.00	1.00		0.96	1.00
Satd. Flow (prot)	1615	3420	3386		3250	1392
Flt Permitted	0.47	1.00	1.00		0.96	1.00
Satd. Flow (perm)	805	3420	3386		3250	1392
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	62	561	457	32	81	71
RTOR Reduction (vph)	0	0	7	0	21	44
Lane Group Flow (vph)	62	561	482	0	83	4
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	21.4	21.4	21.4		5.2	5.2
Effective Green, g (s)	19.4	19.4	19.4		3.2	3.2
Actuated g/C Ratio	0.54	0.54	0.54		0.09	0.09
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	439	1864	1845		292	125
v/s Ratio Prot		c0.16	0.14		c0.03	
v/s Ratio Perm	0.08					0.00
v/c Ratio	0.14	0.30	0.26		0.28	0.03
Uniform Delay, d1	4.0	4.4	4.3		15.1	14.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.1	0.1		0.5	0.1
Delay (s)	4.1	4.5	4.4		15.7	14.9
Level of Service	A	A	A		B	B
Approach Delay (s)		4.5	4.4		15.4	
Approach LOS		A	A		B	

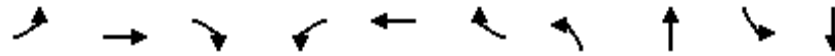
Intersection Summary

HCM Average Control Delay	5.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	35.6	Sum of lost time (s)	13.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

11/25/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	120	358	199	179	342	100	164	777	91	829
v/c Ratio	0.53	0.43	0.38	0.80	0.41	0.22	0.47	0.40	0.26	0.44
Control Delay	26.7	19.6	5.0	45.5	19.3	5.1	15.3	14.9	10.5	15.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.7	19.6	5.0	45.5	19.3	5.1	15.3	14.9	10.5	15.7
Queue Length 50th (ft)	37	55	0	59	53	0	28	73	15	84
Queue Length 95th (ft)	74	79	37	#118	76	26	#73	114	39	123
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	309	1140	643	305	1140	577	352	1936	355	1887
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	0.39	0.31	0.31	0.59	0.30	0.17	0.47	0.40	0.26	0.44

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗↗	↘	↘	↗↗	↘	↘	↗↗↗		↘	↗↗↗	
Volume (vph)	114	340	189	170	325	95	156	636	103	86	682	105
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	7.0		5.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3420	1530	1615	3420	1530	1615	4812		1615	4815	
Flt Permitted	0.55	1.00	1.00	0.54	1.00	1.00	0.31	1.00		0.35	1.00	
Satd. Flow (perm)	928	3420	1530	914	3420	1530	525	4812		587	4815	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	120	358	199	179	342	100	164	669	108	91	718	111
RTOR Reduction (vph)	0	0	150	0	0	76	0	31	0	0	30	0
Lane Group Flow (vph)	120	358	49	179	342	25	164	746	0	91	799	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	16.7	16.7	16.7	16.7	16.7	16.7	31.0	25.2		29.6	24.5	
Effective Green, g (s)	14.7	14.7	14.7	14.7	14.7	14.7	27.0	23.2		25.6	22.5	
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24	0.24	0.45	0.39		0.43	0.38	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	227	838	375	224	838	375	305	1861		304	1806	
v/s Ratio Prot		0.10			0.10		c0.03	0.15		0.02	0.17	
v/s Ratio Perm	0.13		0.03	c0.20		0.02	c0.21			0.11		
v/c Ratio	0.53	0.43	0.13	0.80	0.41	0.07	0.54	0.40		0.30	0.44	
Uniform Delay, d1	19.6	19.1	17.7	21.3	19.0	17.4	10.1	13.4		10.5	14.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	0.4	0.2	17.8	0.3	0.1	1.8	0.6		0.6	0.8	
Delay (s)	21.9	19.5	17.8	39.1	19.3	17.5	11.9	14.0		11.0	14.8	
Level of Service	C	B	B	D	B	B	B	B		B	B	
Approach Delay (s)		19.4			24.7			13.6			14.5	
Approach LOS		B			C			B			B	

Intersection Summary

HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Waterman & E Orange Show

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	209	829	97	314	107	720	77	1180
v/c Ratio	0.70	0.74	0.89	0.30	0.64	0.58	0.25	0.90
Control Delay	36.4	21.3	91.3	17.6	35.4	22.3	12.8	32.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.4	21.3	91.3	17.6	35.4	22.3	12.8	32.6
Queue Length 50th (ft)	86	140	43	51	26	149	19	278
Queue Length 95th (ft)	163	204	#131	82	#82	216	42	#435
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	392	1422	143	1389	167	1318	324	1438
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.58	0.68	0.23	0.64	0.55	0.24	0.82

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	199	434	353	92	248	50	102	637	47	73	945	176
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.93		1.00	0.97		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3190		1615	3333		1615	3385		1615	3340	
Flt Permitted	0.56	1.00		0.20	1.00		0.15	1.00		0.28	1.00	
Satd. Flow (perm)	954	3190		348	3333		262	3385		480	3340	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	209	457	372	97	261	53	107	671	49	77	995	185
RTOR Reduction (vph)	0	130	0	0	23	0	0	6	0	0	18	0
Lane Group Flow (vph)	209	699	0	97	291	0	107	714	0	77	1162	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	24.3	24.3		24.3	24.3		31.7	28.0		35.3	29.8	
Effective Green, g (s)	22.3	22.3		22.3	22.3		27.7	26.0		31.3	27.8	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.39	0.36		0.44	0.39	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	296	991		108	1035		133	1226		265	1293	
v/s Ratio Prot		0.22			0.09		c0.02	0.21		0.01	c0.35	
v/s Ratio Perm	0.22			c0.28			0.29			0.11		
v/c Ratio	0.71	0.71		0.90	0.28		0.80	0.58		0.29	0.90	
Uniform Delay, d1	21.9	21.9		23.7	18.7		21.6	18.5		12.4	20.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.5	2.3		55.0	0.1		28.6	0.7		0.6	8.5	
Delay (s)	29.3	24.2		78.7	18.8		50.2	19.2		13.0	29.2	
Level of Service	C	C		E	B		D	B		B	C	
Approach Delay (s)		25.2			33.0			23.2			28.2	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	71.8	Sum of lost time (s)	13.0
Intersection Capacity Utilization	95.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

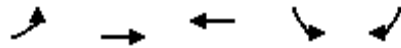
11/25/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	4	3	4	780	1385	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	4	3	4	821	1458	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					87	
pX, platoon unblocked	0.96	0.96	0.96			
vC, conflicting volume	1879	731	1462			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1833	638	1399			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	99	99			
cM capacity (veh/h)	66	408	475			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	7	4	411	411	972	490
Volume Left	4	4	0	0	0	0
Volume Right	3	0	0	0	0	4
cSH	103	475	1700	1700	1700	1700
Volume to Capacity	0.07	0.01	0.24	0.24	0.57	0.29
Queue Length 95th (ft)	6	1	0	0	0	0
Control Delay (s)	42.7	12.6	0.0	0.0	0.0	0.0
Lane LOS	E	B				
Approach Delay (s)	42.7	0.1			0.0	
Approach LOS	E					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			50.5%		ICU Level of Service	A
Analysis Period (min)			15			

Queues
1: Mill St

12/16/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	63	513	569	154	72
v/c Ratio	0.15	0.26	0.30	0.31	0.28
Control Delay	6.4	5.6	5.6	10.9	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.4	5.6	5.6	10.9	8.2
Queue Length 50th (ft)	5	25	27	6	0
Queue Length 95th (ft)	20	48	53	27	26
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	532	2440	2425	2104	934
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.12	0.21	0.23	0.07	0.08

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St

12/16/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑↑	↑↑		↙↘	↘
Volume (vph)	60	487	510	30	87	127
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.94	0.85
Flt Protected	0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	1615	3420	3391		3186	1392
Flt Permitted	0.44	1.00	1.00		0.97	1.00
Satd. Flow (perm)	745	3420	3391		3186	1392
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	513	537	32	92	134
RTOR Reduction (vph)	0	0	6	0	56	65
Lane Group Flow (vph)	63	513	563	0	98	7
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	19.0	19.0	19.0		5.4	5.4
Effective Green, g (s)	17.0	17.0	17.0		3.4	3.4
Actuated g/C Ratio	0.51	0.51	0.51		0.10	0.10
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	379	1741	1726		324	142
v/s Ratio Prot		0.15	c0.17		c0.03	
v/s Ratio Perm	0.08					0.01
v/c Ratio	0.17	0.29	0.33		0.30	0.05
Uniform Delay, d1	4.4	4.7	4.8		13.9	13.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.1	0.1		0.5	0.2
Delay (s)	4.6	4.8	4.9		14.4	13.7
Level of Service	A	A	A		B	B
Approach Delay (s)		4.8	4.9		14.2	
Approach LOS		A	A		B	

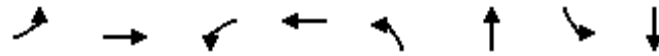
Intersection Summary

HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	33.4	Sum of lost time (s)	13.0
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

2: Waterman Ave & 9th St

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	141	399	146	378	105	1172	78	951
v/c Ratio	0.69	0.51	0.73	0.48	0.44	0.66	0.47	0.53
Control Delay	38.5	19.2	41.5	18.6	19.3	13.6	25.8	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.5	19.2	41.5	18.6	19.3	13.6	25.8	11.6
Queue Length 50th (ft)	47	57	49	53	22	144	16	107
Queue Length 95th (ft)	91	83	95	77	#88	253	#81	188
Internal Link Dist (ft)		852		841		893		996
Turn Bay Length (ft)	130		100		50		75	
Base Capacity (vph)	284	1085	280	1083	239	1774	165	1779
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.37	0.52	0.35	0.44	0.66	0.47	0.53

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2: Waterman Ave & 9th St

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	134	309	70	139	275	85	100	958	156	74	819	85
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	7.5	7.5		7.4	7.4		7.5	7.5		7.5	7.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.96		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3325		1615	3299		1615	3348		1615	3372	
Flt Permitted	0.53	1.00		0.52	1.00		0.27	1.00		0.18	1.00	
Satd. Flow (perm)	897	3325		879	3299		455	3348		314	3372	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	141	325	74	146	289	89	105	1008	164	78	862	89
RTOR Reduction (vph)	0	37	0	0	37	0	0	18	0	0	11	0
Lane Group Flow (vph)	141	362	0	146	341	0	105	1154	0	78	940	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	15.5	15.5		15.6	15.6		33.5	33.5		33.5	33.5	
Effective Green, g (s)	13.5	13.5		13.6	13.6		31.5	31.5		31.5	31.5	
Actuated g/C Ratio	0.22	0.22		0.23	0.23		0.52	0.52		0.52	0.52	
Clearance Time (s)	5.5	5.5		5.4	5.4		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	202	748		199	748		239	1758		165	1770	
v/s Ratio Prot		0.11			0.10			c0.34			0.28	
v/s Ratio Perm	0.16			c0.17			0.23			0.25		
v/c Ratio	0.70	0.48		0.73	0.46		0.44	0.66		0.47	0.53	
Uniform Delay, d1	21.4	20.2		21.5	20.0		8.8	10.3		9.0	9.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.0	0.5		13.1	0.4		5.8	1.9		9.4	1.1	
Delay (s)	31.4	20.7		34.6	20.5		14.6	12.3		18.4	10.5	
Level of Service	C	C		C	C		B	B		B	B	
Approach Delay (s)		23.5			24.4			12.4			11.1	
Approach LOS		C			C			B			B	

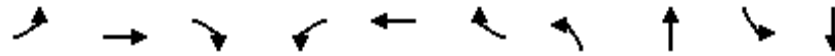
Intersection Summary

HCM Average Control Delay	15.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	14.9
Intersection Capacity Utilization	86.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	182	409	231	251	551	180	163	1144	132	1125
v/c Ratio	0.83	0.37	0.38	0.89	0.49	0.30	0.68	0.58	0.55	0.62
Control Delay	51.6	14.9	6.6	52.6	16.4	4.8	28.7	14.5	19.6	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.6	14.9	6.6	52.6	16.4	4.8	28.7	14.5	19.6	15.2
Queue Length 50th (ft)	52	51	14	74	72	4	27	105	21	100
Queue Length 95th (ft)	#149	81	54	#189	110	37	#86	145	#57	139
Internal Link Dist (ft)		1291			772			620		411
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	231	1182	639	300	1182	636	240	1985	240	1824
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	0.79	0.35	0.36	0.84	0.47	0.28	0.68	0.58	0.55	0.62




























Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			  			  	
Volume (vph)	173	389	219	238	523	171	155	973	114	125	917	152
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0		3.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3420	1530	1615	3420	1530	1615	4837		1615	4809	
Flt Permitted	0.39	1.00	1.00	0.51	1.00	1.00	0.18	1.00		0.20	1.00	
Satd. Flow (perm)	668	3420	1530	868	3420	1530	313	4837		333	4809	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	182	409	231	251	551	180	163	1024	120	132	965	160
RTOR Reduction (vph)	0	0	113	0	0	110	0	25	0	0	41	0
Lane Group Flow (vph)	182	409	118	251	551	70	163	1119	0	132	1084	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	17.9	17.9	17.9	17.9	17.9	17.9	25.4	21.7		22.8	20.4	
Effective Green, g (s)	17.9	17.9	17.9	17.9	17.9	17.9	25.4	21.7		22.8	20.4	
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33	0.33	0.46	0.39		0.41	0.37	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	217	1113	498	282	1113	498	232	1908		194	1784	
v/s Ratio Prot		0.12			0.16		c0.05	0.23		0.03	0.23	
v/s Ratio Perm	0.27		0.08	c0.29		0.05	c0.28			0.25		
v/c Ratio	0.84	0.37	0.24	0.89	0.50	0.14	0.70	0.59		0.68	0.61	
Uniform Delay, d1	17.2	14.2	13.6	17.6	14.9	13.1	9.5	13.1		11.1	14.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	23.7	0.2	0.2	27.4	0.3	0.1	9.3	1.3		9.4	1.5	
Delay (s)	40.9	14.4	13.8	45.0	15.3	13.2	18.7	14.4		20.5	15.6	
Level of Service	D	B	B	D	B	B	B	B		C	B	
Approach Delay (s)		20.1			22.5			15.0			16.1	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Waterman & E Orange Show

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	208	774	161	618	231	1043	141	1100
v/c Ratio	0.87	0.90	0.86	0.84	0.90	0.81	0.72	0.93
Control Delay	60.4	54.8	66.1	53.9	65.1	37.1	38.5	50.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.4	54.8	66.1	53.9	65.1	37.1	38.5	50.8
Queue Length 50th (ft)	113	274	84	235	128	369	56	398
Queue Length 95th (ft)	#226	#370	#196	305	#284	457	#120	#520
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	248	947	190	808	260	1369	212	1287
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.82	0.85	0.76	0.89	0.76	0.67	0.85

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	198	546	189	153	509	78	219	846	144	134	900	145
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	7.0		6.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	*1.00		1.00	0.95		1.00	0.95		1.00	*1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3461		1615	3352		1615	3345		1615	3525	
Flt Permitted	0.18	1.00		0.16	1.00		0.09	1.00		0.14	1.00	
Satd. Flow (perm)	312	3461		275	3352		156	3345		245	3525	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	208	575	199	161	536	82	231	891	152	141	947	153
RTOR Reduction (vph)	0	32	0	0	10	0	0	12	0	0	12	0
Lane Group Flow (vph)	208	742	0	161	608	0	231	1031	0	141	1088	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	42.8	29.3		37.6	26.7		59.8	45.7		50.0	39.9	
Effective Green, g (s)	38.8	27.3		33.6	24.7		57.6	43.7		46.0	37.9	
Actuated g/C Ratio	0.34	0.24		0.29	0.22		0.51	0.38		0.40	0.33	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	238	829		186	726		257	1282		196	1172	
v/s Ratio Prot	c0.09	c0.21		0.07	0.18		c0.11	c0.31		0.05	0.31	
v/s Ratio Perm	0.21			0.19			c0.35			0.24		
v/c Ratio	0.87	0.90		0.87	0.84		0.90	0.80		0.72	0.93	
Uniform Delay, d1	29.9	42.0		32.7	42.7		31.6	31.3		24.3	36.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	27.9	12.1		31.7	8.3		30.6	3.8		11.9	12.5	
Delay (s)	57.8	54.1		64.4	51.1		62.2	35.1		36.2	49.2	
Level of Service	E	D		E	D		E	D		D	D	
Approach Delay (s)		54.9			53.8			40.0			47.8	
Approach LOS		D			D			D			D	

Intersection Summary

HCM Average Control Delay	48.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	114.0	Sum of lost time (s)	26.0
Intersection Capacity Utilization	98.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	21	1187	1311	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	22	1249	1380	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					87	
pX, platoon unblocked	0.96	0.96	0.96			
vC, conflicting volume	2051	692	1383			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2015	606	1323			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	96			
cM capacity (veh/h)	48	429	510			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	0	22	625	625	920	463
Volume Left	0	22	0	0	0	0
Volume Right	0	0	0	0	0	3
cSH	1700	510	1700	1700	1700	1700
Volume to Capacity	0.00	0.04	0.37	0.37	0.54	0.27
Queue Length 95th (ft)	0	3	0	0	0	0
Control Delay (s)	0.0	12.4	0.0	0.0	0.0	0.0
Lane LOS	A	B				
Approach Delay (s)	0.0	0.2			0.0	
Approach LOS	A					

Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			41.7%		ICU Level of Service	A
Analysis Period (min)			15			

Queues

6: Waterman & Washington

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	444	721	5	1141	601	23	178	179	698
v/c Ratio	1.10	0.40	0.02	0.94	0.68	0.07	0.43	0.42	0.93
Control Delay	111.6	14.3	22.2	46.8	9.0	17.1	24.9	24.6	35.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	111.6	14.3	22.2	46.8	9.0	17.1	24.9	24.6	35.3
Queue Length 50th (ft)	~144	133	2	~383	32	9	74	74	204
Queue Length 95th (ft)	#235	178	10	#510	150	21	133	133	#445
Internal Link Dist (ft)		433		239		527		537	
Turn Bay Length (ft)	225		100		200		125		
Base Capacity (vph)	405	1815	227	1208	878	662	466	478	798
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.10	0.40	0.02	0.94	0.68	0.03	0.38	0.37	0.87

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.

HCM Signalized Intersection Capacity Analysis

6: Waterman & Washington

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	422	680	5	5	1084	571	6	10	6	332	8	663
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1800	1800	1800	1700	1800	1800
Total Lost time (s)	4.0	6.0		6.0	6.0	6.0		4.0		5.0	5.0	5.0
Lane Util. Factor	*1.00	0.95		1.00	0.95	1.00		1.00		0.95	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	0.95	1.00
Satd. Flow (prot)	3040	3416		1615	3420	1530		1714		1534	1632	1530
Flt Permitted	0.95	1.00		0.38	1.00	1.00		0.95		0.74	0.72	1.00
Satd. Flow (perm)	3040	3416		642	3420	1530		1644		1199	1229	1530
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	444	716	5	5	1141	601	6	11	6	349	8	698
RTOR Reduction (vph)	0	0	0	0	0	338	0	4	0	0	0	217
Lane Group Flow (vph)	444	721	0	5	1141	263	0	19	0	178	179	481
Turn Type	Prot	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2			6			8				4
Permitted Phases				6		6	8			4		4
Actuated Green, G (s)	12.0	47.8		31.8	31.8	31.8		32.2		31.2	31.2	31.2
Effective Green, g (s)	12.0	47.8		31.8	31.8	31.8		32.2		31.2	31.2	31.2
Actuated g/C Ratio	0.13	0.53		0.35	0.35	0.35		0.36		0.35	0.35	0.35
Clearance Time (s)	4.0	6.0		6.0	6.0	6.0		4.0		5.0	5.0	5.0
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)	405	1814		227	1208	541		588		416	426	530
v/s Ratio Prot	c0.15	0.21			c0.33							
v/s Ratio Perm				0.01		0.17		0.01		0.15	0.15	c0.31
v/c Ratio	1.10	0.40		0.02	0.94	0.49		0.03		0.43	0.42	0.91
Uniform Delay, d1	39.0	12.5		19.0	28.2	22.7		18.8		22.6	22.5	28.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	73.3	0.7		0.2	15.6	3.1		0.0		0.7	0.7	19.2
Delay (s)	112.3	13.2		19.1	43.9	25.8		18.8		23.3	23.2	47.2
Level of Service	F	B		B	D	C		B		C	C	D
Approach Delay (s)		50.9			37.6			18.8			39.1	
Approach LOS		D			D			B			D	

Intersection Summary

HCM Average Control Delay	41.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	90.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

7: S Tippecanoe & E Victoria

12/16/2013



Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	14	58	29	1	1068	47	1059
v/c Ratio	0.08	0.29	0.14	0.00	0.42	0.14	0.41
Control Delay	15.3	23.1	8.6	5.0	5.3	6.2	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Total Delay	15.3	23.1	8.6	5.0	5.5	6.2	5.3
Queue Length 50th (ft)	2	16	0	0	73	5	73
Queue Length 95th (ft)	13	40	15	2	135	21	135
Internal Link Dist (ft)	87		770		198		507
Turn Bay Length (ft)		100		150		115	
Base Capacity (vph)	479	561	528	344	2562	340	2575
Starvation Cap Reductn	0	0	0	0	670	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.10	0.05	0.00	0.56	0.14	0.41

Intersection Summary

HCM Signalized Intersection Capacity Analysis

7: S Tippecanoe & E Victoria

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↖	↗		↖	↗		↖	↗	
Volume (vph)	7	0	7	55	0	28	1	971	44	45	1006	0
Ideal Flow (vphpl)	1800	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.0		6.0	6.0		7.5	7.5		7.5	7.5	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt		0.93		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1638		1615	1530		1615	3398		1615	3420	
Flt Permitted		0.86		1.00	1.00		0.27	1.00		0.27	1.00	
Satd. Flow (perm)		1439		1700	1530		458	3398		452	3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	7	0	7	58	0	29	1	1022	46	47	1059	0
RTOR Reduction (vph)	0	7	0	0	27	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	7	0	58	2	0	1	1064	0	47	1059	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		5.5		5.5	5.5		35.0	35.0		35.0	35.0	
Effective Green, g (s)		3.5		3.5	3.5		33.0	33.0		33.0	33.0	
Actuated g/C Ratio		0.07		0.07	0.07		0.66	0.66		0.66	0.66	
Clearance Time (s)		4.0		4.0	4.0		5.5	5.5		5.5	5.5	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		101		119	107		302	2243		298	2257	
v/s Ratio Prot					0.00			c0.31				0.31
v/s Ratio Perm		0.01		c0.03			0.00			0.10		
v/c Ratio		0.07		0.49	0.02		0.00	0.47		0.16	0.47	
Uniform Delay, d1		21.7		22.4	21.7		2.9	4.2		3.2	4.2	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3		3.1	0.1		0.0	0.7		1.1	0.7	
Delay (s)		22.0		25.5	21.7		2.9	4.9		4.4	4.9	
Level of Service		C		C	C		A	A		A	A	
Approach Delay (s)		22.0			24.2			4.9			4.9	
Approach LOS		C			C			A			A	

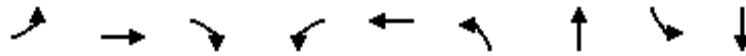
Intersection Summary

HCM Average Control Delay	5.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	285	329	541	168	170	509	1028	66	1164
v/c Ratio	0.91	0.76	0.69	0.87	0.31	0.93	0.37	0.43	0.71
Control Delay	71.8	48.4	11.2	76.0	28.0	81.9	11.9	45.5	38.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.8	48.4	11.2	76.0	28.0	81.9	11.9	45.5	38.2
Queue Length 50th (ft)	211	229	51	116	83	215	143	42	301
Queue Length 95th (ft)	#368	342	173	#239	139	#304	133	95	359
Internal Link Dist (ft)		517			1151		781		1167
Turn Bay Length (ft)	210			85		260		100	
Base Capacity (vph)	352	488	825	218	615	569	2789	152	1635
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.67	0.66	0.77	0.28	0.89	0.37	0.43	0.71

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
 8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	356	227	514	160	113	48	484	915	62	63	955	151
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1600	1800	1800	1700	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		6.0	7.0		7.0	7.0	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		0.97	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	0.98	
Flt Protected	0.95	0.99	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1534	1687	1530	1615	1719		2949	4867		1615	4813	
Flt Permitted	0.62	0.82	1.00	0.37	1.00		0.95	1.00		0.27	1.00	
Satd. Flow (perm)	1004	1394	1530	622	1719		2949	4867		453	4813	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	375	239	541	168	119	51	509	963	65	66	1005	159
RTOR Reduction (vph)	0	0	307	0	14	0	0	6	0	0	17	0
Lane Group Flow (vph)	285	329	234	168	156	0	509	1022	0	66	1147	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)	39.4	39.4	39.4	39.4	39.4		24.3	70.6		42.3	42.3	
Effective Green, g (s)	37.4	37.4	37.4	37.4	37.4		22.3	68.6		40.3	40.3	
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31		0.19	0.57		0.34	0.34	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		4.0	5.0		5.0	5.0	
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)	313	434	477	194	536		548	2782		152	1616	
v/s Ratio Prot					0.09		c0.17	0.21			c0.24	
v/s Ratio Perm	c0.28	0.24	0.15	0.27						0.15		
v/c Ratio	0.91	0.76	0.49	0.87	0.29		0.93	0.37		0.43	0.71	
Uniform Delay, d1	39.7	37.2	33.6	38.9	31.3		48.1	13.9		31.0	34.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.24	0.79		1.00	1.00	
Incremental Delay, d2	29.1	7.4	0.8	30.8	0.3		20.4	0.3		8.8	2.7	
Delay (s)	68.8	44.6	34.4	69.7	31.6		80.1	11.4		39.8	37.4	
Level of Service	E	D	C	E	C		F	B		D	D	
Approach Delay (s)		45.8			50.5			34.1			37.6	
Approach LOS		D			D			C			D	

Intersection Summary

HCM Average Control Delay	39.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	88.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Intersection has too many lanes per leg.

HCM All-Way analysis is limited to two lanes per leg.

Channelized right turn lanes are not counted.

Queues

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

12/16/2013



Lane Group	EBL	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	329	624	1269	534	1224
v/c Ratio	0.92	0.80	0.82	0.94	0.53
Control Delay	77.1	45.7	34.2	68.3	12.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	77.1	45.7	34.2	68.3	12.0
Queue Length 50th (ft)	244	193	427	223	257
Queue Length 95th (ft)	#400	258	#538	#301	283
Internal Link Dist (ft)		1164	1201		347
Turn Bay Length (ft)	275				
Base Capacity (vph)	390	849	1549	627	2294
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.84	0.73	0.82	0.85	0.53

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	568	13	324	0	0	0	0	849	356	507	1163	0
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	6.0						7.0		6.0	7.0	
Lane Util. Factor	*1.00	*1.00						*1.00		0.97	0.95	
Frt	1.00	0.92						0.96		1.00	1.00	
Flt Protected	0.95	0.98						1.00		0.95	1.00	
Satd. Flow (prot)	1615	3235						3440		3133	3420	
Flt Permitted	0.95	0.98						1.00		0.95	1.00	
Satd. Flow (perm)	1615	3235						3440		3133	3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	598	14	341	0	0	0	0	894	375	534	1224	0
RTOR Reduction (vph)	0	69	0	0	0	0	0	40	0	0	0	0
Lane Group Flow (vph)	329	555	0	0	0	0	0	1229	0	534	1224	0
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	28.5	28.5						54.6		23.9	82.5	
Effective Green, g (s)	26.5	26.5						52.6		21.9	80.5	
Actuated g/C Ratio	0.22	0.22						0.44		0.18	0.67	
Clearance Time (s)	4.0	4.0						5.0		4.0	5.0	
Vehicle Extension (s)	2.0	2.0						2.0		2.0	2.0	
Lane Grp Cap (vph)	357	714						1508		572	2294	
v/s Ratio Prot								c0.36		c0.17	0.36	
v/s Ratio Perm	c0.20	0.17										
v/c Ratio	0.92	0.78						0.81		0.93	0.53	
Uniform Delay, d1	45.7	44.0						29.4		48.3	10.1	
Progression Factor	1.00	1.00						1.00		1.00	1.06	
Incremental Delay, d2	28.2	4.9						5.0		18.2	0.7	
Delay (s)	73.9	48.8						34.4		66.3	11.4	
Level of Service	E	D						C		E	B	
Approach Delay (s)		57.5			0.0			34.4			28.1	
Approach LOS		E			A			C			C	

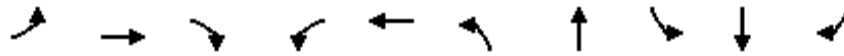
Intersection Summary

HCM Average Control Delay	37.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	88.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

11: Anderson & Academy

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	127	55	66	56	112	68	968	76	681	142
v/c Ratio	0.31	0.12	0.15	0.17	0.18	0.17	0.57	0.24	0.40	0.17
Control Delay	14.3	18.0	7.0	13.3	14.6	8.0	15.2	8.8	12.5	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.3	18.0	7.0	13.3	14.6	8.0	15.2	8.8	12.5	3.6
Queue Length 50th (ft)	27	14	0	11	10	9	129	10	82	0
Queue Length 95th (ft)	58	38	25	30	28	25	#234	28	132	29
Internal Link Dist (ft)		21			32		1375		514	
Turn Bay Length (ft)	75			100		100		100		
Base Capacity (vph)	416	894	793	325	1520	400	1689	323	1699	832
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	0.31	0.06	0.08	0.17	0.07	0.17	0.57	0.24	0.40	0.17

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

11: Anderson & Academy

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	121	52	63	53	69	37	65	862	58	72	647	135
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	4.0	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	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1615	1800	1530	1615	3241		1615	3388		1615	3420	1530
Flt Permitted	0.51	1.00	1.00	0.72	1.00		0.33	1.00		0.21	1.00	1.00
Satd. Flow (perm)	872	1800	1530	1226	3241		565	3388		360	3420	1530
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	127	55	66	56	73	39	68	907	61	76	681	142
RTOR Reduction (vph)	0	0	55	0	34	0	0	7	0	0	0	85
Lane Group Flow (vph)	127	55	11	56	78	0	68	961	0	76	681	57
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)	12.0	7.8	7.8	7.6	5.6		20.9	18.9		20.9	18.9	18.9
Effective Green, g (s)	12.0	7.8	7.8	7.6	5.6		20.9	18.9		20.9	18.9	18.9
Actuated g/C Ratio	0.26	0.17	0.17	0.16	0.12		0.45	0.40		0.45	0.40	0.40
Clearance Time (s)	4.0	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	3.0
Lane Grp Cap (vph)	291	301	256	216	389		298	1371		215	1384	619
v/s Ratio Prot	c0.04	0.03		0.01	0.02		0.01	c0.28		c0.02	0.20	
v/s Ratio Perm	c0.07		0.01	0.03			0.09			0.14		0.04
v/c Ratio	0.44	0.18	0.04	0.26	0.20		0.23	0.70		0.35	0.49	0.09
Uniform Delay, d1	14.0	16.7	16.3	17.0	18.5		7.5	11.6		8.1	10.3	8.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.0	0.3	0.1	0.6	0.3		0.4	1.6		1.0	0.3	0.1
Delay (s)	15.1	17.0	16.4	17.6	18.8		7.9	13.2		9.1	10.6	8.7
Level of Service	B	B	B	B	B		A	B		A	B	A
Approach Delay (s)		15.9			18.4			12.8			10.2	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	12.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	46.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

12: California & WB I-10 Ramps

12/16/2013



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	473	131	726	540	840	802
v/c Ratio	1.09	0.29	1.11	0.24	0.62	1.02
Control Delay	114.2	11.9	109.0	7.0	43.3	56.1
Queue Delay	0.0	0.0	122.7	0.5	0.0	0.0
Total Delay	114.2	11.9	231.7	7.5	43.3	56.1
Queue Length 50th (ft)	~447	13	~637	67	226	~393
Queue Length 95th (ft)	#661	66	#867	86	274	#642
Internal Link Dist (ft)	1118			276	113	
Turn Bay Length (ft)						
Base Capacity (vph)	435	449	654	2262	1361	784
Starvation Cap Reductn	0	0	132	1215	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.09	0.29	1.39	0.52	0.62	1.02

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.

HCM Signalized Intersection Capacity Analysis

12: California & WB I-10 Ramps

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↶	↷	↶	↷			↶↷	↶↷
Volume (vph)	0	0	0	446	4	124	690	513	0	0	798	762
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800
Total Lost time (s)					5.0	7.0	5.5	6.0			5.0	5.0
Lane Util. Factor					1.00	1.00	1.00	0.95			0.91	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1715	1530	1615	3420			4914	1530
Flt Permitted					0.95	1.00	0.16	1.00			1.00	1.00
Satd. Flow (perm)					1715	1530	280	3420			4914	1530
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	469	4	131	726	540	0	0	840	802
RTOR Reduction (vph)	0	0	0	0	0	85	0	0	0	0	0	360
Lane Group Flow (vph)	0	0	0	0	473	46	726	540	0	0	840	442
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases					8		5	6			2	
Permitted Phases				8		8	6					2
Actuated Green, G (s)					33.0	33.0	88.0	88.0			38.0	38.0
Effective Green, g (s)					33.0	31.0	86.0	86.0			36.0	36.0
Actuated g/C Ratio					0.25	0.24	0.66	0.66			0.28	0.28
Clearance Time (s)					5.0	5.0	3.5	4.0			3.0	3.0
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					435	365	652	2262			1361	424
v/s Ratio Prot							c0.39	0.16			0.17	
v/s Ratio Perm					0.28	0.03	c0.35					0.29
v/c Ratio					1.09	0.13	1.11	0.24			0.62	1.04
Uniform Delay, d1					48.5	38.9	31.9	8.8			41.0	47.0
Progression Factor					1.00	1.00	1.45	0.76			1.00	1.00
Incremental Delay, d2					68.8	0.1	69.8	0.2			2.1	55.1
Delay (s)					117.3	38.9	116.0	7.0			43.1	102.1
Level of Service					F	D	F	A			D	F
Approach Delay (s)		0.0			100.3			69.5			71.9	
Approach LOS		A			F			E			E	

Intersection Summary

HCM Average Control Delay	75.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	131.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues

13: EB I-10 Ramps & California

12/16/2013



Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	286	633	1054	676	305	765
v/c Ratio	0.66	1.20	0.30	0.55	1.02	0.34
Control Delay	51.7	132.5	10.2	2.5	63.3	0.3
Queue Delay	0.2	0.0	146.3	7.1	0.0	0.5
Total Delay	51.9	132.5	156.5	9.6	63.3	0.7
Queue Length 50th (ft)	217	-493	120	0	-219	0
Queue Length 95th (ft)	318	#730	141	41	m#282	m0
Internal Link Dist (ft)	1294		46			276
Turn Bay Length (ft)						
Base Capacity (vph)	436	529	3510	1231	300	2223
Starvation Cap Reductn	0	0	2711	502	0	928
Spillback Cap Reductn	8	0	45	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.67	1.20	1.32	0.93	1.02	0.59






















Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

13: EB I-10 Ramps & California

12/16/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations								  			 		
Volume (vph)	264	8	601	0	0	0	0	1001	642	290	727	0	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800	
Lane Width	12	12	8	12	12	12	12	12	12	12	12	12	
Total Lost time (s)		6.0	4.0					6.5	6.5	6.5	6.5		
Lane Util. Factor		1.00	1.00					*1.00	1.00	1.00	0.95		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		0.95	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		1717	1326					5400	1530	1615	3420		
Flt Permitted		0.95	1.00					1.00	1.00	0.27	1.00		
Satd. Flow (perm)		1717	1326					5400	1530	460	3420		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	278	8	633	0	0	0	0	1054	676	305	765	0	
RTOR Reduction (vph)	0	0	172	0	0	0	0	0	237	0	0	0	
Lane Group Flow (vph)	0	286	461	0	0	0	0	1054	439	305	765	0	
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA		
Protected Phases		4						2			6		
Permitted Phases	4		4						2	6			
Actuated Green, G (s)		35.0	35.0					86.5	86.5	86.5	86.5		
Effective Green, g (s)		33.0	35.0					84.5	84.5	84.5	84.5		
Actuated g/C Ratio		0.25	0.27					0.65	0.65	0.65	0.65		
Clearance Time (s)		4.0	4.0					4.5	4.5	4.5	4.5		
Vehicle Extension (s)		2.0	2.0					2.0	2.0	2.0	2.0		
Lane Grp Cap (vph)		436	357					3510	995	299	2223		
v/s Ratio Prot								0.20			0.22		
v/s Ratio Perm		0.17	c0.35						0.29	c0.66			
v/c Ratio		0.66	1.29					0.30	0.44	1.02	0.34		
Uniform Delay, d1		43.4	47.5					9.9	11.2	22.8	10.3		
Progression Factor		1.00	1.00					1.00	1.00	0.67	0.00		
Incremental Delay, d2		2.7	150.9					0.2	1.4	45.3	0.3		
Delay (s)		46.1	198.4					10.1	12.6	60.5	0.3		
Level of Service		D	F					B	B	E	A		
Approach Delay (s)		151.0			0.0			11.1			17.4		
Approach LOS		F			A			B			B		
Intersection Summary													
HCM Average Control Delay			47.5									HCM Level of Service	D
HCM Volume to Capacity ratio			1.10										
Actuated Cycle Length (s)			130.0									Sum of lost time (s)	10.5
Intersection Capacity Utilization			131.7%									ICU Level of Service	H
Analysis Period (min)			15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

14: California & Shopping Center

12/16/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑↑↑		↔	↑↑
Volume (veh/h)	2	147	1481	55	377	972
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	155	1559	58	397	1023
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)			652		321	
pX, platoon unblocked	0.97	0.96			0.96	
vC, conflicting volume	2893	549			1617	
vC1, stage 1 conf vol	1588					
vC2, stage 2 conf vol	1305					
vCu, unblocked vol	2668	365			1483	
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 %	90	75			10	
cM capacity (veh/h)	21	610			439	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	157	624	624	370	397	512	512
Volume Left	2	0	0	0	397	0	0
Volume Right	155	0	0	58	0	0	0
cSH	446	1700	1700	1700	439	1700	1700
Volume to Capacity	0.35	0.37	0.37	0.22	0.90	0.30	0.30
Queue Length 95th (ft)	39	0	0	0	246	0	0
Control Delay (s)	17.4	0.0	0.0	0.0	53.1	0.0	0.0
Lane LOS	C				F		
Approach Delay (s)	17.4	0.0			14.8		
Approach LOS	C						

Intersection Summary			
Average Delay		7.5	
Intersection Capacity Utilization		74.6%	ICU Level of Service D
Analysis Period (min)		15	

Queues

15: California/California & W Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	218	819	137	589	626	64	623	425	561
v/c Ratio	0.91	0.90	0.84	0.74	0.92	0.37	0.87	1.02	0.34
Control Delay	69.4	52.4	66.5	44.9	34.3	42.9	54.8	77.9	15.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.4	52.4	66.5	44.9	34.3	42.9	54.8	77.9	15.4
Queue Length 50th (ft)	108	270	64	203	162	39	225	~275	111
Queue Length 95th (ft)	#219	#380	#162	275	#406	83	294	#483	150
Internal Link Dist (ft)		1468		1180			268		572
Turn Bay Length (ft)	90		150		100			150	
Base Capacity (vph)	239	997	163	892	708	202	852	418	1805
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.91	0.82	0.84	0.66	0.88	0.32	0.73	1.02	0.31

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

15: California/California & W Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↗	↖	↗		↖	↗	
Volume (vph)	207	606	172	130	560	595	61	538	54	404	401	132
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.5	7.7		6.5	7.7	7.7	5.2	7.2		7.2	6.0	
Lane Util. Factor	1.00	*1.00		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3481		1615	3420	1530	1615	3373		1615	3293	
Flt Permitted	0.25	1.00		0.16	1.00	1.00	0.44	1.00		0.16	1.00	
Satd. Flow (perm)	423	3481		269	3420	1530	751	3373		275	3293	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	218	638	181	137	589	626	64	566	57	425	422	139
RTOR Reduction (vph)	0	25	0	0	0	320	0	7	0	0	28	0
Lane Group Flow (vph)	218	794	0	137	589	306	64	616	0	425	533	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			4		3	8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	40.0	29.4		36.0	27.4	27.4	24.8	24.8		56.1	56.1	
Effective Green, g (s)	36.0	27.4		32.0	25.4	25.4	24.8	22.8		54.1	54.1	
Actuated g/C Ratio	0.33	0.25		0.30	0.23	0.23	0.23	0.21		0.50	0.50	
Clearance Time (s)	4.5	5.7		4.5	5.7	5.7	5.2	5.2		5.2	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)	235	881		162	802	359	172	710		421	1645	
v/s Ratio Prot	c0.07	0.23		0.05	0.17			0.18		c0.21	0.16	
v/s Ratio Perm	c0.23			0.20		0.20	0.09			c0.29		
v/c Ratio	0.93	0.90		0.85	0.73	0.85	0.37	0.87		1.01	0.32	
Uniform Delay, d1	31.8	39.1		31.4	38.3	39.7	35.2	41.3		29.2	16.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	39.0	12.2		31.2	3.5	17.4	1.4	10.9		46.3	0.1	
Delay (s)	70.7	51.4		62.7	41.8	57.1	36.5	52.2		75.5	16.3	
Level of Service	E	D		E	D	E	D	D		E	B	
Approach Delay (s)		55.4			51.0			50.7			41.8	
Approach LOS		E			D			D			D	

Intersection Summary

HCM Average Control Delay	49.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	108.3	Sum of lost time (s)	13.7
Intersection Capacity Utilization	96.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues

16: Alabama St & WB I-10 Ramps

12/16/2013



Lane Group	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	790	433	1197	1438
v/c Ratio	1.00	0.99	0.52	0.67
Control Delay	78.8	66.2	25.8	30.4
Queue Delay	0.0	30.8	20.4	0.0
Total Delay	78.8	97.0	46.2	30.4
Queue Length 50th (ft)	314	314	482	300
Queue Length 95th (ft)	#449	m#488	442	349
Internal Link Dist (ft)	765		410	271
Turn Bay Length (ft)				
Base Capacity (vph)	790	437	2289	2161
Starvation Cap Reductn	0	39	1119	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.00	1.09	1.02	0.67

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.

HCM Signalized Intersection Capacity Analysis

16: Alabama St & WB I-10 Ramps

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	179	335	237	411	1137	0	0	918	448
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800
Total Lost time (s)					6.5		6.0	8.0			8.0	
Lane Util. Factor					*1.00		1.00	0.95			*1.00	
Frt					0.95		1.00	1.00			0.95	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					3389		1615	3420			5134	
Flt Permitted					0.99		0.11	1.00			1.00	
Satd. Flow (perm)					3389		189	3420			5134	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	188	353	249	433	1197	0	0	966	472
RTOR Reduction (vph)	0	0	0	0	47	0	0	0	0	0	68	0
Lane Group Flow (vph)	0	0	0	0	743	0	433	1197	0	0	1370	0
Turn Type				Perm	NA		pm+pt	NA			NA	
Protected Phases					4		1	6			2	
Permitted Phases				4			6					
Actuated Green, G (s)					30.5		89.0	89.0			55.0	
Effective Green, g (s)					28.5		87.0	87.0			53.0	
Actuated g/C Ratio					0.22		0.67	0.67			0.41	
Clearance Time (s)					4.5		4.0	6.0			6.0	
Vehicle Extension (s)					3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)					743		434	2289			2093	
v/s Ratio Prot							c0.22	0.35			0.27	
v/s Ratio Perm					0.22		c0.45					
v/c Ratio					1.00		1.00	0.52			0.65	
Uniform Delay, d1					50.8		36.4	10.9			31.1	
Progression Factor					1.00		1.01	2.28			1.00	
Incremental Delay, d2					33.1		33.8	0.6			1.6	
Delay (s)					83.8		70.6	25.5			32.7	
Level of Service					F		E	C			C	
Approach Delay (s)		0.0			83.8			37.5			32.7	
Approach LOS		A			F			D			C	
Intersection Summary												
HCM Average Control Delay			45.2		HCM Level of Service						D	
HCM Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			130.0		Sum of lost time (s)					12.5		
Intersection Capacity Utilization			95.1%		ICU Level of Service					F		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

17: Alabama St & EB I-10 Ramps

12/16/2013



Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	1007	1540	285	979
v/c Ratio	0.97dr	0.71	0.88	0.47
Control Delay	49.7	33.8	42.3	7.4
Queue Delay	26.4	0.7	0.0	0.6
Total Delay	76.1	34.5	42.3	8.0
Queue Length 50th (ft)	356	366	92	271
Queue Length 95th (ft)	443	423	m#273	m77
Internal Link Dist (ft)	703	471		410
Turn Bay Length (ft)				
Base Capacity (vph)	1173	2176	354	2070
Starvation Cap Reductn	0	304	0	651
Spillback Cap Reductn	209	5	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.04	0.82	0.81	0.69

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.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

HCM Signalized Intersection Capacity Analysis

17: Alabama St & EB I-10 Ramps

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	419	8	530	0	0	0	0	1149	314	271	930	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1700	1800	1800
Total Lost time (s)		5.0						6.0		4.0	5.0	
Lane Util. Factor		*1.00						*1.00		1.00	0.95	
Frt		0.92						0.97		1.00	1.00	
Flt Protected		0.98						1.00		0.95	1.00	
Satd. Flow (prot)		3230						5226		1615	3420	
Flt Permitted		0.98						1.00		0.09	1.00	
Satd. Flow (perm)		3230						5226		156	3420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	441	8	558	0	0	0	0	1209	331	285	979	0
RTOR Reduction (vph)	0	81	0	0	0	0	0	35	0	0	0	0
Lane Group Flow (vph)	0	926	0	0	0	0	0	1505	0	285	979	0
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		8						6		5	2	
Permitted Phases	8									2		
Actuated Green, G (s)		41.3						53.3		78.7	78.7	
Effective Green, g (s)		41.3						53.3		78.7	78.7	
Actuated g/C Ratio		0.32						0.41		0.61	0.61	
Clearance Time (s)		5.0						6.0		4.0	5.0	
Vehicle Extension (s)		2.0						2.0		2.0	2.0	
Lane Grp Cap (vph)		1026						2143		323	2070	
v/s Ratio Prot								0.29		c0.14	0.29	
v/s Ratio Perm		0.29								c0.40		
v/c Ratio		0.97dr						0.70		0.88	0.47	
Uniform Delay, d1		42.4						31.8		34.9	14.2	
Progression Factor		1.00						1.00		0.66	0.46	
Incremental Delay, d2		10.7						2.0		18.2	0.6	
Delay (s)		53.1						33.7		41.1	7.1	
Level of Service		D						C		D	A	
Approach Delay (s)		53.1			0.0			33.7			14.8	
Approach LOS		D			A			C			B	

Intersection Summary

HCM Average Control Delay	32.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	95.1%	ICU Level of Service	F
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

Queues

18: Alabama St & Industrial Park

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	165	161	77	451	57	1150	353	984	152
v/c Ratio	0.81	0.28	0.39	0.91	0.44	0.81	0.87	0.54	0.18
Control Delay	54.4	18.5	38.4	37.8	41.6	36.2	46.4	15.9	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.2	0.0
Total Delay	54.4	18.5	38.4	37.8	41.6	39.6	46.4	16.1	7.7
Queue Length 50th (ft)	73	53	40	110	27	204	152	187	23
Queue Length 95th (ft)	#167	101	83	#266	73	274	#353	280	61
Internal Link Dist (ft)		298		379		236		471	
Turn Bay Length (ft)	100		50		150		215		55
Base Capacity (vph)	204	731	302	621	149	1617	405	1958	905
Starvation Cap Reductn	0	0	0	0	0	360	0	312	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.22	0.25	0.73	0.38	0.91	0.87	0.60	0.17

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

18: Alabama St & Industrial Park

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	157	94	59	73	65	364	54	1002	90	335	935	144
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	6.2		6.2	6.2		6.2	6.2		6.0	6.2	6.2
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	*1.00		1.00	0.95	1.00
Frt	1.00	0.94		1.00	0.87		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1615	1696		1615	1571		1615	5333		1615	3420	1530
Flt Permitted	0.18	1.00		0.66	1.00		0.29	1.00		0.13	1.00	1.00
Satd. Flow (perm)	309	1696		1114	1571		495	5333		227	3420	1530
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	165	99	62	77	68	383	57	1055	95	353	984	152
RTOR Reduction (vph)	0	24	0	0	219	0	0	12	0	0	0	31
Lane Group Flow (vph)	165	137	0	77	232	0	57	1138	0	353	984	121
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	3	8			4			6		5	2	
Permitted Phases	8			4			6			2		2
Actuated Green, G (s)	31.1	31.1		18.0	18.0		25.9	25.9		50.2	50.2	50.2
Effective Green, g (s)	29.1	29.1		16.0	16.0		23.9	23.9		48.2	48.2	48.2
Actuated g/C Ratio	0.32	0.32		0.18	0.18		0.27	0.27		0.54	0.54	0.54
Clearance Time (s)	4.0	4.2		4.2	4.2		4.2	4.2		4.0	4.2	4.2
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)	204	550		199	280		132	1421		405	1838	822
v/s Ratio Prot	c0.06	0.08			0.15			0.21		c0.18	0.29	
v/s Ratio Perm	c0.20			0.07			0.12			c0.29		0.08
v/c Ratio	0.81	0.25		0.39	0.83		0.43	0.80		0.87	0.54	0.15
Uniform Delay, d1	24.8	22.3		32.5	35.5		27.3	30.7		22.4	13.5	10.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	20.5	0.2		1.3	17.8		2.3	3.3		18.2	0.3	0.1
Delay (s)	45.3	22.5		33.8	53.3		29.5	34.0		40.6	13.8	10.5
Level of Service	D	C		C	D		C	C		D	B	B
Approach Delay (s)		34.0			50.5			33.8			19.8	
Approach LOS		C			D			C			B	

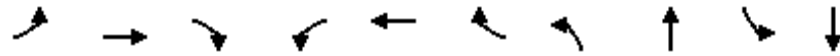
Intersection Summary

HCM Average Control Delay	30.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	89.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	100.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues

19: Alabama St & W Redlands

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	317	769	91	124	441	245	135	808	196	967
v/c Ratio	0.58	0.81	0.17	0.52	0.68	0.49	0.78	0.65	0.57	0.92
Control Delay	37.0	36.5	6.1	45.6	37.9	8.2	70.4	30.8	43.8	42.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	158.0
Total Delay	37.0	36.5	6.1	45.6	37.9	8.2	70.4	30.8	43.8	200.7
Queue Length 50th (ft)	79	200	0	32	110	4	37	135	51	247
Queue Length 95th (ft)	131	279	33	62	156	61	#92	195	92	#416
Internal Link Dist (ft)		1247			345			380		164
Turn Bay Length (ft)	240		240	290			115		125	
Base Capacity (vph)	550	949	524	693	1088	657	174	1238	342	1052
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	339
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	0.58	0.81	0.17	0.18	0.41	0.37	0.78	0.65	0.57	1.36

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

19: Alabama St & W Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	301	731	86	118	419	233	128	662	105	186	686	233
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Total Lost time (s)	6.2	6.9	4.9	5.0	5.0	3.0	5.0	5.0		6.2	6.2	
Lane Util. Factor	0.97	0.95	1.00	0.97	*1.00	*1.00	0.97	0.91		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	2949	3420	1530	2949	3600	1530	2949	4813		2949	3290	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	2949	3420	1530	2949	3600	1530	2949	4813		2949	3290	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	317	769	91	124	441	245	135	697	111	196	722	245
RTOR Reduction (vph)	0	0	64	0	0	187	0	22	0	0	34	0
Lane Group Flow (vph)	317	769	27	124	441	58	135	786	0	196	933	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	17.8	25.6	25.6	8.9	17.4	17.4	7.0	23.5		11.8	28.3	
Effective Green, g (s)	15.8	23.6	25.6	6.9	15.4	17.4	5.0	21.5		9.8	26.3	
Actuated g/C Ratio	0.19	0.28	0.30	0.08	0.18	0.20	0.06	0.25		0.12	0.31	
Clearance Time (s)	4.2	4.9	4.9	3.0	3.0	3.0	3.0	3.0		4.2	4.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	549	951	461	240	653	314	174	1219		340	1019	
v/s Ratio Prot	c0.11	c0.22		0.04	0.12		0.05	0.16		c0.07	c0.28	
v/s Ratio Perm			0.02			0.04						
v/c Ratio	0.58	0.81	0.06	0.52	0.68	0.19	0.78	0.65		0.58	0.92	
Uniform Delay, d1	31.5	28.5	21.1	37.4	32.4	27.9	39.4	28.3		35.6	28.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.4	5.1	0.1	1.9	2.8	0.3	19.2	2.6		7.0	14.0	
Delay (s)	35.9	33.7	21.1	39.3	35.2	28.2	58.6	30.9		42.5	42.3	
Level of Service	D	C	C	D	D	C	E	C		D	D	
Approach Delay (s)		33.3			33.7			34.9			42.3	
Approach LOS		C			C			C			D	

Intersection Summary

HCM Average Control Delay	36.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	84.9	Sum of lost time (s)	25.5
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

20: Tennessee & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	354	964	46	530	758	731
v/c Ratio	0.91	0.66	0.51	0.78	0.78	0.88
Control Delay	46.9	20.1	51.1	31.4	27.9	35.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	189.6
Total Delay	46.9	20.1	51.1	31.4	27.9	225.4
Queue Length 50th (ft)	125	198	22	102	165	169
Queue Length 95th (ft)	#300	272	58	160	266	#306
Internal Link Dist (ft)		2241		737	458	48
Turn Bay Length (ft)	145		140			
Base Capacity (vph)	405	1843	141	997	1166	1009
Starvation Cap Reductn	0	0	0	0	0	493
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.52	0.33	0.53	0.65	1.42

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

20: Tennessee & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	336	815	101	44	301	202	73	596	51	111	554	29
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.5	6.9		6.9	6.9			6.9			6.9	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frt	1.00	0.98		1.00	0.94			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1615	3364		1615	3214			3366			3371	
Flt Permitted	0.22	1.00		0.30	1.00			0.74			0.63	
Satd. Flow (perm)	367	3364		505	3214			2492			2156	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	354	858	106	46	317	213	77	627	54	117	583	31
RTOR Reduction (vph)	0	11	0	0	111	0	0	6	0	0	4	0
Lane Group Flow (vph)	354	953	0	46	419	0	0	752	0	0	727	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	35.5	35.5		15.9	15.9			31.8			31.8	
Effective Green, g (s)	33.5	33.5		13.9	13.9			29.8			29.8	
Actuated g/C Ratio	0.43	0.43		0.18	0.18			0.39			0.39	
Clearance Time (s)	3.5	4.9		4.9	4.9			4.9			4.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	388	1462		91	579			963			833	
v/s Ratio Prot	c0.17	0.28			0.13							
v/s Ratio Perm	c0.23			0.09				0.30			c0.34	
v/c Ratio	0.91	0.65		0.51	0.72			0.78			0.87	
Uniform Delay, d1	17.0	17.2		28.5	29.8			20.8			21.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	25.2	1.1		4.4	4.5			4.2			10.0	
Delay (s)	42.2	18.3		32.9	34.3			24.9			31.9	
Level of Service	D	B		C	C			C			C	
Approach Delay (s)		24.7			34.2			24.9			31.9	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	27.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	77.1	Sum of lost time (s)	12.4
Intersection Capacity Utilization	100.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

21: Texas & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	3	10	50	19	14	17	19	538	28	17	292	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	3	11	53	20	15	18	20	566	29	18	307	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								193				
pX, platoon unblocked	0.99	0.99		0.99	0.99	0.99				0.99		
vC, conflicting volume	698	986	161	868	978	298	321			596		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	669	960	161	841	952	263	321			565		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	96	94	91	94	98	98			98		
cM capacity (veh/h)	311	247	862	228	250	732	1250			1004		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	66	53	303	313	172	167
Volume Left	3	20	20	0	18	0
Volume Right	53	18	0	29	0	14
cSH	583	308	1250	1700	1004	1700
Volume to Capacity	0.11	0.17	0.02	0.18	0.02	0.10
Queue Length 95th (ft)	10	15	1	0	1	0
Control Delay (s)	12.0	19.1	0.7	0.0	1.1	0.0
Lane LOS	B	C	A		A	
Approach Delay (s)	12.0	19.1	0.3		0.5	
Approach LOS	B	C				

Intersection Summary		
Average Delay		2.0
Intersection Capacity Utilization	50.9%	ICU Level of Service
Analysis Period (min)		15
		A

HCM Unsignalized Intersection Capacity Analysis

22: Texas & Oriental

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	35	9	26	55	3	31	1	620	13	6	360	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	37	9	27	58	3	33	1	653	14	6	379	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											212	
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99		0.99					
vC, conflicting volume	754	1060	189	896	1053	333	379			666		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	741	1048	172	883	1041	333	363			666		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	87	96	97	74	99	95	100			99		
cM capacity (veh/h)	287	226	842	225	229	668	1199			933		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	74	94	327	340	196	189
Volume Left	37	58	1	0	6	0
Volume Right	27	33	0	14	0	0
cSH	363	293	1199	1700	933	1700
Volume to Capacity	0.20	0.32	0.00	0.20	0.01	0.11
Queue Length 95th (ft)	19	33	0	0	1	0
Control Delay (s)	17.4	22.9	0.0	0.0	0.4	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	17.4	22.9	0.0		0.2	
Approach LOS	C	C				

Intersection Summary		
Average Delay		2.9
Intersection Capacity Utilization	33.3%	ICU Level of Service
Analysis Period (min)		15
		A

Queues

23: Eureka & EB I-10 off/Pearl

12/16/2013



Lane Group	EBT	EBR	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	883	525	43	19	142	264	75
v/c Ratio	0.95	0.50	0.45	0.02	0.27	0.45	0.15
Control Delay	39.3	2.8	29.4	3.8	20.9	7.6	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.3	2.8	29.4	3.8	20.9	7.6	20.7
Queue Length 50th (ft)	354	0	11	0	46	16	26
Queue Length 95th (ft)	#617	42	#57	9	79	51	57
Internal Link Dist (ft)	447				545		418
Turn Bay Length (ft)				75			
Base Capacity (vph)	949	1061	97	845	528	590	510
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.49	0.44	0.02	0.27	0.45	0.15

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

23: Eureka & EB I-10 off/Pearl

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖		↗		↕	↗		↕	
Volume (vph)	182	656	499	41	0	18	0	135	251	18	53	0
Ideal Flow (vphpl)	1800	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		7.0	7.0	6.0		6.0		7.0	7.0		6.0	
Lane Util. Factor		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.99	1.00	0.95		1.00		1.00	1.00		0.99	
Satd. Flow (prot)		1781	1530	1615		1530		1800	1530		1777	
Flt Permitted		0.99	1.00	0.10		1.00		1.00	1.00		0.92	
Satd. Flow (perm)		1781	1530	176		1530		1800	1530		1661	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	192	691	525	43	0	19	0	142	264	19	56	0
RTOR Reduction (vph)	0	0	252	0	0	9	0	0	141	0	0	0
Lane Group Flow (vph)	0	883	273	43	0	10	0	142	123	0	75	0
Turn Type	Perm	NA	Perm	custom		custom		NA	Perm	Perm	NA	
Protected Phases		4						2				6
Permitted Phases	4		4	8		8			2	6		
Actuated Green, G (s)		41.0	41.0	42.0		42.0		24.0	24.0		25.0	
Effective Green, g (s)		39.0	39.0	40.0		40.0		22.0	22.0		23.0	
Actuated g/C Ratio		0.52	0.52	0.53		0.53		0.29	0.29		0.31	
Clearance Time (s)		5.0	5.0	4.0		4.0		5.0	5.0		4.0	
Vehicle Extension (s)		2.0	2.0	3.0		3.0		2.0	2.0		2.0	
Lane Grp Cap (vph)		926	796	94		816		528	449		509	
v/s Ratio Prot								0.08				
v/s Ratio Perm		0.50	0.18	0.24		0.01			c0.08		0.05	
v/c Ratio		0.95	0.34	0.46		0.01		0.27	0.27		0.15	
Uniform Delay, d1		17.1	10.5	10.8		8.2		20.3	20.4		18.9	
Progression Factor		1.00	1.00	1.00		1.00		0.92	0.78		1.00	
Incremental Delay, d2		19.0	0.1	3.5		0.0		1.2	1.5		0.6	
Delay (s)		36.2	10.6	14.3		8.2		19.9	17.4		19.5	
Level of Service		D	B	B		A		B	B		B	
Approach Delay (s)		26.6			12.4			18.2			19.5	
Approach LOS		C			B			B			B	

Intersection Summary

HCM Average Control Delay	24.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

24: Eureka & Stuart

12/16/2013



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	58	80	17	448	43	563
v/c Ratio	0.36	0.58	0.03	0.18	0.07	0.22
Control Delay	30.8	45.4	3.4	2.8	4.5	4.1
Queue Delay	0.0	0.0	0.0	0.7	0.0	0.0
Total Delay	30.8	45.4	3.4	3.4	4.5	4.1
Queue Length 50th (ft)	19	33	2	20	4	30
Queue Length 95th (ft)	51	71	7	40	m17	83
Internal Link Dist (ft)	380	399		136		545
Turn Bay Length (ft)			20		20	
Base Capacity (vph)	527	467	558	2461	621	2525
Starvation Cap Reductn	0	0	0	1610	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.17	0.03	0.53	0.07	0.22

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

24: Eureka & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (vph)	16	26	13	45	25	7	16	325	101	41	504	30
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00			1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.97			0.99		1.00	0.96		1.00	0.99	
Flt Protected		0.99			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1702			1716		1615	3278		1609	3391	
Flt Permitted		0.90			0.79		0.44	1.00		0.49	1.00	
Satd. Flow (perm)		1554			1389		749	3278		835	3391	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	17	27	14	47	26	7	17	342	106	43	531	32
RTOR Reduction (vph)	0	13	0	0	6	0	0	20	0	0	3	0
Lane Group Flow (vph)	0	45	0	0	74	0	17	428	0	43	560	0
Confl. Peds. (#/hr)	9		6	6		9			3	3		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.2			9.2		57.8	57.8		57.8	57.8	
Effective Green, g (s)		7.2			7.2		55.8	55.8		55.8	55.8	
Actuated g/C Ratio		0.10			0.10		0.74	0.74		0.74	0.74	
Clearance Time (s)		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	
Lane Grp Cap (vph)		149			133		557	2439		621	2523	
v/s Ratio Prot								0.13			c0.17	
v/s Ratio Perm		0.03			c0.05		0.02			0.05		
v/c Ratio		0.30			0.55		0.03	0.18		0.07	0.22	
Uniform Delay, d1		31.6			32.4		2.5	2.8		2.6	2.9	
Progression Factor		1.00			1.00		1.00	1.00		1.28	1.20	
Incremental Delay, d2		1.2			4.9		0.1	0.2		0.2	0.2	
Delay (s)		32.7			37.3		2.6	3.0		3.5	3.7	
Level of Service		C			D		A	A		A	A	
Approach Delay (s)		32.7			37.3			3.0			3.7	
Approach LOS		C			D			A			A	

Intersection Summary

HCM Average Control Delay	7.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
25: Eureka & Oriental

12/16/2013



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	40	36	8	448	35	599
v/c Ratio	0.17	0.14	0.03	0.30	0.09	0.40
Control Delay	10.1	8.3	5.2	6.0	5.9	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	10.1	8.3	5.2	6.0	5.9	6.9
Queue Length 50th (ft)	3	2	1	20	3	30
Queue Length 95th (ft)	16	14	4	35	10	48
Internal Link Dist (ft)	432	448		184		93
Turn Bay Length (ft)			25		40	
Base Capacity (vph)	441	482	413	1941	476	1943
Starvation Cap Reductn	0	0	0	0	0	639
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.07	0.02	0.23	0.07	0.46
Intersection Summary						

HCM Signalized Intersection Capacity Analysis

25: Eureka & Oriental

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (vph)	20	1	17	7	4	24	8	402	24	33	548	21
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)		6.2			6.2		6.2	6.2		6.2	6.2	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		0.99			0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			0.91		1.00	0.99		1.00	0.99	
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1624			1585		1614	3386		1609	3399	
Flt Permitted		0.82			0.92		0.43	1.00		0.49	1.00	
Satd. Flow (perm)		1360			1475		723	3386		835	3399	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	1	18	7	4	25	8	423	25	35	577	22
RTOR Reduction (vph)	0	15	0	0	21	0	0	11	0	0	7	0
Lane Group Flow (vph)	0	25	0	0	15	0	8	437	0	35	592	0
Confl. Peds. (#/hr)	8		2	2		8	1		6	6		1
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			5			7				3
Permitted Phases	1			5			7			3		
Actuated Green, G (s)		7.0			7.0		15.8	15.8		15.8	15.8	
Effective Green, g (s)		5.0			5.0		13.8	13.8		13.8	13.8	
Actuated g/C Ratio		0.16			0.16		0.44	0.44		0.44	0.44	
Clearance Time (s)		4.2			4.2		4.2	4.2		4.2	4.2	
Vehicle Extension (s)		2.5			2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		218			236		320	1498		369	1503	
v/s Ratio Prot								0.13				c0.17
v/s Ratio Perm		c0.02			0.01		0.01			0.04		
v/c Ratio		0.11			0.06		0.03	0.29		0.09	0.39	
Uniform Delay, d1		11.2			11.1		4.9	5.6		5.1	5.9	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.1		0.0	0.1		0.1	0.1	
Delay (s)		11.4			11.2		4.9	5.7		5.1	6.0	
Level of Service		B			B		A	A		A	A	
Approach Delay (s)		11.4			11.2			5.6			6.0	
Approach LOS		B			B			A			A	

Intersection Summary

HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	31.2	Sum of lost time (s)	12.4
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

26: Eureka & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	78	846	52	468	358	582
v/c Ratio	0.26	0.61	0.38	0.63	0.37	0.68
Control Delay	11.8	14.1	26.1	20.9	12.4	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.8	14.1	26.1	20.9	12.4	18.8
Queue Length 50th (ft)	14	99	13	62	34	71
Queue Length 95th (ft)	36	160	42	106	72	137
Internal Link Dist (ft)		660		354	209	138
Turn Bay Length (ft)	35		40			
Base Capacity (vph)	302	1888	233	1244	1291	1150
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.45	0.22	0.38	0.28	0.51

Intersection Summary

HCM Signalized Intersection Capacity Analysis

26: Eureka & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	74	748	56	49	387	58	31	248	61	133	378	42
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7	6.6		6.6	6.6			6.2			6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.97			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1615	3380		1612	3347			3302			3334	
Flt Permitted	0.32	1.00		0.37	1.00			0.87			0.77	
Satd. Flow (perm)	536	3380		634	3347			2888			2605	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	78	787	59	52	407	61	33	261	64	140	398	44
RTOR Reduction (vph)	0	9	0	0	22	0	0	32	0	0	10	0
Lane Group Flow (vph)	78	837	0	52	446	0	0	326	0	0	572	0
Confl. Peds. (#/hr)	2		7	7		2	4		9	9		4
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			4			4	
Permitted Phases	6			2			4			4		
Actuated Green, G (s)	21.9	21.9		12.7	12.7			18.0			18.0	
Effective Green, g (s)	19.9	19.9		10.7	10.7			16.0			16.0	
Actuated g/C Ratio	0.41	0.41		0.22	0.22			0.33			0.33	
Clearance Time (s)	3.7	4.6		4.6	4.6			4.2			4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	297	1381		139	735			949			856	
v/s Ratio Prot	0.02	c0.25			0.13							
v/s Ratio Perm	0.09			0.08				0.11			c0.22	
v/c Ratio	0.26	0.61		0.37	0.61			0.34			0.67	
Uniform Delay, d1	9.3	11.3		16.2	17.1			12.4			14.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.5	0.8		1.7	1.4			0.2			2.0	
Delay (s)	9.8	12.1		17.8	18.5			12.6			16.1	
Level of Service	A	B		B	B			B			B	
Approach Delay (s)		11.9			18.5			12.6			16.1	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	48.7	Sum of lost time (s)	12.8
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Queues
27: Orange & Colton

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	180	644	168	265	121	71	446	96	559
v/c Ratio	0.35	0.72	0.67	0.29	0.14	0.42	0.49	0.44	0.64
Control Delay	11.4	16.5	29.2	9.4	2.7	23.8	15.2	23.1	19.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.4	16.5	29.2	9.4	2.7	23.8	15.2	23.1	19.9
Queue Length 50th (ft)	30	127	34	42	0	18	50	25	77
Queue Length 95th (ft)	83	#347	#144	101	23	49	83	60	118
Internal Link Dist (ft)		502		260			472		133
Turn Bay Length (ft)	50		65		65	50		75	
Base Capacity (vph)	531	924	260	944	860	272	1390	343	1387
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.70	0.65	0.28	0.14	0.26	0.32	0.28	0.40

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

27: Orange & Colton

12/16/2013



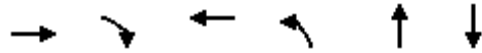
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	171	437	175	160	252	115	67	322	102	91	485	46
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	1723		1615	1800	1530	1615	3297		1615	3376	
Flt Permitted	0.60	1.00		0.29	1.00	1.00	0.39	1.00		0.49	1.00	
Satd. Flow (perm)	1013	1723		496	1800	1530	666	3297		840	3376	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	180	460	184	168	265	121	71	339	107	96	511	48
RTOR Reduction (vph)	0	21	0	0	0	59	0	57	0	0	13	0
Lane Group Flow (vph)	180	623	0	168	265	62	71	389	0	96	546	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	28.6	28.6		28.6	28.6	28.6	15.4	15.4		15.4	15.4	
Effective Green, g (s)	26.6	26.6		26.6	26.6	26.6	13.4	13.4		13.4	13.4	
Actuated g/C Ratio	0.51	0.51		0.51	0.51	0.51	0.26	0.26		0.26	0.26	
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	3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	518	881		254	921	783	172	850		216	870	
v/s Ratio Prot		c0.36			0.15			0.12			c0.16	
v/s Ratio Perm	0.18			0.34		0.04	0.11			0.11		
v/c Ratio	0.35	0.71		0.66	0.29	0.08	0.41	0.46		0.44	0.63	
Uniform Delay, d1	7.5	9.7		9.4	7.3	6.5	16.0	16.2		16.2	17.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	2.6		6.3	0.2	0.0	1.9	0.5		1.7	1.5	
Delay (s)	8.0	12.3		15.7	7.4	6.5	17.9	16.7		17.9	18.6	
Level of Service	A	B		B	A	A	B	B		B	B	
Approach Delay (s)		11.4			9.7			16.9			18.5	
Approach LOS		B			A			B			B	

Intersection Summary

HCM Average Control Delay	14.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	52.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues
28: Pearl & Orange

12/16/2013



Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	775	263	365	22	1081	474
v/c Ratio	1.10	0.30	0.62	0.10	1.02	0.66
Control Delay	88.5	9.4	18.9	23.7	65.0	31.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	88.5	9.4	18.9	23.7	65.0	31.9
Queue Length 50th (ft)	~507	57	127	9	~333	121
Queue Length 95th (ft)	#727	103	226	27	#474	176
Internal Link Dist (ft)	445		279		526	472
Turn Bay Length (ft)		20		75		
Base Capacity (vph)	702	874	587	218	1058	723
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.10	0.30	0.62	0.10	1.02	0.66

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.

HCM Signalized Intersection Capacity Analysis

28: Pearl & Orange

12/16/2013



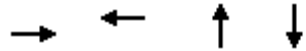
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↗			↖↗	
Volume (vph)	300	436	250	51	45	251	21	948	79	27	415	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1700	1800	1800	1800	1800	1800
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95			0.95	
Frt		1.00	0.85		0.90		1.00	0.99			1.00	
Flt Protected		0.98	1.00		0.99		0.95	1.00			1.00	
Satd. Flow (prot)		1764	1530		1612		1615	3381			3400	
Flt Permitted		0.70	1.00		0.65		0.41	1.00			0.68	
Satd. Flow (perm)		1264	1530		1048		701	3381			2318	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	316	459	263	54	47	264	22	998	83	28	437	9
RTOR Reduction (vph)	0	0	24	0	6	0	0	7	0	0	1	0
Lane Group Flow (vph)	0	775	239	0	359	0	22	1074	0	0	473	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2				2
Permitted Phases	4		4	4			2			2		
Actuated Green, G (s)		52.0	52.0		52.0		30.0	30.0			30.0	
Effective Green, g (s)		50.0	50.0		50.0		28.0	28.0			28.0	
Actuated g/C Ratio		0.56	0.56		0.56		0.31	0.31			0.31	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.5	3.5			3.5	
Lane Grp Cap (vph)		702	850		582		218	1052			721	
v/s Ratio Prot								c0.32				
v/s Ratio Perm		c0.61	0.16		0.34		0.03				0.20	
v/c Ratio		1.10	0.28		0.62		0.10	1.02			0.66	
Uniform Delay, d1		20.0	10.5		13.5		22.0	31.0			26.8	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		66.1	0.2		2.0		0.2	33.2			2.2	
Delay (s)		86.1	10.7		15.5		22.3	64.2			29.1	
Level of Service		F	B		B		C	E			C	
Approach Delay (s)		67.0			15.5			63.3			29.1	
Approach LOS		E			B			E			C	

Intersection Summary

HCM Average Control Delay	53.3	HCM Level of Service	D
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	112.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues
29: Orange & Stuart

12/16/2013



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	213	274	1002	639
v/c Ratio	0.54	0.71	0.76	0.56
Control Delay	17.8	24.1	14.9	12.2
Queue Delay	0.0	0.0	0.1	0.0
Total Delay	17.8	24.1	15.0	12.2
Queue Length 50th (ft)	36	49	91	54
Queue Length 95th (ft)	102	136	202	126
Internal Link Dist (ft)	305	198	150	526
Turn Bay Length (ft)				
Base Capacity (vph)	743	710	2124	1841
Starvation Cap Reductn	0	0	269	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.29	0.39	0.54	0.35
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

29: Orange & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	76	81	46	135	50	75	9	789	154	53	542	11
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.2			6.2			6.2			6.2	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frbp, ped/bikes		0.99			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.97			0.96			0.98			1.00	
Flt Protected		0.98			0.97			1.00			1.00	
Satd. Flow (prot)		1694			1660			3312			3392	
Flt Permitted		0.80			0.77			0.95			0.80	
Satd. Flow (perm)		1382			1315			3144			2742	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	80	85	48	142	53	79	9	831	162	56	571	12
RTOR Reduction (vph)	0	19	0	0	27	0	0	28	0	0	2	0
Lane Group Flow (vph)	0	194	0	0	247	0	0	974	0	0	637	0
Confl. Peds. (#/hr)	33		35	35		33	12		21	21		12
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		13.9			13.9			19.9			19.9	
Effective Green, g (s)		11.9			11.9			17.9			17.9	
Actuated g/C Ratio		0.28			0.28			0.42			0.42	
Clearance Time (s)		4.2			4.2			4.2			4.2	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		390			371			1334			1163	
v/s Ratio Prot												
v/s Ratio Perm		0.14			0.19			0.31			0.23	
v/c Ratio		0.50			0.67			0.73			0.55	
Uniform Delay, d1		12.6			13.4			10.1			9.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.0			4.5			2.1			0.5	
Delay (s)		13.6			17.9			12.2			9.6	
Level of Service		B			B			B			A	
Approach Delay (s)		13.6			17.9			12.2			9.6	
Approach LOS		B			B			B			A	

Intersection Summary

HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	42.2	Sum of lost time (s)	12.4
Intersection Capacity Utilization	86.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

30: Orange & Oriental

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	45	22	11	893	694	32
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	47	23	12	940	731	34
Pedestrians	16			24	1	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	1			2	0	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				464	165	
pX, platoon unblocked	0.89	0.99	0.99			
vC, conflicting volume	1258	422	780			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	977	383	747			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	78	96	99			
cM capacity (veh/h)	219	591	846			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	71	325	627	487	277
Volume Left	47	12	0	0	0
Volume Right	23	0	0	0	34
cSH	276	846	1700	1700	1700
Volume to Capacity	0.26	0.01	0.37	0.29	0.16
Queue Length 95th (ft)	25	1	0	0	0
Control Delay (s)	22.5	0.5	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	22.5	0.2		0.0	
Approach LOS	C				

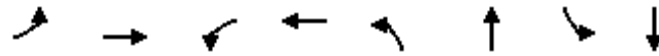
Intersection Summary

Average Delay	1.0				
Intersection Capacity Utilization	50.4%		ICU Level of Service	A	
Analysis Period (min)	15				

Queues

31: Orange & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	209	698	58	631	72	542	168	541
v/c Ratio	0.70	0.52	0.45	0.75	0.44	0.73	0.64	0.41
Control Delay	28.8	14.7	34.0	18.8	30.5	28.0	27.4	13.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.8	14.7	34.0	18.8	30.5	28.0	27.4	13.5
Queue Length 50th (ft)	49	91	19	61	23	93	39	64
Queue Length 95th (ft)	#133	151	54	121	62	154	#105	114
Internal Link Dist (ft)		387		273		223		384
Turn Bay Length (ft)	60		60		75		60	
Base Capacity (vph)	297	1702	196	1139	232	1043	263	1602
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.41	0.30	0.55	0.31	0.52	0.64	0.34

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

31: Orange & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	199	571	92	55	333	266	68	468	47	160	411	103
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	5.5	6.2		6.2	6.2		6.2	6.2		5.5	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.93		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1614	3335		1605	3153		1598	3364		1612	3295	
Flt Permitted	0.23	1.00		0.39	1.00		0.45	1.00		0.25	1.00	
Satd. Flow (perm)	393	3335		652	3153		758	3364		433	3295	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	209	601	97	58	351	280	72	493	49	168	433	108
RTOR Reduction (vph)	0	19	0	0	221	0	0	11	0	0	32	0
Lane Group Flow (vph)	209	679	0	58	410	0	72	531	0	168	509	0
Confl. Peds. (#/hr)	16		15	15		16	26		23	23		26
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	26.0	26.0		13.8	13.8		15.1	15.1		25.2	25.2	
Effective Green, g (s)	24.0	24.0		11.8	11.8		13.1	13.1		23.2	23.2	
Actuated g/C Ratio	0.40	0.40		0.20	0.20		0.22	0.22		0.39	0.39	
Clearance Time (s)	3.5	4.2		4.2	4.2		4.2	4.2		3.5	4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	296	1343		129	624		167	739		260	1283	
v/s Ratio Prot	c0.08	0.20			0.13			0.16		c0.05	0.15	
v/s Ratio Perm	c0.21			0.09			0.10			c0.20		
v/c Ratio	0.71	0.51		0.45	0.66		0.43	0.72		0.65	0.40	
Uniform Delay, d1	13.3	13.3		21.0	22.0		20.0	21.5		13.1	13.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.5	0.3		2.5	2.5		1.8	3.4		5.4	0.2	
Delay (s)	20.8	13.7		23.5	24.5		21.8	24.9		18.5	13.3	
Level of Service	C	B		C	C		C	C		B	B	
Approach Delay (s)		15.3			24.5			24.5			14.6	
Approach LOS		B			C			C			B	

Intersection Summary

HCM Average Control Delay	19.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	59.6	Sum of lost time (s)	11.0
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

32: 6th St & WB I-10 Ramp

12/16/2013





















Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	212	11	179	0	353	0	0	508	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	223	12	188	0	372	0	0	535	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1101	906	535	906	906	372	535			372		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1101	906	535	906	906	372	535			372		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	14	96	72	100			100		
cM capacity (veh/h)	134	278	549	259	278	679	1043			1198		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	223	200	372	535
Volume Left	223	0	0	0
Volume Right	0	188	0	0
cSH	259	626	1700	1700
Volume to Capacity	0.86	0.32	0.22	0.31
Queue Length 95th (ft)	179	34	0	0
Control Delay (s)	67.5	13.4	0.0	0.0
Lane LOS	F	B		
Approach Delay (s)	41.9		0.0	0.0
Approach LOS	E			

Intersection Summary			
Average Delay		13.3	
Intersection Capacity Utilization	48.0%		ICU Level of Service
Analysis Period (min)		15	A

HCM Unsignalized Intersection Capacity Analysis
 33: 6th St & EB I-10 Ramp

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	145	234	200	0	0	0	204	182	129	260	273	119
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	153	246	211	0	0	0	215	192	136	274	287	125
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2						
Volume Total (vph)	399	211	215	327	274	413						
Volume Left (vph)	153	0	215	0	274	0						
Volume Right (vph)	0	211	0	136	0	125						
Hadj (s)	0.19	-0.70	0.50	-0.29	0.50	-0.21						
Departure Headway (s)	8.0	7.0	8.4	7.6	8.2	7.4						
Degree Utilization, x	0.88	0.41	0.50	0.69	0.62	0.85						
Capacity (veh/h)	446	495	411	461	424	477						
Control Delay (s)	45.2	13.7	18.3	24.4	22.4	38.8						
Approach Delay (s)	34.3		22.0		32.2							
Approach LOS	D		C		D							
Intersection Summary												
Delay			29.9									
HCM Level of Service			D									
Intersection Capacity Utilization			66.9%		ICU Level of Service				C			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

34: 6th St & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (veh/h)	18	14	37	18	9	56	62	483	21	37	335	36
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	19	15	39	19	9	59	65	508	22	39	353	38
Pedestrians		2			2			4			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								231				
pX, platoon unblocked	0.97	0.97		0.97	0.97	0.97				0.97		
vC, conflicting volume	1156	1115	201	957	1122	523	393			533		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1147	1104	201	942	1113	498	393			507		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	92	95	89	95	88	94			96		
cM capacity (veh/h)	120	188	808	178	186	508	1175			1039		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	73	87	65	531	39	235	155
Volume Left	19	19	65	0	39	0	0
Volume Right	39	59	0	22	0	0	38
cSH	255	319	1175	1700	1039	1700	1700
Volume to Capacity	0.28	0.27	0.06	0.31	0.04	0.14	0.09
Queue Length 95th (ft)	28	27	4	0	3	0	0
Control Delay (s)	24.6	20.5	8.2	0.0	8.6	0.0	0.0
Lane LOS	C	C	A		A		
Approach Delay (s)	24.6	20.5	0.9		0.8		
Approach LOS	C	C					

Intersection Summary		
Average Delay		3.8
Intersection Capacity Utilization	48.7%	ICU Level of Service
Analysis Period (min)		15
		A

Queues

35: Redlands Blvd & Citrus Ave

12/16/2013



Lane Group	EBT	WBT	SET	SER	NWT
Lane Group Flow (vph)	671	364	693	114	435
v/c Ratio	0.80	0.70	0.78	0.19	0.52
Control Delay	30.3	29.9	29.9	7.3	21.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	30.3	29.9	29.9	7.3	21.3
Queue Length 50th (ft)	127	61	140	5	73
Queue Length 95th (ft)	203	110	#282	42	142
Internal Link Dist (ft)	399	463	375		430
Turn Bay Length (ft)				100	
Base Capacity (vph)	1124	905	920	625	869
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.60	0.40	0.75	0.18	0.50

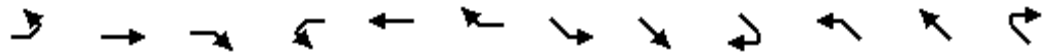
Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

35: Redlands Blvd & Citrus Ave

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕↕			↕↕			↕↕	↗		↕↕	
Volume (vph)	134	309	195	47	185	114	166	492	108	75	281	57
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.0			6.2			6.2	6.2		6.2	
Lane Util. Factor		0.95			0.95			0.95	1.00		0.95	
Frt		0.95			0.95			1.00	0.85		0.98	
Flt Protected		0.99			0.99			0.99	1.00		0.99	
Satd. Flow (prot)		3229			3229			3377	1530		3319	
Flt Permitted		0.99			0.99			0.73	1.00		0.69	
Satd. Flow (perm)		3229			3229			2492	1530		2318	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	141	325	205	49	195	120	175	518	114	79	296	60
RTOR Reduction (vph)	0	61	0	0	78	0	0	0	61	0	14	0
Lane Group Flow (vph)	0	610	0	0	286	0	0	693	53	0	421	0
Turn Type	Split	NA		Split	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	4	4		1	1			2			2	
Permitted Phases							2		2	2		
Actuated Green, G (s)		19.0			11.7			27.2	27.2		27.2	
Effective Green, g (s)		17.0			9.7			25.2	25.2		25.2	
Actuated g/C Ratio		0.24			0.14			0.36	0.36		0.36	
Clearance Time (s)		4.0			4.2			4.2	4.2		4.2	
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		781			446			893	548		831	
v/s Ratio Prot		c0.19			c0.09							
v/s Ratio Perm								c0.28	0.03		0.18	
v/c Ratio		0.78			0.64			0.78	0.10		0.51	
Uniform Delay, d1		24.9			28.7			20.0	15.0		17.7	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		5.1			3.2			4.3	0.1		0.5	
Delay (s)		30.0			31.8			24.3	15.1		18.2	
Level of Service		C			C			C	B		B	
Approach Delay (s)		30.0			31.8			23.0			18.2	
Approach LOS		C			C			C			B	

Intersection Summary

HCM Average Control Delay	25.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	70.3	Sum of lost time (s)	18.4
Intersection Capacity Utilization	82.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

36: Stuart & Church

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	76	35	14	369	292	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	80	37	15	388	307	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				203		
pX, platoon unblocked	0.99					
vC, conflicting volume	542	164	328			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	526	164	328			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	83	96	99			
cM capacity (veh/h)	478	858	1242			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	117	144	259	205	124
Volume Left	80	15	0	0	0
Volume Right	37	0	0	0	21
cSH	555	1242	1700	1700	1700
Volume to Capacity	0.21	0.01	0.15	0.12	0.07
Queue Length 95th (ft)	20	1	0	0	0
Control Delay (s)	13.2	0.9	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	13.2	0.3		0.0	
Approach LOS	B				

Intersection Summary					
Average Delay			2.0		
Intersection Capacity Utilization		34.9%		ICU Level of Service	A
Analysis Period (min)		15			

HCM Unsignalized Intersection Capacity Analysis

37: Universtiy & WB I-10 Ramp/E Central

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↔			↔	
Volume (veh/h)	0	0	0	2	21	15	329	644	45	11	193	455
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	2	22	16	346	678	47	12	203	479
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												563
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99		0.99					
vC, conflicting volume	1524	1884	341	1519	2099	363	682			725		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1506	1870	308	1501	2088	363	653			725		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	96	32	98	63			99		
cM capacity (veh/h)	28	45	685	60	33	640	932			887		

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	40	685	386	113	581
Volume Left	2	346	0	12	0
Volume Right	16	0	47	0	479
cSH	54	932	1700	887	1700
Volume to Capacity	0.74	0.37	0.23	0.01	0.34
Queue Length 95th (ft)	77	43	0	1	0
Control Delay (s)	171.6	8.2	0.0	1.0	0.0
Lane LOS	F	A		A	
Approach Delay (s)	171.6	5.2		0.2	
Approach LOS	F				

Intersection Summary		
Average Delay		7.0
Intersection Capacity Utilization	65.2%	ICU Level of Service C
Analysis Period (min)		15

HCM Unsignalized Intersection Capacity Analysis
 38: Universtiy & EB I-10 Ramp

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	480	619	0	550	211	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	505	652	0	579	222	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	12					
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)	1022					
pX, platoon unblocked						
vC, conflicting volume	512	111	222			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	512	111	222			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	30	100			
cM capacity (veh/h)	497	927	1359			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	1157	289	289	111	111	
Volume Left	505	0	0	0	0	
Volume Right	652	0	0	0	0	
cSH	1137	1700	1700	1700	1700	
Volume to Capacity	1.02	0.17	0.17	0.07	0.07	
Queue Length 95th (ft)	552	0	0	0	0	
Control Delay (s)	42.1	0.0	0.0	0.0	0.0	
Lane LOS	E					
Approach Delay (s)	42.1	0.0		0.0		
Approach LOS	E					
Intersection Summary						
Average Delay	24.9					
Intersection Capacity Utilization	53.3%			ICU Level of Service	A	
Analysis Period (min)	15					

Queues

39: Tippecanoe & Harriman PI

12/16/2013



Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	216	724	326	291	265	284	989	538	1587
v/c Ratio	0.78	0.78	0.73	0.84	0.68	0.75	0.38	0.50	0.67
Control Delay	67.4	23.9	59.9	64.0	33.5	58.9	22.4	7.8	25.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.4	23.9	59.9	64.0	33.5	58.9	22.4	7.8	25.7
Queue Length 50th (ft)	161	130	125	209	110	119	203	72	177
Queue Length 95th (ft)	242	203	174	#332	208	m151	255	m161	242
Internal Link Dist (ft)				428			367		781
Turn Bay Length (ft)	280		300		300	225		500	
Base Capacity (vph)	328	1036	498	394	428	396	2634	1070	2373
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.70	0.65	0.74	0.62	0.72	0.38	0.50	0.67

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.

HCM Signalized Intersection Capacity Analysis

39: Tippecanoe & Harriman PI

12/16/2013



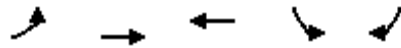
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖		↖↖	↖↖	↖	↖	↖↖	↖↖↖	↖		↖↖↖	
Volume (vph)	205	0	688	310	179	350	270	940	511	0	1293	215
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00		0.88	0.97	0.95	0.95	0.97	0.91	1.00		0.86	
Frt	1.00		0.85	1.00	0.95	0.85	1.00	1.00	0.85		0.98	
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (prot)	1710		2693	3317	1619	1454	3317	4914	1530		6060	
Flt Permitted	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (perm)	1710		2693	3317	1619	1454	3317	4914	1530		6060	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	216	0	724	326	188	368	284	989	538	0	1361	226
RTOR Reduction (vph)	0	0	314	0	17	93	0	0	250	0	23	0
Lane Group Flow (vph)	216	0	410	326	274	172	284	989	288	0	1564	0
Turn Type	Prot		custom	Prot	NA	Perm	Prot	NA	Perm		NA	
Protected Phases	7			3	8		5	2				6
Permitted Phases			4			8			2			
Actuated Green, G (s)	19.4		27.6	16.1	24.3	24.3	13.8	64.3	64.3		46.5	
Effective Green, g (s)	19.4		27.6	16.1	24.3	24.3	13.8	64.3	64.3		46.5	
Actuated g/C Ratio	0.16		0.23	0.13	0.20	0.20	0.12	0.54	0.54		0.39	
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)	276		619	445	328	294	381	2633	820		2348	
v/s Ratio Prot	c0.13			0.10	c0.17		c0.09	0.20			c0.26	
v/s Ratio Perm			c0.15			0.12			0.19			
v/c Ratio	0.78		0.66	0.73	0.84	0.59	0.75	0.38	0.35		0.67	
Uniform Delay, d1	48.3		42.0	49.9	45.9	43.3	51.4	16.2	15.9		30.3	
Progression Factor	1.00		1.00	1.00	1.00	1.00	0.96	1.27	3.98		0.79	
Incremental Delay, d2	13.5		2.7	6.1	16.6	3.0	5.8	0.3	0.9		1.1	
Delay (s)	61.7		44.6	56.0	62.6	46.3	55.1	20.8	64.3		25.0	
Level of Service	E		D	E	E	D	E	C	E		C	
Approach Delay (s)		48.6			55.3			39.1			25.0	
Approach LOS		D			E			D			C	

Intersection Summary

HCM Average Control Delay	39.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Mill St

11/25/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	63	685	804	154	72
v/c Ratio	0.17	0.32	0.38	0.34	0.30
Control Delay	6.4	5.4	5.7	12.4	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.4	5.4	5.7	12.4	9.0
Queue Length 50th (ft)	6	35	43	9	0
Queue Length 95th (ft)	21	66	79	27	26
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	381	2200	2189	1884	842
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.17	0.31	0.37	0.08	0.09

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St

11/25/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	60	651	733	30	87	127
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.94	0.85
Flt Protected	0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	1615	3420	3400		3186	1392
Flt Permitted	0.35	1.00	1.00		0.97	1.00
Satd. Flow (perm)	592	3420	3400		3186	1392
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	685	772	32	92	134
RTOR Reduction (vph)	0	0	4	0	57	66
Lane Group Flow (vph)	63	685	800	0	97	6
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	23.0	23.0	23.0		5.3	5.3
Effective Green, g (s)	21.0	21.0	21.0		3.3	3.3
Actuated g/C Ratio	0.56	0.56	0.56		0.09	0.09
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	333	1925	1914		282	123
v/s Ratio Prot		0.20	c0.24		c0.03	
v/s Ratio Perm	0.11					0.00
v/c Ratio	0.19	0.36	0.42		0.35	0.05
Uniform Delay, d1	4.0	4.5	4.7		16.0	15.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.1	0.1		0.7	0.2
Delay (s)	4.3	4.6	4.8		16.7	15.7
Level of Service	A	A	A		B	B
Approach Delay (s)		4.5	4.8		16.4	
Approach LOS		A	A		B	

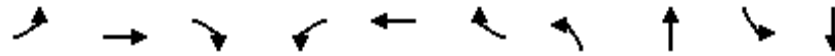
Intersection Summary

HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	37.3	Sum of lost time (s)	13.0
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

11/25/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	275	437	286	251	551	180	282	1236	132	1361
v/c Ratio	0.84	0.64	0.54	0.70	0.88	0.49	0.99	0.73	0.71	0.99
Control Delay	45.9	41.6	8.6	32.0	57.6	20.7	78.5	32.0	39.7	56.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.9	41.6	8.6	32.0	57.6	20.7	78.5	32.0	39.7	56.2
Queue Length 50th (ft)	117	131	2	105	176	39	~163	257	48	303
Queue Length 95th (ft)	#225	191	73	168	#291	108	#328	313	#114	#412
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	379	693	536	411	627	369	286	1685	191	1379
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	0.73	0.63	0.53	0.61	0.88	0.49	0.99	0.73	0.69	0.99

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.

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

11/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	261	415	272	238	523	171	268	1060	114	125	1028	265	
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800	
Total Lost time (s)	6.0	7.0	7.0	6.0	7.0	7.0	5.0	7.0		5.0	7.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91		1.00	0.91		
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.97		
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1615	3420	1530	1615	3420	1530	1615	4842		1615	4763		
Flt Permitted	0.21	1.00	1.00	0.42	1.00	1.00	0.12	1.00		0.15	1.00		
Satd. Flow (perm)	360	3420	1530	711	3420	1530	206	4842		255	4763		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	275	437	286	251	551	180	282	1116	120	132	1082	279	
RTOR Reduction (vph)	0	0	226	0	0	88	0	12	0	0	45	0	
Lane Group Flow (vph)	275	437	60	251	551	92	282	1224	0	132	1316	0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		
Protected Phases	3	8		7	4		5	2		1	6		
Permitted Phases	8		8	4		4	2			6			
Actuated Green, G (s)	39.5	22.0	22.0	35.9	20.2	20.2	48.3	36.6		38.7	30.0		
Effective Green, g (s)	35.5	20.0	20.0	31.9	18.2	18.2	46.3	34.6		34.7	28.0		
Actuated g/C Ratio	0.36	0.20	0.20	0.32	0.18	0.18	0.46	0.35		0.35	0.28		
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	3.0	5.0		3.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	322	684	306	351	622	278	283	1675		180	1334		
v/s Ratio Prot	c0.13	0.13		0.10	0.16		c0.13	0.25		0.05	0.28		
v/s Ratio Perm	c0.17		0.04	0.13		0.06	c0.33			0.21			
v/c Ratio	0.85	0.64	0.19	0.72	0.89	0.33	1.00	0.73		0.73	0.99		
Uniform Delay, d1	25.9	36.7	33.3	27.5	39.9	35.6	27.9	28.6		23.8	35.8		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	19.2	2.0	0.3	6.8	14.2	0.7	52.2	2.8		14.3	21.2		
Delay (s)	45.2	38.7	33.6	34.3	54.1	36.3	80.1	31.5		38.1	57.0		
Level of Service	D	D	C	C	D	D	F	C		D	E		
Approach Delay (s)		39.0			45.8			40.5			55.3		
Approach LOS		D			D			D			E		
Intersection Summary													
HCM Average Control Delay			45.7									HCM Level of Service	D
HCM Volume to Capacity ratio			0.83										
Actuated Cycle Length (s)			100.0									Sum of lost time (s)	11.0
Intersection Capacity Utilization			96.1%									ICU Level of Service	F
Analysis Period (min)			15										
c	Critical Lane Group												

Queues

4: Waterman & E Orange Show

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	299	855	161	618	279	1090	141	1343
v/c Ratio	1.12	0.97	0.96	0.92	1.10	0.80	0.74	1.15
Control Delay	125.1	68.1	94.5	69.7	122.6	39.7	43.2	115.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Total Delay	125.1	68.1	94.5	69.7	122.6	39.9	43.2	115.8
Queue Length 50th (ft)	~241	357	92	265	~221	423	60	~691
Queue Length 95th (ft)	#427	#492	#230	#374	#404	516	#133	#832
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	267	892	167	682	253	1355	205	1167
Starvation Cap Reductn	0	0	0	0	0	26	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	1.12	0.96	0.96	0.91	1.10	0.82	0.69	1.15

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.

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	284	571	241	153	509	78	265	891	144	134	953	323
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Total Lost time (s)	6.0	7.0		6.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.98		1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1615	3268		1615	3352		1615	3348		1615	3290	
Flt Permitted	0.13	1.00		0.16	1.00		0.08	1.00		0.13	1.00	
Satd. Flow (perm)	219	3268		265	3352		133	3348		226	3290	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	299	601	254	161	536	82	279	938	152	141	1003	340
RTOR Reduction (vph)	0	36	0	0	10	0	0	10	0	0	25	0
Lane Group Flow (vph)	299	819	0	161	608	0	279	1080	0	141	1318	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	50.7	35.7		38.7	27.7		69.0	54.1		57.9	47.0	
Effective Green, g (s)	48.7	33.7		34.7	25.7		67.0	52.1		53.9	45.0	
Actuated g/C Ratio	0.38	0.26		0.27	0.20		0.52	0.40		0.42	0.35	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	265	849		165	664		252	1345		189	1141	
v/s Ratio Prot	c0.15	0.25		0.07	0.18		c0.14	0.32		0.05	0.40	
v/s Ratio Perm	c0.28			0.19			c0.44			0.26		
v/c Ratio	1.13	0.96		0.98	0.92		1.11	0.80		0.75	1.15	
Uniform Delay, d1	37.3	47.4		42.4	50.9		41.7	34.3		27.0	42.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	94.3	22.4		62.3	17.4		88.4	3.6		14.8	79.9	
Delay (s)	131.6	69.8		104.7	68.3		130.2	37.8		41.8	122.2	
Level of Service	F	E		F	E		F	D		D	F	
Approach Delay (s)		85.8			75.8			56.7			114.6	
Approach LOS		F			E			E			F	

Intersection Summary

HCM Average Control Delay	84.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	129.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	111.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

11/25/2013



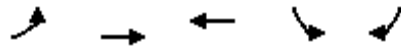
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	10	0	21	1290	1345	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	0	22	1358	1416	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					87	
pX, platoon unblocked	0.96	0.96	0.96			
vC, conflicting volume	2141	709	1419			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2107	620	1357			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	75	100	96			
cM capacity (veh/h)	42	419	494			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	11	22	679	679	944	475
Volume Left	11	22	0	0	0	0
Volume Right	0	0	0	0	0	3
cSH	42	494	1700	1700	1700	1700
Volume to Capacity	0.25	0.04	0.40	0.40	0.56	0.28
Queue Length 95th (ft)	21	4	0	0	0	0
Control Delay (s)	118.8	12.6	0.0	0.0	0.0	0.0
Lane LOS	F	B				
Approach Delay (s)	118.8	0.2			0.0	
Approach LOS	F					

Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			49.3%		ICU Level of Service	A
Analysis Period (min)			15			

Queues
1: Mill St

12/16/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	77	548	471	313	142
v/c Ratio	0.22	0.38	0.32	0.45	0.37
Control Delay	8.2	7.6	7.0	12.2	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	8.2	7.6	7.0	12.2	6.6
Queue Length 50th (ft)	7	30	24	18	0
Queue Length 95th (ft)	27	62	52	52	34
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	578	2402	2380	2306	1026
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.13	0.23	0.20	0.14	0.14

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St

12/16/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	73	521	411	36	234	199
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.97	0.85
Flt Protected	0.95	1.00	1.00		0.96	1.00
Satd. Flow (prot)	1710	3610	3566		3433	1470
Flt Permitted	0.48	1.00	1.00		0.96	1.00
Satd. Flow (perm)	868	3610	3566		3433	1470
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	77	548	433	38	246	209
RTOR Reduction (vph)	0	0	11	0	54	115
Lane Group Flow (vph)	77	548	460	0	259	27
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	15.2	15.2	15.2		8.1	8.1
Effective Green, g (s)	13.2	13.2	13.2		6.1	6.1
Actuated g/C Ratio	0.41	0.41	0.41		0.19	0.19
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	355	1475	1457		648	278
v/s Ratio Prot		c0.15	0.13		c0.08	
v/s Ratio Perm	0.09					0.02
v/c Ratio	0.22	0.37	0.32		0.40	0.10
Uniform Delay, d1	6.2	6.7	6.5		11.5	10.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.2	0.1		0.4	0.2
Delay (s)	6.5	6.8	6.6		11.9	11.0
Level of Service	A	A	A		B	B
Approach Delay (s)		6.8	6.6		11.6	
Approach LOS		A	A		B	

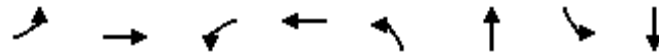
Intersection Summary

HCM Average Control Delay	8.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	32.3	Sum of lost time (s)	13.0
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

2: Waterman Ave & 9th St

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	114	575	192	618	55	596	93	985
v/c Ratio	0.48	0.51	0.77	0.54	0.37	0.46	0.34	0.76
Control Delay	22.0	14.4	39.7	14.2	20.4	12.8	16.0	18.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.0	14.4	39.7	14.2	20.4	12.8	16.0	18.1
Queue Length 50th (ft)	27	67	51	70	12	67	20	134
Queue Length 95th (ft)	69	107	#143	112	40	106	52	197
Internal Link Dist (ft)		852		841		893		996
Turn Bay Length (ft)	130		100		50		75	
Base Capacity (vph)	312	1476	328	1498	192	1644	353	1649
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.39	0.59	0.41	0.29	0.36	0.26	0.60

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2: Waterman Ave & 9th St

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	108	433	113	182	468	119	52	506	60	88	880	56
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	7.5	7.5		7.4	7.4		7.5	7.5		7.5	7.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.97		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3498		1710	3500		1710	3553		1710	3578	
Flt Permitted	0.42	1.00		0.44	1.00		0.23	1.00		0.43	1.00	
Satd. Flow (perm)	752	3498		784	3500		419	3553		768	3578	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	114	456	119	192	493	125	55	533	63	93	926	59
RTOR Reduction (vph)	0	29	0	0	43	0	0	17	0	0	9	0
Lane Group Flow (vph)	114	546	0	192	575	0	55	579	0	93	976	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	17.1	17.1		17.2	17.2		19.2	19.2		19.2	19.2	
Effective Green, g (s)	15.1	15.1		15.2	15.2		17.2	17.2		17.2	17.2	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.36	0.36		0.36	0.36	
Clearance Time (s)	5.5	5.5		5.4	5.4		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	240	1117		252	1125		152	1292		279	1301	
v/s Ratio Prot		0.16			0.16			0.16			c0.27	
v/s Ratio Perm	0.15			c0.24			0.13			0.12		
v/c Ratio	0.47	0.49		0.76	0.51		0.36	0.45		0.33	0.75	
Uniform Delay, d1	12.9	13.0		14.4	13.0		11.0	11.4		10.9	13.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	0.3		12.7	0.4		1.5	0.2		0.7	2.5	
Delay (s)	14.4	13.3		27.2	13.4		12.5	11.7		11.6	15.7	
Level of Service	B	B		C	B		B	B		B	B	
Approach Delay (s)		13.5			16.7			11.8			15.3	
Approach LOS		B			B			B			B	

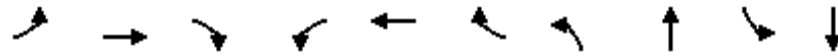
Intersection Summary

HCM Average Control Delay	14.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	47.3	Sum of lost time (s)	14.9
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	108	369	153	333	641	186	112	834	97	808
v/c Ratio	0.42	0.26	0.21	0.90	0.46	0.25	0.44	0.53	0.40	0.52
Control Delay	19.4	13.6	3.3	48.4	15.7	3.2	22.0	20.3	20.6	20.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.4	13.6	3.3	48.4	15.7	3.2	22.0	20.3	20.6	20.8
Queue Length 50th (ft)	27	46	0	109	87	0	29	102	25	101
Queue Length 95th (ft)	69	75	29	#255	131	32	#61	137	51	135
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	282	1514	766	402	1514	786	252	1618	241	1612
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	0.38	0.24	0.20	0.83	0.42	0.24	0.44	0.52	0.40	0.50

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑	↗	↘	↑↑↑		↘	↑↑↑	
Volume (vph)	103	351	145	316	609	177	106	679	113	92	693	75
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	7.0		5.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3610	1615	1710	3610	1615	1710	5076		1710	5111	
Flt Permitted	0.37	1.00	1.00	0.53	1.00	1.00	0.30	1.00		0.29	1.00	
Satd. Flow (perm)	671	3610	1615	958	3610	1615	538	5076		513	5111	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	108	369	153	333	641	186	112	715	119	97	729	79
RTOR Reduction (vph)	0	0	94	0	0	114	0	34	0	0	19	0
Lane Group Flow (vph)	108	369	59	333	641	72	112	800	0	97	789	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	27.1	27.1	27.1	27.1	27.1	27.1	24.9	21.1		24.9	21.1	
Effective Green, g (s)	25.1	25.1	25.1	25.1	25.1	25.1	20.9	19.1		20.9	19.1	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.32	0.29		0.32	0.29	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	259	1394	624	370	1394	624	205	1492		198	1502	
v/s Ratio Prot		0.10			0.18		c0.02	0.16		0.01	0.15	
v/s Ratio Perm	0.16		0.04	c0.35		0.04	c0.16			0.14		
v/c Ratio	0.42	0.26	0.09	0.90	0.46	0.12	0.55	0.54		0.49	0.53	
Uniform Delay, d1	14.6	13.6	12.7	18.8	14.9	12.8	17.2	19.2		16.7	19.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.1	0.1	24.0	0.2	0.1	3.0	1.4		1.9	1.3	
Delay (s)	15.7	13.7	12.8	42.8	15.1	12.9	20.1	20.6		18.7	20.5	
Level of Service	B	B	B	D	B	B	C	C		B	C	
Approach Delay (s)		13.8			22.7			20.6			20.3	
Approach LOS		B			C			C			C	

Intersection Summary

HCM Average Control Delay	20.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Waterman & E Orange Show

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	236	932	260	839	141	1245	80	1094
v/c Ratio	1.00	0.95	0.94	0.88	0.89	0.97	0.58	0.94
Control Delay	83.5	47.2	64.0	42.7	72.1	49.5	35.7	46.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.5	47.2	64.0	42.7	72.1	49.5	35.7	46.6
Queue Length 50th (ft)	~87	232	96	233	48	~364	26	295
Queue Length 95th (ft)	#238	#361	#246	#339	#141	#504	#64	#420
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	235	994	276	968	158	1284	139	1188
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.94	0.94	0.87	0.89	0.97	0.58	0.92

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	224	517	369	247	665	132	134	1100	83	76	928	111
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	6.0	6.0		6.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	*1.00		1.00	*1.00	
Frt	1.00	0.94		1.00	0.98		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3385		1710	3520		1710	3760		1710	3739	
Flt Permitted	0.18	1.00		0.17	1.00		0.13	1.00		0.14	1.00	
Satd. Flow (perm)	319	3385		305	3520		238	3760		255	3739	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	236	544	388	260	700	139	141	1158	87	80	977	117
RTOR Reduction (vph)	0	120	0	0	18	0	0	7	0	0	11	0
Lane Group Flow (vph)	236	812	0	260	821	0	141	1238	0	80	1083	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	34.6	24.6		37.6	25.6		38.2	32.2		34.2	30.2	
Effective Green, g (s)	30.6	22.6		33.6	23.6		34.2	30.2		30.2	28.2	
Actuated g/C Ratio	0.34	0.25		0.37	0.26		0.38	0.34		0.34	0.31	
Clearance Time (s)	4.0	4.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	233	852		271	925		156	1264		118	1174	
v/s Ratio Prot	0.09	0.24		c0.11	0.23		c0.04	c0.33		0.02	0.29	
v/s Ratio Perm	c0.26			0.25			0.30			0.21		
v/c Ratio	1.01	0.95		0.96	0.89		0.90	0.98		0.68	0.92	
Uniform Delay, d1	25.8	33.1		23.3	31.8		25.2	29.5		28.8	29.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	62.3	20.2		43.0	10.3		44.8	20.3		14.4	11.9	
Delay (s)	88.1	53.3		66.4	42.1		70.0	49.8		43.2	41.6	
Level of Service	F	D		E	D		E	D		D	D	
Approach Delay (s)		60.3			47.8			51.9			41.7	
Approach LOS		E			D			D			D	

Intersection Summary

HCM Average Control Delay	50.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	89.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	98.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	5	3	8	1335	1307	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	3	8	1405	1376	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					745	
pX, platoon unblocked						
vC, conflicting volume	2097	690	1380			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2097	690	1380			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	88	99	98			
cM capacity (veh/h)	45	392	503			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	8	8	703	703	917	463
Volume Left	5	8	0	0	0	0
Volume Right	3	0	0	0	0	4
cSH	68	503	1700	1700	1700	1700
Volume to Capacity	0.12	0.02	0.41	0.41	0.54	0.27
Queue Length 95th (ft)	10	1	0	0	0	0
Control Delay (s)	65.8	12.3	0.0	0.0	0.0	0.0
Lane LOS	F	B				
Approach Delay (s)	65.8	0.1			0.0	
Approach LOS	F					

Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization		46.9%		ICU Level of Service		A
Analysis Period (min)		15				

Queues

6: Waterman & Washington

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	732	1452	21	954	651	5	310	309	252
v/c Ratio	0.99	0.68	0.20	0.82	0.71	0.02	0.81	0.79	0.38
Control Delay	69.0	16.9	33.9	39.6	9.8	28.4	49.0	46.8	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.0	16.9	33.9	39.6	9.8	28.4	49.0	46.8	4.8
Queue Length 50th (ft)	233	324	10	301	35	2	186	184	0
Queue Length 95th (ft)	#352	442	34	#453	174	9	284	278	51
Internal Link Dist (ft)		433		239		527		537	
Turn Bay Length (ft)	225		100		200		125		
Base Capacity (vph)	743	2143	106	1168	912	619	451	462	729
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.68	0.20	0.82	0.71	0.01	0.69	0.67	0.35

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

6: Waterman & Washington

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	695	1377	3	20	906	618	2	2	1	577	11	239
Ideal Flow (vphpl)	1700	1900	1900	1800	1900	1900	1900	1900	1900	1800	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0	6.0		4.0		5.0	5.0	5.0
Lane Util. Factor	*1.00	*0.95		1.00	0.95	1.00		1.00		0.95	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98		0.95	0.95	1.00
Satd. Flow (prot)	3230	3609		1710	3610	1615		1812		1624	1722	1615
Flt Permitted	0.95	1.00		0.18	1.00	1.00		0.93		0.75	0.73	1.00
Satd. Flow (perm)	3230	3609		328	3610	1615		1718		1290	1320	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	732	1449	3	21	954	651	2	2	1	607	12	252
RTOR Reduction (vph)	0	0	0	0	0	389	0	1	0	0	0	177
Lane Group Flow (vph)	732	1452	0	21	954	262	0	4	0	310	309	75
Turn Type	Prot	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	5	2			6			8				4
Permitted Phases				6		6	8			4		4
Actuated Green, G (s)	23.0	59.4		32.4	32.4	32.4		30.6		29.6	29.6	29.6
Effective Green, g (s)	23.0	59.4		32.4	32.4	32.4		30.6		29.6	29.6	29.6
Actuated g/C Ratio	0.23	0.59		0.32	0.32	0.32		0.31		0.30	0.30	0.30
Clearance Time (s)	4.0	6.0		6.0	6.0	6.0		4.0		5.0	5.0	5.0
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)	743	2144		106	1170	523		526		382	391	478
v/s Ratio Prot	c0.23	0.40			c0.26							
v/s Ratio Perm				0.06		0.16		0.00		c0.24	0.23	0.05
v/c Ratio	0.99	0.68		0.20	0.82	0.50		0.01		0.81	0.79	0.16
Uniform Delay, d1	38.3	13.8		24.4	31.1	27.3		24.1		32.6	32.3	26.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	29.1	1.7		4.1	6.3	3.4		0.0		12.3	10.4	0.2
Delay (s)	67.4	15.5		28.6	37.4	30.7		24.1		44.9	42.8	26.1
Level of Service	E	B		C	D	C		C		D	D	C
Approach Delay (s)		32.9			34.6			24.1			38.7	
Approach LOS		C			C			C			D	

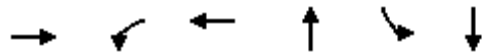
Intersection Summary

HCM Average Control Delay	34.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

7: S Tippecanoe & E Victoria

12/16/2013



Lane Group	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	2	74	38	1475	31	1290
v/c Ratio	0.01	0.49	0.19	0.57	0.16	0.50
Control Delay	19.0	34.9	15.4	6.8	7.4	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	34.9	15.4	6.8	7.4	6.1
Queue Length 50th (ft)	0	26	5	128	3	103
Queue Length 95th (ft)	5	58	26	224	17	180
Internal Link Dist (ft)	87		770	198		507
Turn Bay Length (ft)		100			115	
Base Capacity (vph)	406	363	450	2588	191	2599
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.20	0.08	0.57	0.16	0.50

Intersection Summary

HCM Signalized Intersection Capacity Analysis

7: S Tippecanoe & E Victoria

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕↕		↕	↕↕	
Volume (vph)	1	0	1	70	1	35	0	1355	47	29	1223	3
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)		6.0		6.0	6.0			7.5		7.5	7.5	
Lane Util. Factor		1.00		1.00	1.00			0.95		1.00	0.95	
Frt		0.93		1.00	0.85			1.00		1.00	1.00	
Flt Protected		0.98		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1729		1710	1622			3592		1710	3609	
Flt Permitted		0.86		0.76	1.00			1.00		0.15	1.00	
Satd. Flow (perm)		1520		1362	1622			3592		265	3609	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1	0	1	74	1	37	0	1426	49	31	1287	3
RTOR Reduction (vph)	0	1	0	0	22	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	1	0	74	16	0	0	1472	0	31	1290	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.6		7.6	7.6			42.9		42.9	42.9	
Effective Green, g (s)		5.6		5.6	5.6			40.9		40.9	40.9	
Actuated g/C Ratio		0.09		0.09	0.09			0.68		0.68	0.68	
Clearance Time (s)		4.0		4.0	4.0			5.5		5.5	5.5	
Vehicle Extension (s)		3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		142		127	151			2449		181	2460	
v/s Ratio Prot					0.01			c0.41			0.36	
v/s Ratio Perm		0.00		c0.05						0.12		
v/c Ratio		0.01		0.58	0.11			0.60		0.17	0.52	
Uniform Delay, d1		24.7		26.1	24.9			5.2		3.4	4.7	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.0		6.7	0.3			1.1		2.0	0.8	
Delay (s)		24.7		32.7	25.2			6.3		5.5	5.5	
Level of Service		C		C	C			A		A	A	
Approach Delay (s)		24.7			30.2			6.3			5.5	
Approach LOS		C			C			A			A	

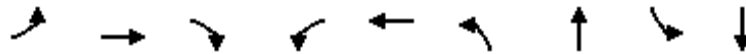
Intersection Summary

HCM Average Control Delay	6.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	101	121	161	158	339	579	1598	85	1068
v/c Ratio	0.95	0.83	0.36	0.65	0.87	0.94	0.50	0.77	0.62
Control Delay	108.3	70.0	6.8	37.5	46.5	53.0	6.5	66.8	19.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	108.3	70.0	6.8	37.5	46.5	53.0	6.5	66.8	19.9
Queue Length 50th (ft)	41	47	0	57	114	115	67	30	126
Queue Length 95th (ft)	#129	#135	42	#127	#243	#212	132	#105	167
Internal Link Dist (ft)		517			1151		777		1167
Turn Bay Length (ft)	210			85		260		100	
Base Capacity (vph)	114	156	474	262	417	615	3170	112	1727
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.78	0.34	0.60	0.81	0.94	0.50	0.76	0.62

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖	↖	↖	↖		↖↖	↖↖↖		↖	↖↖↖	
Volume (vph)	148	63	153	150	211	111	550	1403	115	81	920	95
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1700	1900	1900	1800	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		*1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	0.99	
Flt Protected	0.95	0.98	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1624	1765	1615	1710	1802		3230	5128		1710	5114	
Flt Permitted	0.31	0.40	1.00	0.68	1.00		0.95	1.00		0.19	1.00	
Satd. Flow (perm)	526	722	1615	1216	1802		3230	5128		333	5114	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	156	66	161	158	222	117	579	1477	121	85	968	100
RTOR Reduction (vph)	0	0	129	0	30	0	0	14	0	0	19	0
Lane Group Flow (vph)	101	121	32	158	309	0	579	1584	0	85	1049	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)	15.0	15.0	15.0	15.0	15.0		14.4	42.0		23.6	23.6	
Effective Green, g (s)	13.0	13.0	13.0	13.0	13.0		12.4	40.0		21.6	21.6	
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20		0.19	0.62		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)	105	144	323	243	360		616	3156		111	1699	
v/s Ratio Prot					0.17		c0.18	0.31				0.21
v/s Ratio Perm	c0.19	0.17	0.02	0.13						c0.26		
v/c Ratio	0.96	0.84	0.10	0.65	0.86		0.94	0.50		0.77	0.62	
Uniform Delay, d1	25.8	25.0	21.2	23.9	25.1		25.9	7.0		19.4	18.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.15	0.85		1.00	1.00	
Incremental Delay, d2	75.2	33.4	0.1	6.1	18.1		18.6	0.4		38.8	1.7	
Delay (s)	101.0	58.4	21.4	30.0	43.2		48.3	6.3		58.2	19.9	
Level of Service	F	E	C	C	D		D	A		E	B	
Approach Delay (s)		54.1			39.0			17.5			22.7	
Approach LOS		D			D			B			C	

Intersection Summary

HCM Average Control Delay	24.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	81.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection has too many lanes per leg.

HCM All-Way analysis is limited to two lanes per leg.

Channelized right turn lanes are not counted.

Queues

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

12/16/2013



Lane Group	EBL	EBT	EBR	NBT	SBL	SBT
Lane Group Flow (vph)	497	486	460	918	123	933
v/c Ratio	0.88	0.79	0.77	0.70	0.63	0.55
Control Delay	39.4	27.7	25.5	21.9	32.8	23.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.4	27.7	25.5	21.9	32.8	23.8
Queue Length 50th (ft)	176	143	135	153	26	212
Queue Length 95th (ft)	#331	#282	#264	#228	m33	m241
Internal Link Dist (ft)		1164		1201		347
Turn Bay Length (ft)	275					
Base Capacity (vph)	605	653	631	1320	204	1695
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.74	0.73	0.70	0.60	0.55

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.

HCM Signalized Intersection Capacity Analysis

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	737	0	634	0	0	0	0	650	222	117	886	0
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900	1900	1900	1900	1800	1900	1900
Total Lost time (s)	6.0	6.0	4.0					7.0		6.0	7.0	
Lane Util. Factor	*1.00	*1.00	0.95					*1.00		0.97	0.95	
Frt	1.00	0.94	0.85					0.96		1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1710	1729	1534					3655		3317	3610	
Flt Permitted	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1710	1729	1534					3655		3317	3610	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	776	0	667	0	0	0	0	684	234	123	933	0
RTOR Reduction (vph)	0	43	43	0	0	0	0	54	0	0	0	0
Lane Group Flow (vph)	497	443	417	0	0	0	0	864	0	123	933	0
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)	23.5	23.5	23.5					23.7		4.8	32.5	
Effective Green, g (s)	21.5	21.5	23.5					21.7		2.8	30.5	
Actuated g/C Ratio	0.33	0.33	0.36					0.33		0.04	0.47	
Clearance Time (s)	4.0	4.0	4.0					5.0		4.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0					2.0		2.0	2.0	
Lane Grp Cap (vph)	566	572	555					1220		143	1694	
v/s Ratio Prot								c0.24		0.04	c0.26	
v/s Ratio Perm	c0.29	0.26	0.27									
v/c Ratio	0.88	0.77	0.75					0.71		0.86	0.55	
Uniform Delay, d1	20.5	19.6	18.2					18.9		30.9	12.3	
Progression Factor	1.00	1.00	1.00					1.00		0.81	1.77	
Incremental Delay, d2	14.0	5.9	5.1					3.5		20.1	0.6	
Delay (s)	34.5	25.5	23.3					22.4		45.1	22.5	
Level of Service	C	C	C					C		D	C	
Approach Delay (s)		27.9			0.0			22.4			25.1	
Approach LOS		C			A			C			C	

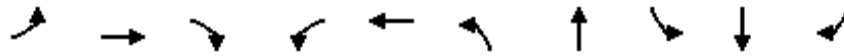
Intersection Summary

HCM Average Control Delay	25.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	113.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues

11: Anderson & Academy

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	579	298	475	100	339	213	549	32	1189	448
v/c Ratio	1.02	0.46	0.67	0.53	0.97	0.91	0.33	0.12	0.99	0.54
Control Delay	65.0	22.9	16.7	28.6	77.1	59.0	13.1	18.9	49.9	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.0	22.9	16.7	28.6	77.1	59.0	13.1	18.9	49.9	4.7
Queue Length 50th (ft)	~229	110	95	27	79	58	79	10	285	0
Queue Length 95th (ft)	#436	182	204	#58	#163	#175	113	29	#427	59
Internal Link Dist (ft)		21			32		1375		514	
Turn Bay Length (ft)	75			100		100		100		
Base Capacity (vph)	568	649	704	188	348	233	1679	268	1203	837
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	1.02	0.46	0.67	0.53	0.97	0.91	0.33	0.12	0.99	0.54

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.

HCM Signalized Intersection Capacity Analysis

11: Anderson & Academy

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	550	283	451	95	276	46	202	504	17	30	1130	426
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	4.0	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	0.95		1.00	0.95		1.00	*0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1710	1900	1615	1710	3533		1710	3592		1710	3610	1615
Flt Permitted	0.34	1.00	1.00	0.58	1.00		0.14	1.00		0.45	1.00	1.00
Satd. Flow (perm)	610	1900	1615	1041	3533		248	3592		804	3610	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	579	298	475	100	291	48	213	531	18	32	1189	448
RTOR Reduction (vph)	0	0	153	0	18	0	0	3	0	0	0	300
Lane Group Flow (vph)	579	298	322	100	321	0	213	546	0	32	1189	148
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)	32.8	25.6	25.6	11.0	7.8		35.0	35.0		25.0	25.0	25.0
Effective Green, g (s)	32.8	25.6	25.6	11.0	7.8		35.0	35.0		25.0	25.0	25.0
Actuated g/C Ratio	0.43	0.34	0.34	0.15	0.10		0.46	0.46		0.33	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	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	569	642	545	179	364		230	1659		265	1191	533
v/s Ratio Prot	c0.28	0.16		0.02	0.09		c0.07	0.15			0.33	
v/s Ratio Perm	c0.16		0.20	0.06			c0.35			0.04		0.09
v/c Ratio	1.02	0.46	0.59	0.56	0.88		0.93	0.33		0.12	1.00	0.28
Uniform Delay, d1	19.0	19.7	20.8	29.5	33.5		17.2	12.9		17.7	25.4	18.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	42.2	0.5	1.7	3.7	21.3		39.2	0.1		0.2	25.5	0.3
Delay (s)	61.2	20.2	22.5	33.2	54.9		56.5	13.1		17.9	50.9	19.0
Level of Service	E	C	C	C	D		E	B		B	D	B
Approach Delay (s)		38.6			49.9			25.2			41.7	
Approach LOS		D			D			C			D	

Intersection Summary

HCM Average Control Delay	38.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	75.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	97.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues

12: California & WB I-10 Ramps

12/16/2013



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	1316	1080	922	1262	424	396
v/c Ratio	1.55	1.45	1.69	0.78	0.63	0.71
Control Delay	279.9	238.2	340.3	37.3	58.0	12.8
Queue Delay	222.1	0.0	0.0	13.3	0.0	0.0
Total Delay	502.0	238.2	340.3	50.5	58.0	12.8
Queue Length 50th (ft)	~1559	~1236	~1094	535	125	0
Queue Length 95th (ft)	#1824	#1499	m#831	m418	164	101
Internal Link Dist (ft)	1118			276	113	
Turn Bay Length (ft)						
Base Capacity (vph)	851	746	544	1611	678	555
Starvation Cap Reductn	0	0	0	352	0	0
Spillback Cap Reductn	206	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	2.04	1.45	1.69	1.00	0.63	0.71

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.

HCM Signalized Intersection Capacity Analysis

12: California & WB I-10 Ramps

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕	↗	↖	↑↑			↑↑↑	↗
Volume (vph)	0	0	0	1202	48	1026	876	1199	0	0	403	376
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1800	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	7.0	6.0	6.0			5.0	5.0
Lane Util. Factor					1.00	1.00	1.00	*0.95			0.91	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1813	1615	1710	3610			5187	1615
Flt Permitted					0.95	1.00	0.23	1.00			1.00	1.00
Satd. Flow (perm)					1813	1615	419	3610			5187	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	1265	51	1080	922	1262	0	0	424	396
RTOR Reduction (vph)	0	0	0	0	0	13	0	0	0	0	0	344
Lane Group Flow (vph)	0	0	0	0	1316	1067	922	1262	0	0	424	52
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases					8		1	6			2	
Permitted Phases				8		8	6					2
Actuated Green, G (s)					61.0	61.0	60.0	60.0			19.0	19.0
Effective Green, g (s)					61.0	59.0	58.0	58.0			17.0	17.0
Actuated g/C Ratio					0.47	0.45	0.45	0.45			0.13	0.13
Clearance Time (s)					5.0	5.0	4.0	4.0			3.0	3.0
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					851	733	544	1611			678	211
v/s Ratio Prot							c0.47	0.35			0.08	
v/s Ratio Perm					0.73	0.66	c0.29					0.03
v/c Ratio					1.55	1.46	1.69	0.78			0.63	0.25
Uniform Delay, d1					34.5	35.5	34.6	30.7			53.5	50.7
Progression Factor					1.00	1.00	1.05	1.19			1.00	1.00
Incremental Delay, d2					251.7	212.9	313.4	0.4			4.3	2.8
Delay (s)					286.2	248.4	349.6	36.8			57.8	53.5
Level of Service					F	F	F	D			E	D
Approach Delay (s)		0.0			269.2			168.8			55.7	
Approach LOS		A			F			F			E	

Intersection Summary

HCM Average Control Delay	196.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.58		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	181.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues

13: EB I-10 Ramps & California

12/16/2013



Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	887	872	1202	548	171	1562
v/c Ratio	2.66	2.66	0.37	0.45	0.53	0.57
Control Delay	775.2	775.1	12.9	2.2	10.6	15.5
Queue Delay	0.0	0.0	0.1	0.0	0.0	146.8
Total Delay	775.2	775.1	13.0	2.2	10.6	162.3
Queue Length 50th (ft)	~1261	~1211	177	0	55	527
Queue Length 95th (ft)	#1513	#1465	211	44	m57	m389
Internal Link Dist (ft)	1294		46			276
Turn Bay Length (ft)						
Base Capacity (vph)	334	328	3209	1208	340	2733
Starvation Cap Reductn	0	0	0	0	0	1552
Spillback Cap Reductn	50	0	728	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	3.12	2.66	0.48	0.45	0.50	1.32






















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.

HCM Signalized Intersection Capacity Analysis

13: EB I-10 Ramps & California

12/16/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations								  			 		
Volume (vph)	841	2	828	0	0	0	0	1142	521	162	1484	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1800	1900	1900	
Lane Width	12	12	8	12	12	12	12	12	12	12	12	12	
Total Lost time (s)		6.0	4.0					6.5	6.5	5.5	6.5		
Lane Util. Factor		1.00	1.00					*0.91	1.00	1.00	*1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		0.95	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		1810	1400					5187	1615	1710	3800		
Flt Permitted		0.95	1.00					1.00	1.00	0.18	1.00		
Satd. Flow (perm)		1810	1400					5187	1615	330	3800		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	885	2	872	0	0	0	0	1202	548	171	1562	0	
RTOR Reduction (vph)	0	0	48	0	0	0	0	0	209	0	0	0	
Lane Group Flow (vph)	0	887	824	0	0	0	0	1202	339	171	1562	0	
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA		
Protected Phases		4						2		1	6		
Permitted Phases	4		4						2	6			
Actuated Green, G (s)		26.0	26.0					82.4	82.4	95.5	95.5		
Effective Green, g (s)		24.0	26.0					80.4	80.4	93.5	93.5		
Actuated g/C Ratio		0.18	0.20					0.62	0.62	0.72	0.72		
Clearance Time (s)		4.0	4.0					4.5	4.5	3.5	4.5		
Vehicle Extension (s)		2.0	2.0					2.0	2.0	2.0	2.0		
Lane Grp Cap (vph)		334	280					3208	999	318	2733		
v/s Ratio Prot								0.23		0.03	c0.41		
v/s Ratio Perm		0.49	c0.59						0.21	0.36			
v/c Ratio		2.66	2.94					0.37	0.34	0.54	0.57		
Uniform Delay, d1		53.0	52.0					12.3	12.0	7.2	8.7		
Progression Factor		1.00	1.00					1.00	1.00	1.83	1.75		
Incremental Delay, d2		753.6	883.9					0.3	0.9	0.1	0.1		
Delay (s)		806.6	935.9					12.7	12.9	13.3	15.3		
Level of Service		F	F					B	B	B	B		
Approach Delay (s)		870.7			0.0			12.7			15.1		
Approach LOS		F			A			B			B		
Intersection Summary													
HCM Average Control Delay			301.4									HCM Level of Service	F
HCM Volume to Capacity ratio			1.09										
Actuated Cycle Length (s)			130.0									Sum of lost time (s)	10.5
Intersection Capacity Utilization			181.5%									ICU Level of Service	H
Analysis Period (min)			15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

14: California & Shopping Center

12/16/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	1	86	1409	31	380	1397
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	91	1483	33	400	1471
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)			652		447	
pX, platoon unblocked						
vC, conflicting volume	3035	511			1516	
vC1, stage 1 conf vol	1499					
vC2, stage 2 conf vol	1535					
vCu, unblocked vol	3035	511			1516	
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 %	94	82			10	
cM capacity (veh/h)	17	513			447	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	92	593	593	329	400	735	735
Volume Left	1	0	0	0	400	0	0
Volume Right	91	0	0	33	0	0	0
cSH	384	1700	1700	1700	447	1700	1700
Volume to Capacity	0.24	0.35	0.35	0.19	0.90	0.43	0.43
Queue Length 95th (ft)	23	0	0	0	242	0	0
Control Delay (s)	17.3	0.0	0.0	0.0	51.2	0.0	0.0
Lane LOS	C				F		
Approach Delay (s)	17.3	0.0			11.0		
Approach LOS	C						

Intersection Summary			
Average Delay		6.3	
Intersection Capacity Utilization	65.5%		ICU Level of Service C
Analysis Period (min)		15	

Queues

15: California/California & W Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	172	603	79	502	546	307	1193	722	939
v/c Ratio	1.35	0.67	0.78	0.62	0.84	1.38	0.85	1.71	0.40
Control Delay	241.2	39.5	93.6	49.1	27.8	230.0	43.0	359.8	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	241.2	39.5	93.6	49.1	27.8	230.0	43.0	359.8	10.2
Queue Length 50th (ft)	~190	183	63	201	152	~343	476	~854	167
Queue Length 95th (ft)	#339	246	#157	262	#351	#529	572	#1099	207
Internal Link Dist (ft)		1468		1180			268		572
Turn Bay Length (ft)	90		150		100			150	
Base Capacity (vph)	127	905	101	814	651	222	1405	421	2326
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.35	0.67	0.78	0.62	0.84	1.38	0.85	1.71	0.40

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.

HCM Signalized Intersection Capacity Analysis

15: California/California & W Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↗	↖	↗		↖	↗	
Volume (vph)	163	332	241	75	477	519	292	1095	38	686	709	183
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	7.7	7.7		7.7	7.7	7.7	5.2	7.2		7.2	7.2	
Lane Util. Factor	1.00	*1.00		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3560		1710	3610	1615	1710	3592		1710	3499	
Flt Permitted	0.31	1.00		0.25	1.00	1.00	0.30	1.00		0.07	1.00	
Satd. Flow (perm)	565	3560		449	3610	1615	548	3592		124	3499	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	172	349	254	79	502	546	307	1153	40	722	746	193
RTOR Reduction (vph)	0	102	0	0	0	287	0	2	0	0	18	0
Lane Group Flow (vph)	172	501	0	79	502	259	307	1191	0	722	921	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		2			6			4		3	8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	31.3	31.3		31.3	31.3	31.3	52.8	52.8		87.8	87.8	
Effective Green, g (s)	29.3	29.3		29.3	29.3	29.3	52.8	50.8		85.8	85.8	
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.41	0.39		0.66	0.66	
Clearance Time (s)	5.7	5.7		5.7	5.7	5.7	5.2	5.2		5.2	5.2	
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)	127	802		101	814	364	223	1404		421	2309	
v/s Ratio Prot		0.14			0.14			0.33		c0.37	0.26	
v/s Ratio Perm	c0.30			0.18		0.16	0.56			c0.76		
v/c Ratio	1.35	0.62		0.78	0.62	0.71	1.38	0.85		1.71	0.40	
Uniform Delay, d1	50.4	45.4		47.3	45.3	46.5	38.6	36.1		42.4	10.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	202.2	1.5		31.6	1.4	6.5	195.1	5.0		331.7	0.1	
Delay (s)	252.5	46.9		78.9	46.7	52.9	233.7	41.1		374.1	10.3	
Level of Service	F	D		E	D	D	F	D		F	B	
Approach Delay (s)		92.5			52.0			80.5			168.4	
Approach LOS		F			D			F			F	

Intersection Summary

HCM Average Control Delay	104.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.56		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.9
Intersection Capacity Utilization	120.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues

16: Alabama St & WB I-10 Ramps

12/16/2013



Lane Group	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	1721	545	695	576
v/c Ratio	1.06	1.17	0.43	0.92
Control Delay	75.6	130.4	23.9	71.4
Queue Delay	0.0	6.5	0.3	0.0
Total Delay	75.6	136.9	24.2	71.4
Queue Length 50th (ft)	~785	~485	198	226
Queue Length 95th (ft)	#920	#726	227	#330
Internal Link Dist (ft)	765		376	271
Turn Bay Length (ft)				
Base Capacity (vph)	1619	467	1611	623
Starvation Cap Reductn	0	6	382	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.06	1.18	0.57	0.92


















Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

16: Alabama St & WB I-10 Ramps

12/16/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	0	0	0	538	671	427	518	660	0	0	394	153	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1800	1900	1900	1900	1900	1900	
Total Lost time (s)					6.5		6.0	8.0			8.0		
Lane Util. Factor					*1.00		1.00	0.95			*1.00		
Flt					0.96		1.00	1.00			0.96		
Flt Protected					0.98		0.95	1.00			1.00		
Satd. Flow (prot)					3592		1710	3610			3641		
Flt Permitted					0.98		0.15	1.00			1.00		
Satd. Flow (perm)					3592		267	3610			3641		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	0	0	0	566	706	449	545	695	0	0	415	161	
RTOR Reduction (vph)	0	0	0	0	30	0	0	0	0	0	35	0	
Lane Group Flow (vph)	0	0	0	0	1691	0	545	695	0	0	541	0	
Turn Type				Perm	NA		pm+pt	NA			NA		
Protected Phases					4		1	6			2		
Permitted Phases				4			6						
Actuated Green, G (s)					59.5		60.0	60.0			23.0		
Effective Green, g (s)					57.5		58.0	58.0			21.0		
Actuated g/C Ratio					0.44		0.45	0.45			0.16		
Clearance Time (s)					4.5		4.0	6.0			6.0		
Vehicle Extension (s)					3.0		3.0	3.0			3.0		
Lane Grp Cap (vph)					1589		463	1611			588		
v/s Ratio Prot							c0.28	0.19			0.15		
v/s Ratio Perm					0.47		c0.24						
v/c Ratio					1.06		1.18	0.43			0.92		
Uniform Delay, d1					36.2		38.5	24.7			53.7		
Progression Factor					1.00		1.06	0.93			1.00		
Incremental Delay, d2					41.8		98.5	0.8			21.8		
Delay (s)					78.1		139.5	23.7			75.5		
Level of Service					E		F	C			E		
Approach Delay (s)		0.0			78.1			74.6			75.5		
Approach LOS		A			E			E			E		
Intersection Summary													
HCM Average Control Delay			76.4		HCM Level of Service						E		
HCM Volume to Capacity ratio			1.07										
Actuated Cycle Length (s)			130.0		Sum of lost time (s)					12.5			
Intersection Capacity Utilization			111.0%		ICU Level of Service					H			
Analysis Period (min)			15										
c Critical Lane Group													

Queues

17: EB I-10 Ramps & Alabama St

12/16/2013



Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	1025	882	63	689
v/c Ratio	1.00dr	0.40	0.26	0.44
Control Delay	23.6	13.3	17.1	17.7
Queue Delay	0.7	0.0	0.0	0.0
Total Delay	24.3	13.3	17.1	17.7
Queue Length 50th (ft)	160	79	26	167
Queue Length 95th (ft)	213	118	m24	m155
Internal Link Dist (ft)	622	505		376
Turn Bay Length (ft)				
Base Capacity (vph)	1413	2179	242	1580
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	139	21	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.80	0.41	0.26	0.44

Intersection Summary

- m Volume for 95th percentile queue is metered by upstream signal.
- dr Defacto Right Lane. Recode with 1 though lane as a right lane.

HCM Signalized Intersection Capacity Analysis

17: EB I-10 Ramps & Alabama St

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕						↕↕↕		↕	↕↕	
Volume (vph)	369	3	602	0	0	0	0	697	141	60	655	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1800	1900	1900
Total Lost time (s)		7.0						8.0		7.0	7.0	
Lane Util. Factor		*1.00						0.91		1.00	0.95	
Frt		0.91						0.97		1.00	1.00	
Flt Protected		0.98						1.00		0.95	1.00	
Satd. Flow (prot)		3383						5056		1710	3610	
Flt Permitted		0.98						1.00		0.31	1.00	
Satd. Flow (perm)		3383						5056		554	3610	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	388	3	634	0	0	0	0	734	148	63	689	0
RTOR Reduction (vph)	0	66	0	0	0	0	0	43	0	0	0	0
Lane Group Flow (vph)	0	959	0	0	0	0	0	839	0	63	689	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		8						6			2	
Permitted Phases	8									2		
Actuated Green, G (s)		24.5						29.5		30.5	30.5	
Effective Green, g (s)		22.5						27.5		28.5	28.5	
Actuated g/C Ratio		0.35						0.42		0.44	0.44	
Clearance Time (s)		5.0						6.0		5.0	5.0	
Vehicle Extension (s)		2.0						2.0		2.0	2.0	
Lane Grp Cap (vph)		1171						2139		243	1583	
v/s Ratio Prot								0.17			c0.19	
v/s Ratio Perm		0.28								0.11		
v/c Ratio		1.00dr						0.39		0.26	0.44	
Uniform Delay, d1		19.4						13.0		11.6	12.7	
Progression Factor		1.00						1.00		1.23	1.31	
Incremental Delay, d2		4.3						0.5		0.2	0.1	
Delay (s)		23.7						13.5		14.5	16.7	
Level of Service		C						B		B	B	
Approach Delay (s)		23.7			0.0			13.5			16.5	
Approach LOS		C			A			B			B	

Intersection Summary

HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	111.0%	ICU Level of Service	H
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

Queues

18: Alabama St & Industrial Park

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	74	57	31	116	26	840	84	904	131
v/c Ratio	0.25	0.18	0.11	0.33	0.13	0.53	0.27	0.41	0.13
Control Delay	17.0	9.2	15.3	9.5	11.9	11.9	7.3	6.3	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.0	9.2	15.3	9.5	11.9	11.9	7.3	6.3	2.9
Queue Length 50th (ft)	13	3	6	6	4	50	7	53	4
Queue Length 95th (ft)	42	24	23	38	17	85	24	102	22
Internal Link Dist (ft)		298		379		236		505	
Turn Bay Length (ft)	100		50		150		215		55
Base Capacity (vph)	1223	1189	1223	1203	303	2457	311	2483	1138
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.05	0.03	0.10	0.09	0.34	0.27	0.36	0.12

Intersection Summary

HCM Signalized Intersection Capacity Analysis

18: Alabama St & Industrial Park

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	14	40	29	29	81	25	767	31	80	859	124
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	6.2	6.2		6.2	6.2		6.2	6.2		6.0	6.2	6.2
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.89		1.00	0.89		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1710	1690		1710	1691		1710	5156		1710	3610	1615
Flt Permitted	0.98	1.00		0.98	1.00		0.35	1.00		0.23	1.00	1.00
Satd. Flow (perm)	1756	1690		1756	1691		637	5156		416	3610	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	15	42	31	31	85	26	807	33	84	904	131
RTOR Reduction (vph)	0	37	0	0	75	0	0	7	0	0	0	40
Lane Group Flow (vph)	74	20	0	31	41	0	26	833	0	84	904	91
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		8			4			6		5	2	
Permitted Phases	8			4			6			2		2
Actuated Green, G (s)	6.1	6.1		6.1	6.1		13.3	13.3		21.6	21.6	21.6
Effective Green, g (s)	4.1	4.1		4.1	4.1		11.3	11.3		19.6	19.6	19.6
Actuated g/C Ratio	0.11	0.11		0.11	0.11		0.31	0.31		0.54	0.54	0.54
Clearance Time (s)	4.2	4.2		4.2	4.2		4.2	4.2		4.0	4.2	4.2
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)	199	192		199	192		199	1614		308	1960	877
v/s Ratio Prot		0.01			0.02			0.16		0.02	c0.25	
v/s Ratio Perm	c0.04			0.02			0.04			0.13		0.06
v/c Ratio	0.37	0.10		0.16	0.21		0.13	0.52		0.27	0.46	0.10
Uniform Delay, d1	14.8	14.4		14.4	14.5		8.9	10.2		4.5	5.0	4.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.2	0.2		0.4	0.6		0.3	0.3		0.5	0.2	0.1
Delay (s)	16.0	14.6		14.8	15.1		9.2	10.4		5.0	5.2	4.0
Level of Service	B	B		B	B		A	B		A	A	A
Approach Delay (s)		15.4			15.0			10.4			5.1	
Approach LOS		B			B			B			A	

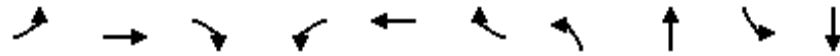
Intersection Summary

HCM Average Control Delay	8.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	36.1	Sum of lost time (s)	12.4
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

19: Alabama St & W Redlands

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	162	269	49	106	437	137	100	558	91	779
v/c Ratio	0.58	0.40	0.13	0.48	0.71	0.33	0.47	0.24	0.44	0.49
Control Delay	52.0	35.9	10.0	51.9	44.4	8.3	52.0	17.5	51.8	20.4
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	35.9	10.0	51.9	44.4	8.3	52.0	17.5	51.8	20.4
Queue Length 50th (ft)	49	76	0	32	133	0	30	72	27	162
Queue Length 95th (ft)	90	120	30	64	197	49	62	123	58	273
Internal Link Dist (ft)		1247			345			380		164
Turn Bay Length (ft)	240		240	290			115		125	
Base Capacity (vph)	439	981	508	709	1288	696	338	2310	304	1580
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	0.37	0.27	0.10	0.15	0.34	0.20	0.30	0.24	0.30	0.49

Intersection Summary

HCM Signalized Intersection Capacity Analysis

19: Alabama St & W Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗	↔↔	↑↑	↗	↔↔	↑↑↔		↔↔	↑↔	
Volume (vph)	154	256	47	101	415	130	95	473	57	86	536	204
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Total Lost time (s)	5.0	6.9	4.9	5.0	6.9	4.9	5.0	6.2		5.0	6.2	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3133	3610	1615	3133	3610	1615	3133	5103		3133	3461	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3133	3610	1615	3133	3610	1615	3133	5103		3133	3461	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	162	269	49	106	437	137	100	498	60	91	564	215
RTOR Reduction (vph)	0	0	39	0	0	111	0	10	0	0	28	0
Lane Group Flow (vph)	162	269	10	106	437	26	100	548	0	91	751	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	10.4	19.8	19.8	8.7	18.1	18.1	6.9	44.5		6.7	44.3	
Effective Green, g (s)	8.4	17.8	19.8	6.7	16.1	18.1	4.9	42.5		4.7	42.3	
Actuated g/C Ratio	0.09	0.19	0.21	0.07	0.17	0.19	0.05	0.45		0.05	0.45	
Clearance Time (s)	3.0	4.9	4.9	3.0	4.9	4.9	3.0	4.2		3.0	4.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	278	678	337	221	613	308	162	2288		155	1544	
v/s Ratio Prot	c0.05	0.07		0.03	c0.12		c0.03	0.11		0.03	c0.22	
v/s Ratio Perm			0.01			0.02						
v/c Ratio	0.58	0.40	0.03	0.48	0.71	0.08	0.62	0.24		0.59	0.49	
Uniform Delay, d1	41.5	33.8	29.9	42.4	37.2	31.5	44.0	16.2		44.1	18.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.1	0.4	0.0	1.6	3.9	0.1	6.8	0.2		5.6	1.1	
Delay (s)	44.6	34.2	29.9	44.0	41.1	31.7	50.9	16.4		49.7	19.7	
Level of Service	D	C	C	D	D	C	D	B		D	B	
Approach Delay (s)		37.3			39.6			21.6			22.8	
Approach LOS		D			D			C			C	

Intersection Summary

HCM Average Control Delay	29.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	94.8	Sum of lost time (s)	23.1
Intersection Capacity Utilization	62.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

20: Tennessee & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	15	159	57	421	801	827
v/c Ratio	0.08	0.39	0.18	0.44	0.56	0.73
Control Delay	23.6	21.9	15.1	14.6	12.5	17.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.6	21.9	15.1	14.6	12.5	17.1
Queue Length 50th (ft)	5	21	13	46	93	109
Queue Length 95th (ft)	19	44	34	79	152	#192
Internal Link Dist (ft)		2241		737	458	48
Turn Bay Length (ft)	145		140			
Base Capacity (vph)	661	1304	315	2003	1464	1159
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.12	0.18	0.21	0.55	0.71

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

20: Tennessee & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Volume (vph)	14	118	33	54	302	98	58	679	24	145	621	19
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.9	6.9		5.5	6.9			6.9			6.9	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frt	1.00	0.97		1.00	0.96			1.00			1.00	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1710	3491		1710	3478			3579			3564	
Flt Permitted	1.00	1.00		0.42	1.00			0.83			0.65	
Satd. Flow (perm)	1800	3491		758	3478			2977			2355	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	15	124	35	57	318	103	61	715	25	153	654	20
RTOR Reduction (vph)	0	32	0	0	57	0	0	3	0	0	2	0
Lane Group Flow (vph)	15	127	0	57	364	0	0	798	0	0	825	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		6		5	2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	6.0	6.0		17.1	17.1			27.9			27.9	
Effective Green, g (s)	4.0	4.0		15.1	15.1			25.9			25.9	
Actuated g/C Ratio	0.07	0.07		0.28	0.28			0.47			0.47	
Clearance Time (s)	4.9	4.9		3.5	4.9			4.9			4.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	131	255		306	958			1407			1113	
v/s Ratio Prot		0.04		0.02	c0.10							
v/s Ratio Perm	0.01			0.03				0.27			c0.35	
v/c Ratio	0.11	0.50		0.19	0.38			0.57			0.74	
Uniform Delay, d1	23.7	24.4		15.2	16.1			10.4			11.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.4	1.5		0.3	0.3			0.5			2.7	
Delay (s)	24.1	26.0		15.5	16.3			10.9			14.4	
Level of Service	C	C		B	B			B			B	
Approach Delay (s)		25.8			16.2			10.9			14.4	
Approach LOS		C			B			B			B	

Intersection Summary

HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	54.8	Sum of lost time (s)	13.8
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

21: Texas & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	27	5	31	44	80	36	65	317	23	31	444	96
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	28	5	33	46	84	38	68	334	24	33	467	101
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	967	1078	284	817	1116	179	568			358		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	967	1078	284	817	1116	179	568			358		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	77	97	95	80	56	95	93			97		
cM capacity (veh/h)	123	200	719	236	190	839	1014			1212		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	66	168	235	191	266	335
Volume Left	28	46	68	0	33	0
Volume Right	33	38	0	24	0	101
cSH	220	246	1014	1700	1212	1700
Volume to Capacity	0.30	0.68	0.07	0.11	0.03	0.20
Queue Length 95th (ft)	31	112	5	0	2	0
Control Delay (s)	28.3	46.4	3.0	0.0	1.2	0.0
Lane LOS	D	E	A		A	
Approach Delay (s)	28.3	46.4	1.7		0.5	
Approach LOS	D	E				

Intersection Summary		
Average Delay		8.5
Intersection Capacity Utilization	52.6%	ICU Level of Service
Analysis Period (min)		15
		A

HCM Unsignalized Intersection Capacity Analysis

22: Texas & Oriental

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	6	3	5	25	1	13	2	568	16	5	390	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	6	3	5	26	1	14	2	598	17	5	411	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	740	1042	207	833	1035	307	414			615		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	740	1042	207	833	1035	307	414			615		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	99	99	90	100	98	100			99		
cM capacity (veh/h)	300	230	806	259	232	695	1156			975		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	15	41	301	316	211	208
Volume Left	6	26	2	0	5	0
Volume Right	5	14	0	17	0	3
cSH	357	326	1156	1700	975	1700
Volume to Capacity	0.04	0.13	0.00	0.19	0.01	0.12
Queue Length 95th (ft)	3	11	0	0	0	0
Control Delay (s)	15.5	17.6	0.1	0.0	0.3	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	15.5	17.6	0.0		0.1	
Approach LOS	C	C				

Intersection Summary		
Average Delay		0.9
Intersection Capacity Utilization	27.7%	ICU Level of Service
Analysis Period (min)		15
		A

Queues

23: Eureka & EB I-10 off/Pearl

12/16/2013



Lane Group	EBT	EBR	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	726	688	118	28	38	78	54
v/c Ratio	0.81	0.61	0.86	0.04	0.06	0.13	0.08
Control Delay	25.3	3.4	65.9	3.2	21.1	6.6	21.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.3	3.4	65.9	3.2	21.1	6.6	21.2
Queue Length 50th (ft)	283	0	44	0	13	0	18
Queue Length 95th (ft)	364	44	#130	10	37	31	48
Internal Link Dist (ft)	447				545		418
Turn Bay Length (ft)				75			
Base Capacity (vph)	1060	1209	181	941	666	617	657
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.57	0.65	0.03	0.06	0.13	0.08

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

23: Eureka & EB I-10 off/Pearl

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖		↗		↑	↗		↕	
Volume (vph)	109	580	654	112	0	27	0	36	74	5	47	0
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0	6.0		6.0		7.0	7.0		7.0	
Lane Util. Factor		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.99	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1885	1615	1710		1615		1900	1615		1891	
Flt Permitted		0.99	1.00	0.17		1.00		1.00	1.00		0.99	
Satd. Flow (perm)		1885	1615	314		1615		1900	1615		1872	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	115	611	688	118	0	28	0	38	78	5	49	0
RTOR Reduction (vph)	0	0	362	0	0	14	0	0	51	0	0	0
Lane Group Flow (vph)	0	726	326	118	0	14	0	38	27	0	54	0
Turn Type	Perm	NA	Perm	custom		custom		NA	Perm	Perm	NA	
Protected Phases		8						2				6
Permitted Phases	8	8	8	3		3			2	6		
Actuated Green, G (s)		39.9	39.9	40.9		40.9		30.1	30.1		30.1	
Effective Green, g (s)		37.9	37.9	38.9		38.9		28.1	28.1		28.1	
Actuated g/C Ratio		0.47	0.47	0.49		0.49		0.35	0.35		0.35	
Clearance Time (s)		5.0	5.0	4.0		4.0		5.0	5.0		5.0	
Vehicle Extension (s)		2.0	2.0	2.0		2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)		893	765	153		785		667	567		658	
v/s Ratio Prot								0.02				
v/s Ratio Perm		0.39	0.20	0.38		0.01			0.02		c0.03	
v/c Ratio		0.81	0.43	0.77		0.02		0.06	0.05		0.08	
Uniform Delay, d1		18.0	13.9	16.9		10.6		17.2	17.1		17.3	
Progression Factor		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Incremental Delay, d2		5.4	0.1	19.4		0.0		0.2	0.2		0.2	
Delay (s)		23.4	14.0	36.3		10.7		17.3	17.3		17.6	
Level of Service		C	B	D		B		B	B		B	
Approach Delay (s)		18.9			31.3			17.3			17.6	
Approach LOS		B			C			B			B	

Intersection Summary

HCM Average Control Delay	19.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues

24: Eureka & Stuart

12/16/2013



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	36	31	9	100	25	660
v/c Ratio	0.14	0.12	0.03	0.08	0.06	0.51
Control Delay	11.6	10.8	5.2	5.0	5.3	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.6	10.8	5.2	5.0	5.3	7.4
Queue Length 50th (ft)	4	3	1	3	2	27
Queue Length 95th (ft)	17	15	4	10	8	51
Internal Link Dist (ft)	380	399		136		545
Turn Bay Length (ft)			20		20	
Base Capacity (vph)	881	882	439	2007	695	2010
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.04	0.02	0.05	0.04	0.33

Intersection Summary

HCM Signalized Intersection Capacity Analysis

24: Eureka & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (vph)	16	16	2	12	12	5	9	90	5	24	572	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.98		1.00	0.99		1.00	0.99	
Flt Protected		0.98			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1841			1816		1710	3579		1709	3562	
Flt Permitted		0.83			0.85		0.43	1.00		0.69	1.00	
Satd. Flow (perm)		1571			1571		783	3579		1239	3562	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	17	17	2	13	13	5	9	95	5	25	602	58
RTOR Reduction (vph)	0	2	0	0	4	0	0	3	0	0	18	0
Lane Group Flow (vph)	0	34	0	0	27	0	9	97	0	25	642	0
Confl. Peds. (#/hr)	1		2	2		1			1	1		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.2			6.2		11.2	11.2		11.2	11.2	
Effective Green, g (s)		4.2			4.2		9.2	9.2		9.2	9.2	
Actuated g/C Ratio		0.17			0.17		0.36	0.36		0.36	0.36	
Clearance Time (s)		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	
Lane Grp Cap (vph)		260			260		284	1296		449	1290	
v/s Ratio Prot								0.03			c0.18	
v/s Ratio Perm		c0.02			0.02		0.01			0.02		
v/c Ratio		0.13			0.10		0.03	0.07		0.06	0.50	
Uniform Delay, d1		9.0			9.0		5.2	5.3		5.3	6.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.2		0.0	0.0		0.1	0.3	
Delay (s)		9.3			9.2		5.3	5.3		5.3	6.6	
Level of Service		A			A		A	A		A	A	
Approach Delay (s)		9.3			9.2			5.3			6.6	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	25.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	31.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

25: Eureka & Oriental

12/16/2013



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	21	29	6	105	14	602
v/c Ratio	0.09	0.11	0.02	0.06	0.02	0.33
Control Delay	12.5	13.8	4.5	4.5	4.5	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.5	13.8	4.5	4.5	4.5	5.4
Queue Length 50th (ft)	3	5	1	4	1	27
Queue Length 95th (ft)	14	18	3	10	5	46
Internal Link Dist (ft)	432	448		184		93
Turn Bay Length (ft)			25		40	
Base Capacity (vph)	362	416	427	2017	690	2003
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.07	0.01	0.05	0.02	0.30

Intersection Summary

HCM Signalized Intersection Capacity Analysis

25: Eureka & Oriental

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (vph)	6	9	6	0	26	2	6	99	1	13	520	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)		6.2			6.2		6.2	6.2		6.2	6.2	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.96			0.99		1.00	1.00		1.00	0.99	
Flt Protected		0.99			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1787			1879		1709	3604		1709	3553	
Flt Permitted		0.89			1.00		0.42	1.00		0.69	1.00	
Satd. Flow (perm)		1619			1879		763	3604		1233	3553	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	9	6	0	27	2	6	104	1	14	547	55
RTOR Reduction (vph)	0	5	0	0	2	0	0	0	0	0	18	0
Lane Group Flow (vph)	0	16	0	0	27	0	6	105	0	14	584	0
Confl. Peds. (#/hr)	6		1	1		6	2		1	1		2
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			5			7				3
Permitted Phases	1			5			7			3		
Actuated Green, G (s)		7.0			7.0		20.0	20.0		20.0	20.0	
Effective Green, g (s)		5.0			5.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio		0.14			0.14		0.51	0.51		0.51	0.51	
Clearance Time (s)		4.2			4.2		4.2	4.2		4.2	4.2	
Vehicle Extension (s)		2.5			2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		229			265		388	1833		627	1807	
v/s Ratio Prot					c0.01			0.03				c0.16
v/s Ratio Perm		0.01					0.01			0.01		
v/c Ratio		0.07			0.10		0.02	0.06		0.02	0.32	
Uniform Delay, d1		13.2			13.2		4.3	4.4		4.3	5.1	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			0.1		0.0	0.0		0.0	0.1	
Delay (s)		13.3			13.4		4.3	4.4		4.3	5.2	
Level of Service		B			B		A	A		A	A	
Approach Delay (s)		13.3			13.4			4.4			5.2	
Approach LOS		B			B			A			A	

Intersection Summary

HCM Average Control Delay	5.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	35.4	Sum of lost time (s)	12.4
Intersection Capacity Utilization	33.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

26: Eureka & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	11	187	20	633	137	517
v/c Ratio	0.05	0.17	0.06	0.58	0.15	0.53
Control Delay	10.2	9.2	10.0	12.7	8.4	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.2	9.2	10.0	12.7	8.4	10.8
Queue Length 50th (ft)	1	11	2	45	7	31
Queue Length 95th (ft)	10	33	14	107	24	77
Internal Link Dist (ft)		660		354	209	138
Turn Bay Length (ft)	35		40			
Base Capacity (vph)	400	1934	614	1939	1957	1980
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.10	0.03	0.33	0.07	0.26

Intersection Summary

HCM Signalized Intersection Capacity Analysis

26: Eureka & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	166	11	19	575	27	14	97	19	65	332	95
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6		6.6	6.6			6.2			6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.98			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1709	3572		1705	3584			3505			3474	
Flt Permitted	0.41	1.00		0.63	1.00			0.88			0.89	
Satd. Flow (perm)	740	3572		1138	3584			3104			3111	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	175	12	20	605	28	15	102	20	68	349	100
RTOR Reduction (vph)	0	8	0	0	7	0	0	14	0	0	49	0
Lane Group Flow (vph)	11	179	0	20	626	0	0	123	0	0	468	0
Confl. Peds. (#/hr)	3		7	7		3	2		1	1		2
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			4	
Permitted Phases	6			2			4			4		
Actuated Green, G (s)	12.3	12.3		12.3	12.3			12.2			12.2	
Effective Green, g (s)	10.3	10.3		10.3	10.3			10.2			10.2	
Actuated g/C Ratio	0.31	0.31		0.31	0.31			0.31			0.31	
Clearance Time (s)	4.6	4.6		4.6	4.6			4.2			4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	229	1105		352	1109			951			953	
v/s Ratio Prot		0.05			c0.17							
v/s Ratio Perm	0.01			0.02				0.04			c0.15	
v/c Ratio	0.05	0.16		0.06	0.56			0.13			0.49	
Uniform Delay, d1	8.1	8.4		8.1	9.6			8.3			9.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	0.1		0.1	0.7			0.1			0.4	
Delay (s)	8.1	8.4		8.2	10.3			8.4			9.8	
Level of Service	A	A		A	B			A			A	
Approach Delay (s)		8.4			10.2			8.4			9.8	
Approach LOS		A			B			A			A	

Intersection Summary

HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	12.8
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
27: Orange & Colton

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	154	553	296	354	124	16	267	93	735
v/c Ratio	0.35	0.61	1.03	0.38	0.15	0.10	0.22	0.26	0.60
Control Delay	12.6	14.2	82.3	11.9	2.3	19.9	16.3	21.2	22.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	14.2	82.3	11.9	2.3	19.9	16.3	21.2	22.3
Queue Length 50th (ft)	35	131	112	82	0	5	40	31	142
Queue Length 95th (ft)	72	218	#270	134	21	19	67	67	200
Internal Link Dist (ft)		502		260			472		133
Turn Bay Length (ft)	50		65		65	50		75	
Base Capacity (vph)	480	978	310	1004	912	164	1214	358	1215
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.57	0.95	0.35	0.14	0.10	0.22	0.26	0.60

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

27: Orange & Colton

12/16/2013



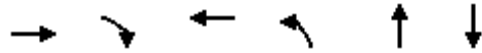
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	146	341	184	281	336	118	15	215	39	88	630	68
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	1800		1710	1900	1615	1710	3527		1710	3557	
Flt Permitted	0.51	1.00		0.33	1.00	1.00	0.27	1.00		0.59	1.00	
Satd. Flow (perm)	910	1800		587	1900	1615	482	3527		1057	3557	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	154	359	194	296	354	124	16	226	41	93	663	72
RTOR Reduction (vph)	0	29	0	0	0	63	0	20	0	0	11	0
Lane Group Flow (vph)	154	524	0	296	354	61	16	247	0	93	724	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	36.3	36.3		36.3	36.3	36.3	25.7	25.7		25.7	25.7	
Effective Green, g (s)	34.3	34.3		34.3	34.3	34.3	23.7	23.7		23.7	23.7	
Actuated g/C Ratio	0.49	0.49		0.49	0.49	0.49	0.34	0.34		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	3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	446	882		288	931	791	163	1194		358	1204	
v/s Ratio Prot		0.29			0.19			0.07			c0.20	
v/s Ratio Perm	0.17			c0.50		0.04	0.03			0.09		
v/c Ratio	0.35	0.59		1.03	0.38	0.08	0.10	0.21		0.26	0.60	
Uniform Delay, d1	11.0	12.8		17.9	11.2	9.5	15.8	16.5		16.8	19.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.1		60.4	0.3	0.0	1.2	0.4		1.8	2.2	
Delay (s)	11.4	13.9		78.2	11.4	9.5	17.0	16.9		18.5	21.5	
Level of Service	B	B		E	B	A	B	B		B	C	
Approach Delay (s)		13.4			36.7			16.9			21.1	
Approach LOS		B			D			B			C	

Intersection Summary

HCM Average Control Delay	23.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues
28: Pearl & Orange

12/16/2013



Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	874	211	350	2	819	365
v/c Ratio	0.99	0.20	0.34	0.01	0.92	0.52
Control Delay	46.9	5.8	8.7	27.0	51.3	32.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.9	5.8	8.7	27.0	51.3	32.8
Queue Length 50th (ft)	441	34	81	1	228	94
Queue Length 95th (ft)	#745	63	130	7	#337	139
Internal Link Dist (ft)	445		279		526	472
Turn Bay Length (ft)		20		75		
Base Capacity (vph)	881	1040	1015	200	886	704
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.20	0.34	0.01	0.92	0.52

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

28: Pearl & Orange

12/16/2013



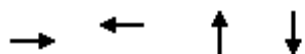
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↖	↕			↕	↗
Volume (vph)	321	509	200	18	47	268	2	765	13	10	319	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1800	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	*1.00			0.95	
Frt		1.00	0.85		0.89		1.00	1.00			0.99	
Flt Protected		0.98	1.00		1.00		0.95	1.00			1.00	
Satd. Flow (prot)		1864	1615		1689		1710	3790			3578	
Flt Permitted		0.73	1.00		0.94		0.48	1.00			0.84	
Satd. Flow (perm)		1391	1615		1599		859	3790			2999	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	338	536	211	19	49	282	2	805	14	11	336	18
RTOR Reduction (vph)	0	0	17	0	3	0	0	2	0	0	4	0
Lane Group Flow (vph)	0	874	194	0	347	0	2	817	0	0	361	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4		4	4		2	2		2	2	
Permitted Phases	4		4	4			2			2		
Actuated Green, G (s)		59.0	59.0		59.0		23.0	23.0			23.0	
Effective Green, g (s)		57.0	57.0		57.0		21.0	21.0			21.0	
Actuated g/C Ratio		0.63	0.63		0.63		0.23	0.23			0.23	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.5	3.5			3.5	
Lane Grp Cap (vph)		881	1023		1013		200	884			700	
v/s Ratio Prot								c0.22				
v/s Ratio Perm		c0.63	0.12		0.22		0.00				0.12	
v/c Ratio		0.99	0.19		0.34		0.01	0.92			0.52	
Uniform Delay, d1		16.3	6.9		7.7		26.5	33.7			30.1	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		28.2	0.1		0.2		0.0	15.3			0.7	
Delay (s)		44.5	7.0		7.9		26.5	49.0			30.8	
Level of Service		D	A		A		C	D			C	
Approach Delay (s)		37.2			7.9			49.0			30.8	
Approach LOS		D			A			D			C	

Intersection Summary

HCM Average Control Delay	36.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	101.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues
29: Orange & Stuart

12/16/2013



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	36	85	834	754
v/c Ratio	0.13	0.30	0.62	0.56
Control Delay	9.2	11.6	9.2	8.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.2	11.6	9.2	8.6
Queue Length 50th (ft)	2	7	43	38
Queue Length 95th (ft)	17	33	85	76
Internal Link Dist (ft)	305	198	150	526
Turn Bay Length (ft)				
Base Capacity (vph)	1150	1101	2573	2592
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.03	0.08	0.32	0.29
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

29: Orange & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	9	7	19	40	10	30	6	729	58	6	697	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.2			6.2			6.2			6.2	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frbp, ped/bikes		0.99			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.93			0.95			0.99			1.00	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1723			1750			3563			3597	
Flt Permitted		0.89			0.83			0.95			0.95	
Satd. Flow (perm)		1549			1480			3380			3406	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	9	7	20	42	11	32	6	767	61	6	734	14
RTOR Reduction (vph)	0	17	0	0	26	0	0	10	0	0	2	0
Lane Group Flow (vph)	0	19	0	0	59	0	0	824	0	0	752	0
Confl. Peds. (#/hr)	4		2	2		4	3		2	2		3
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.0			7.0			13.5			13.5	
Effective Green, g (s)		5.0			5.0			11.5			11.5	
Actuated g/C Ratio		0.17			0.17			0.40			0.40	
Clearance Time (s)		4.2			4.2			4.2			4.2	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		268			256			1345			1355	
v/s Ratio Prot												
v/s Ratio Perm		0.01			0.04			0.24			0.22	
v/c Ratio		0.07			0.23			0.61			0.55	
Uniform Delay, d1		10.0			10.3			6.9			6.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.5			0.8			0.5	
Delay (s)		10.1			10.7			7.8			7.2	
Level of Service		B			B			A			A	
Approach Delay (s)		10.1			10.7			7.8			7.2	
Approach LOS		B			B			A			A	

Intersection Summary

HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	28.9	Sum of lost time (s)	12.4
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

30: Orange & Oriental

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	3	1	1	770	730	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	3	1	1	811	768	2
Pedestrians	2			1		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	4.0			4.0		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				464	395	
pX, platoon unblocked	0.85					
vC, conflicting volume	1179	388	773			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	859	388	773			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	254	614	850			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	4	271	540	512	258
Volume Left	3	1	0	0	0
Volume Right	1	0	0	0	2
cSH	298	850	1700	1700	1700
Volume to Capacity	0.01	0.00	0.32	0.30	0.15
Queue Length 95th (ft)	1	0	0	0	0
Control Delay (s)	17.3	0.0	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	17.3	0.0		0.0	
Approach LOS	C				

Intersection Summary

Average Delay		0.1			
Intersection Capacity Utilization		32.3%		ICU Level of Service	A
Analysis Period (min)		15			

Queues

31: Orange & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	52	171	24	498	39	657	106	727
v/c Ratio	0.21	0.14	0.12	0.70	0.24	0.75	0.35	0.46
Control Delay	15.6	10.9	22.7	22.0	23.0	26.7	13.4	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.6	10.9	22.7	22.0	23.0	26.7	13.4	12.4
Queue Length 50th (ft)	12	15	7	61	11	112	20	84
Queue Length 95th (ft)	34	37	26	114	37	184	51	146
Internal Link Dist (ft)		387		273		223		384
Turn Bay Length (ft)	60		60		75		60	
Base Capacity (vph)	252	1608	334	1080	230	1227	324	1974
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.11	0.07	0.46	0.17	0.54	0.33	0.37

Intersection Summary

HCM Signalized Intersection Capacity Analysis

31: Orange & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	49	120	43	23	304	169	37	606	18	101	600	90
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	5.5	6.2		6.2	6.2		6.2	6.2		5.5	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.95		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3468		1710	3401		1708	3593		1710	3533	
Flt Permitted	0.25	1.00		0.64	1.00		0.38	1.00		0.20	1.00	
Satd. Flow (perm)	453	3468		1159	3401		675	3593		369	3533	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	52	126	45	24	320	178	39	638	19	106	632	95
RTOR Reduction (vph)	0	29	0	0	117	0	0	3	0	0	17	0
Lane Group Flow (vph)	52	142	0	24	381	0	39	654	0	106	710	0
Confl. Peds. (#/hr)	1					1	3		1	1		3
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	22.1	22.1		12.4	12.4		16.3	16.3		27.6	27.6	
Effective Green, g (s)	20.1	20.1		10.4	10.4		14.3	14.3		25.6	25.6	
Actuated g/C Ratio	0.35	0.35		0.18	0.18		0.25	0.25		0.44	0.44	
Clearance Time (s)	3.5	4.2		4.2	4.2		4.2	4.2		3.5	4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	248	1200		207	609		166	884		296	1557	
v/s Ratio Prot	c0.02	0.04			c0.11			c0.18		0.04	c0.20	
v/s Ratio Perm	0.06			0.02			0.06			0.12		
v/c Ratio	0.21	0.12		0.12	0.63		0.23	0.74		0.36	0.46	
Uniform Delay, d1	13.3	13.0		20.0	22.1		17.5	20.2		10.6	11.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.0		0.3	2.0		0.7	3.3		0.7	0.2	
Delay (s)	13.7	13.0		20.2	24.1		18.3	23.5		11.4	11.6	
Level of Service	B	B		C	C		B	C		B	B	
Approach Delay (s)		13.2			23.9			23.2			11.6	
Approach LOS		B			C			C			B	

Intersection Summary

HCM Average Control Delay	18.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	58.1	Sum of lost time (s)	24.1
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 32: 6th St & WB I-10 Ramp

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	527	50	547	0	170	0	0	330	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	555	53	576	0	179	0	0	347	0
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)												
pX, platoon unblocked												
vC, conflicting volume	1128	526	347	526	526	179	347			179		
vC1, stage 1 conf vol	347	347		179	179							
vC2, stage 2 conf vol	781	179		347	347							
vCu, unblocked vol	1128	526	347	526	526	179	347			179		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	11	91	34	100			100		
cM capacity (veh/h)	119	591	700	622	591	869	1223			1409		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	555	628	179	347
Volume Left	555	0	0	0
Volume Right	0	576	0	0
cSH	622	836	1700	1700
Volume to Capacity	0.89	0.75	0.11	0.20
Queue Length 95th (ft)	271	178	0	0
Control Delay (s)	40.5	21.1	0.0	0.0
Lane LOS	E	C		
Approach Delay (s)	30.2		0.0	0.0
Approach LOS	D			

Intersection Summary			
Average Delay		20.9	
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis

33: 6th St & EB I-10 Ramp

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗				↖	↗		↖	↗	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	124	65	320	0	0	0	225	98	34	158	344	124
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	131	68	337	0	0	0	237	103	36	166	362	131

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	199	337	237	139	166	493
Volume Left (vph)	131	0	237	0	166	0
Volume Right (vph)	0	337	0	36	0	131
Hadj (s)	0.33	-0.70	0.50	-0.18	0.50	-0.19
Departure Headway (s)	7.6	6.6	7.8	7.1	7.4	6.7
Degree Utilization, x	0.42	0.62	0.52	0.28	0.34	0.92
Capacity (veh/h)	463	535	439	490	469	529
Control Delay (s)	14.9	18.4	17.7	11.6	13.1	46.5
Approach Delay (s)	17.1		15.4		38.1	
Approach LOS	C		C		E	

Intersection Summary

Delay	25.5
HCM Level of Service	D
Intersection Capacity Utilization	59.1%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

34: 6th St & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Volume (veh/h)	5	7	13	19	9	76	10	276	7	137	582	22
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	7	14	20	9	80	11	291	7	144	613	23
Pedestrians		1						1			2	
Lane Width (ft)		12.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1312	1233	320	928	1240	296	637			298		
vC1, stage 1 conf vol	914	914		315	315							
vC2, stage 2 conf vol	398	319		613	925							
vCu, unblocked vol	1312	1233	320	928	1240	296	637			298		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	97	98	94	97	89	99			89		
cM capacity (veh/h)	227	288	681	348	284	705	956			1275		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	26	109	11	298	144	408	227
Volume Left	5	20	11	0	144	0	0
Volume Right	14	80	0	7	0	0	23
cSH	382	536	956	1700	1275	1700	1700
Volume to Capacity	0.07	0.20	0.01	0.18	0.11	0.24	0.13
Queue Length 95th (ft)	6	19	1	0	10	0	0
Control Delay (s)	15.1	13.4	8.8	0.0	8.2	0.0	0.0
Lane LOS	C	B	A		A		
Approach Delay (s)	15.1	13.4	0.3		1.5		
Approach LOS	C	B					

Intersection Summary		
Average Delay		2.6
Intersection Capacity Utilization	41.5%	ICU Level of Service
Analysis Period (min)		15
		A

Queues

35: Redlands Blvd & Citrus Ave

12/16/2013



Lane Group	EBT	WBT	SET	SER	NWT
Lane Group Flow (vph)	553	620	368	36	700
v/c Ratio	0.72	0.78	0.53	0.07	0.77
Control Delay	29.1	28.1	24.1	7.8	29.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	29.1	28.1	24.1	7.8	29.3
Queue Length 50th (ft)	109	104	63	0	132
Queue Length 95th (ft)	169	177	122	20	#237
Internal Link Dist (ft)	399	463	375		430
Turn Bay Length (ft)				100	
Base Capacity (vph)	1233	1030	834	643	1086
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.45	0.60	0.44	0.06	0.64

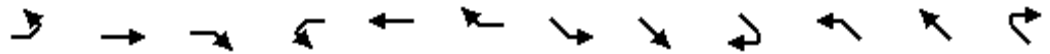
Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

35: Redlands Blvd & Citrus Ave

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕↕			↕↕			↕↕	↕		↕↕	
Volume (vph)	29	349	147	55	302	232	145	204	34	190	435	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.2			6.2	6.2		6.2	
Lane Util. Factor		0.95			0.95			*1.00	1.00		*1.00	
Frt		0.96			0.94			1.00	0.85		0.99	
Flt Protected		1.00			1.00			0.98	1.00		0.99	
Satd. Flow (prot)		3449			3381			3723	1615		3713	
Flt Permitted		1.00			1.00			0.57	1.00		0.75	
Satd. Flow (perm)		3449			3381			2168	1615		2813	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	31	367	155	58	318	244	153	215	36	200	458	42
RTOR Reduction (vph)	0	52	0	0	128	0	0	0	24	0	5	0
Lane Group Flow (vph)	0	501	0	0	492	0	0	368	12	0	695	0
Turn Type	Split	NA		Split	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	4	4		1	1			2		2	2	
Permitted Phases							2		2	2		
Actuated Green, G (s)		16.5			15.7			24.3	24.3		24.3	
Effective Green, g (s)		14.5			13.7			22.3	22.3		22.3	
Actuated g/C Ratio		0.21			0.20			0.32	0.32		0.32	
Clearance Time (s)		4.0			4.2			4.2	4.2		4.2	
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		726			672			702	523		910	
v/s Ratio Prot		c0.15			c0.15							
v/s Ratio Perm								0.17	0.01		c0.25	
v/c Ratio		0.69			0.73			0.52	0.02		0.76	
Uniform Delay, d1		25.1			25.9			19.0	15.9		20.9	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		2.7			4.1			0.7	0.0		3.8	
Delay (s)		27.9			30.0			19.7	15.9		24.8	
Level of Service		C			C			B	B		C	
Approach Delay (s)		27.9			30.0			19.4			24.8	
Approach LOS		C			C			B			C	

Intersection Summary

HCM Average Control Delay	26.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	68.9	Sum of lost time (s)	18.4
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

36: Stuart & Church

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	25	40	44	311	321	57
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	26	42	46	327	338	60
Pedestrians					40	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					3	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	664	199	398			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	664	199	398			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	95	96			
cM capacity (veh/h)	370	815	1172			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	68	155	218	225	173
Volume Left	26	46	0	0	0
Volume Right	42	0	0	0	60
cSH	557	1172	1700	1700	1700
Volume to Capacity	0.12	0.04	0.13	0.13	0.10
Queue Length 95th (ft)	10	3	0	0	0
Control Delay (s)	12.4	2.7	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	12.4	1.1		0.0	
Approach LOS	B				

Intersection Summary					
Average Delay			1.5		
Intersection Capacity Utilization	34.4%		ICU Level of Service	A	
Analysis Period (min)	15				

HCM Unsignalized Intersection Capacity Analysis
 37: Universtiy & WB I-10 Ramp/E Central

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↔			↔	
Volume (veh/h)	0	0	0	0	8	29	562	498	26	7	152	1013
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	0	8	31	592	524	27	7	160	1066
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)												
pX, platoon unblocked												
vC, conflicting volume	2188	2443	613	1816	2962	276	1226				552	
vC1, stage 1 conf vol	708	708		1721	1721							
vC2, stage 2 conf vol	1480	1735		95	1241							
vCu, unblocked vol	2188	2443	613	1816	2962	276	1226				552	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				4.1	
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	0	0	100	0	0	96	0				99	
cM capacity (veh/h)	0	0	440	0	0	728	575				1028	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	39	854	289	87	1146
Volume Left	0	592	0	7	0
Volume Right	31	0	27	0	1066
cSH	0	575	1700	1028	1700
Volume to Capacity	Err	1.03	0.17	0.01	0.67
Queue Length 95th (ft)	Err	399	0	1	0
Control Delay (s)	Err	71.8	0.0	0.8	0.0
Lane LOS	F	F		A	
Approach Delay (s)	Err	53.6		0.1	
Approach LOS	F				

Intersection Summary				
Average Delay			Err	
Intersection Capacity Utilization		81.7%	ICU Level of Service	D
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis

38: Universtiy & EB I-10 Ramp

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	316	489	0	834	182	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	333	515	0	878	192	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	12					
Median type				TWLTL	TWLTL	
Median storage veh				2	2	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	631	96	192			
vC1, stage 1 conf vol	192					
vC2, stage 2 conf vol	439					
vCu, unblocked vol	631	96	192			
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 %	43	46	100			
cM capacity (veh/h)	580	948	1394			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	847	439	439	96	96
Volume Left	333	0	0	0	0
Volume Right	515	0	0	0	0
cSH	1477	1700	1700	1700	1700
Volume to Capacity	0.57	0.26	0.26	0.06	0.06
Queue Length 95th (ft)	96	0	0	0	0
Control Delay (s)	15.6	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	15.6	0.0	0.0		
Approach LOS	C				

Intersection Summary					
Average Delay			6.9		
Intersection Capacity Utilization	48.2%		ICU Level of Service	A	
Analysis Period (min)	15				

Queues

39: Tippecanoe & Harriman PI

12/16/2013



Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	204	423	711	290	278	274	1474	633	1365
v/c Ratio	0.74	0.60	1.23	0.71	0.71	0.74	0.64	0.59	0.80
Control Delay	44.1	13.1	145.6	26.3	26.9	45.5	19.4	6.4	38.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.1	13.1	145.6	26.3	26.9	45.5	19.4	6.4	38.3
Queue Length 50th (ft)	77	34	~184	77	73	52	212	25	167
Queue Length 95th (ft)	#166	72	#281	150	146	m#130	269	m123	205
Internal Link Dist (ft)				495			374		777
Turn Bay Length (ft)	280		300		300	225		500	
Base Capacity (vph)	289	847	578	487	461	371	2290	1067	1711
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.50	1.23	0.60	0.60	0.74	0.64	0.59	0.80

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.

HCM Signalized Intersection Capacity Analysis

39: Tippecanoe & Harriman PI

12/16/2013



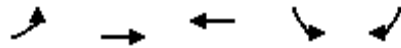
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖		↖↖	↖↖	↖	↖	↖↖	↖↖↖	↖		↖↖↖	
Volume (vph)	194	0	402	675	100	440	260	1400	601	0	1171	125
Ideal Flow (vphpl)	1800	1900	1800	1700	1900	1900	1700	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00		0.88	0.97	0.95	0.95	0.97	0.91	1.00		0.86	
Frt	1.00		0.85	1.00	0.90	0.85	1.00	1.00	0.85		0.99	
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (prot)	1710		2693	3133	1632	1534	3133	5187	1615		6441	
Flt Permitted	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (perm)	1710		2693	3133	1632	1534	3133	5187	1615		6441	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	204	0	423	711	105	463	274	1474	633	0	1233	132
RTOR Reduction (vph)	0	0	198	0	64	64	0	0	354	0	27	0
Lane Group Flow (vph)	204	0	225	711	226	214	274	1474	279	0	1338	0
Turn Type	Prot		custom	Prot	NA	Perm	Prot	NA	Perm		NA	
Protected Phases	7			3	8		5	2				6
Permitted Phases			4			8			2			
Actuated Green, G (s)	10.5		12.3	12.0	13.8	13.8	7.7	28.7	28.7		17.0	
Effective Green, g (s)	10.5		12.3	12.0	13.8	13.8	7.7	28.7	28.7		17.0	
Actuated g/C Ratio	0.16		0.19	0.18	0.21	0.21	0.12	0.44	0.44		0.26	
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)	276		510	578	346	326	371	2290	713		1685	
v/s Ratio Prot	0.12			c0.23	0.14		0.09	c0.28			c0.21	
v/s Ratio Perm			0.08			c0.14			0.17			
v/c Ratio	0.74		0.44	1.23	0.65	0.66	0.74	0.64	0.39		0.79	
Uniform Delay, d1	25.9		23.3	26.5	23.4	23.4	27.7	14.2	12.3		22.4	
Progression Factor	1.00		1.00	1.00	1.00	1.00	0.87	1.19	2.55		1.59	
Incremental Delay, d2	9.9		0.6	118.1	4.4	4.7	6.8	1.3	1.5		3.4	
Delay (s)	35.9		23.9	144.6	27.8	28.2	30.8	18.2	32.8		38.9	
Level of Service	D		C	F	C	C	C	B	C		D	
Approach Delay (s)		27.8			92.8			23.5			38.9	
Approach LOS		C			F			C			D	

Intersection Summary

HCM Average Control Delay	43.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Mill St

11/25/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	77	684	724	313	142
v/c Ratio	0.25	0.41	0.44	0.48	0.42
Control Delay	8.6	7.5	7.5	13.9	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	7.5	7.5	13.9	10.6
Queue Length 50th (ft)	8	40	42	23	7
Queue Length 95th (ft)	30	80	84	52	46
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	404	2156	2143	2076	918
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.19	0.32	0.34	0.15	0.15

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St

11/25/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	73	650	652	36	234	199
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.97	0.85
Flt Protected	0.95	1.00	1.00		0.96	1.00
Satd. Flow (prot)	1710	3610	3582		3433	1470
Flt Permitted	0.38	1.00	1.00		0.96	1.00
Satd. Flow (perm)	678	3610	3582		3433	1470
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	77	684	686	38	246	209
RTOR Reduction (vph)	0	0	6	0	55	83
Lane Group Flow (vph)	77	684	718	0	258	59
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	18.6	18.6	18.6		8.3	8.3
Effective Green, g (s)	16.6	16.6	16.6		6.3	6.3
Actuated g/C Ratio	0.46	0.46	0.46		0.18	0.18
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	314	1669	1656		602	258
v/s Ratio Prot		0.19	c0.20		c0.08	
v/s Ratio Perm	0.11					0.04
v/c Ratio	0.25	0.41	0.43		0.43	0.23
Uniform Delay, d1	5.9	6.4	6.5		13.2	12.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.4	0.2	0.2		0.5	0.5
Delay (s)	6.3	6.6	6.7		13.7	13.2
Level of Service	A	A	A		B	B
Approach Delay (s)		6.5	6.7		13.5	
Approach LOS		A	A		B	

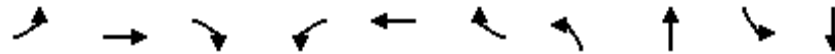
Intersection Summary

HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	35.9	Sum of lost time (s)	13.0
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

11/25/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	142	408	215	333	641	186	271	1145	97	1118
v/c Ratio	0.60	0.30	0.29	0.97	0.47	0.26	0.92	0.65	0.49	0.82
Control Delay	31.0	17.0	3.6	66.5	19.1	4.3	56.0	23.3	22.5	31.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.0	17.0	3.6	66.5	19.1	4.3	56.0	23.3	22.5	31.5
Queue Length 50th (ft)	51	67	0	145	114	4	78	168	25	172
Queue Length 95th (ft)	#118	100	39	#305	159	41	#222	216	51	#231
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	245	1396	756	357	1396	731	293	1771	197	1356
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	0.58	0.29	0.28	0.93	0.46	0.25	0.92	0.65	0.49	0.82

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗↗	↘	↘	↗↗	↘	↘	↗↗↗		↘	↗↗↗	
Volume (vph)	135	388	204	316	609	177	257	975	113	92	885	177
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	7.0		5.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3610	1615	1710	3610	1615	1710	5106		1710	5058	
Flt Permitted	0.35	1.00	1.00	0.51	1.00	1.00	0.16	1.00		0.21	1.00	
Satd. Flow (perm)	634	3610	1615	922	3610	1615	293	5106		370	5058	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	142	408	215	333	641	186	271	1026	119	97	932	186
RTOR Reduction (vph)	0	0	135	0	0	108	0	18	0	0	39	0
Lane Group Flow (vph)	142	408	80	333	641	78	271	1127	0	97	1079	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	30.0	30.0	30.0	30.0	30.0	30.0	35.0	27.2		26.4	21.6	
Effective Green, g (s)	28.0	28.0	28.0	28.0	28.0	28.0	33.0	25.2		22.4	19.6	
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.37	0.37	0.44	0.34		0.30	0.26	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	237	1348	603	344	1348	603	288	1716		161	1322	
v/s Ratio Prot		0.11			0.18		c0.11	0.22		0.02	0.21	
v/s Ratio Perm	0.22		0.05	c0.36		0.05	c0.31			0.16		
v/c Ratio	0.60	0.30	0.13	0.97	0.48	0.13	0.94	0.66		0.60	0.82	
Uniform Delay, d1	19.0	16.6	15.5	23.1	17.9	15.5	16.2	21.2		19.9	26.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.0	0.1	0.1	39.6	0.3	0.1	37.4	2.0		6.2	5.7	
Delay (s)	23.0	16.7	15.6	62.6	18.2	15.6	53.6	23.2		26.2	31.7	
Level of Service	C	B	B	E	B	B	D	C		C	C	
Approach Delay (s)		17.6			30.5			29.0			31.2	
Approach LOS		B			C			C			C	

Intersection Summary

HCM Average Control Delay	28.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Waterman & E Orange Show

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	268	1035	260	839	249	1353	80	1315
v/c Ratio	1.09	0.99	1.12	0.91	1.14	0.92	0.77	1.08
Control Delay	116.4	62.7	124.2	56.9	133.9	45.2	67.6	88.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	116.4	62.7	124.2	56.9	133.9	45.2	67.6	88.1
Queue Length 50th (ft)	~185	368	~181	326	~175	489	33	~561
Queue Length 95th (ft)	#359	#520	#353	#443	#344	#625	#96	#695
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	245	1044	233	923	218	1478	104	1218
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.09	0.99	1.12	0.91	1.14	0.92	0.77	1.08

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.

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	255	554	429	247	665	132	237	1203	83	76	987	262
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	6.0	6.0		6.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	*1.00		1.00	*1.00	
Frt	1.00	0.93		1.00	0.98		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3374		1710	3520		1710	3763		1710	3680	
Flt Permitted	0.12	1.00		0.13	1.00		0.09	1.00		0.10	1.00	
Satd. Flow (perm)	218	3374		232	3520		160	3763		185	3680	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	268	583	452	260	700	139	249	1266	87	80	1039	276
RTOR Reduction (vph)	0	117	0	0	14	0	0	4	0	0	22	0
Lane Group Flow (vph)	268	918	0	260	825	0	249	1349	0	80	1293	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	50.0	35.0		47.0	33.0		58.0	49.0		46.0	41.0	
Effective Green, g (s)	46.0	33.0		43.0	31.0		56.0	47.0		42.0	39.0	
Actuated g/C Ratio	0.38	0.28		0.36	0.26		0.47	0.39		0.35	0.32	
Clearance Time (s)	4.0	4.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	245	928		231	909		217	1474		103	1196	
v/s Ratio Prot	c0.12	0.27		0.11	0.23		c0.11	0.36		0.02	0.35	
v/s Ratio Perm	c0.30			0.29			c0.43			0.25		
v/c Ratio	1.09	0.99		1.13	0.91		1.15	0.92		0.78	1.08	
Uniform Delay, d1	32.5	43.3		32.1	43.1		34.7	34.6		35.2	40.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	84.9	26.7		97.1	12.5		106.6	9.1		29.9	51.0	
Delay (s)	117.4	70.0		129.2	55.7		141.3	43.7		65.1	91.5	
Level of Service	F	E		F	E		F	D		E	F	
Approach Delay (s)		79.7			73.1			58.9			90.0	
Approach LOS		E			E			E			F	

Intersection Summary

HCM Average Control Delay	74.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	113.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

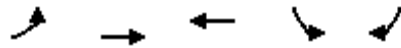
11/25/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	5	3	8	1517	1658	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	3	8	1597	1745	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					745	
pX, platoon unblocked						
vC, conflicting volume	2563	875	1749			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2563	875	1749			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	76	99	98			
cM capacity (veh/h)	22	297	363			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	8	8	798	798	1164	586
Volume Left	5	8	0	0	0	0
Volume Right	3	0	0	0	0	4
cSH	33	363	1700	1700	1700	1700
Volume to Capacity	0.25	0.02	0.47	0.47	0.68	0.34
Queue Length 95th (ft)	20	2	0	0	0	0
Control Delay (s)	147.7	15.1	0.0	0.0	0.0	0.0
Lane LOS	F	C				
Approach Delay (s)	147.7	0.1			0.0	
Approach LOS	F					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			56.0%		ICU Level of Service	B
Analysis Period (min)			15			

Queues
1: Mill St

12/16/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	94	764	1014	277	131
v/c Ratio	0.36	0.39	0.52	0.51	0.49
Control Delay	10.8	6.5	7.4	17.1	17.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	10.8	6.5	7.4	17.1	17.9
Queue Length 50th (ft)	11	46	67	27	19
Queue Length 95th (ft)	42	88	124	54	60
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	296	2221	2206	1700	759
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.32	0.34	0.46	0.16	0.17

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St

12/16/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	89	726	908	55	158	230
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.94	0.85
Flt Protected	0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	1710	3610	3579		3364	1470
Flt Permitted	0.27	1.00	1.00		0.97	1.00
Satd. Flow (perm)	483	3610	3579		3364	1470
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	94	764	956	58	166	242
RTOR Reduction (vph)	0	0	6	0	48	48
Lane Group Flow (vph)	94	764	1008	0	229	83
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	25.3	25.3	25.3		8.4	8.4
Effective Green, g (s)	23.3	23.3	23.3		6.4	6.4
Actuated g/C Ratio	0.55	0.55	0.55		0.15	0.15
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	264	1970	1953		504	220
v/s Ratio Prot		0.21	c0.28		c0.07	
v/s Ratio Perm	0.19					0.06
v/c Ratio	0.36	0.39	0.52		0.45	0.38
Uniform Delay, d1	5.5	5.6	6.1		16.6	16.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.8	0.1	0.2		0.7	1.1
Delay (s)	6.3	5.7	6.4		17.2	17.4
Level of Service	A	A	A		B	B
Approach Delay (s)		5.8	6.4		17.3	
Approach LOS		A	A		B	

Intersection Summary

HCM Average Control Delay	8.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	42.7	Sum of lost time (s)	13.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

2: Waterman Ave & 9th St

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	224	635	194	498	124	1375	89	1095
v/c Ratio	0.99	0.85	1.08	0.73	0.78	0.88	0.64	0.80
Control Delay	87.2	44.4	118.4	38.0	50.1	33.9	38.7	30.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.2	44.4	118.4	38.0	50.1	33.9	38.7	30.7
Queue Length 50th (ft)	95	165	-86	127	36	369	26	288
Queue Length 95th (ft)	#225	220	#211	178	#122	#531	#73	#390
Internal Link Dist (ft)		852		841		893		996
Turn Bay Length (ft)	130		100		50		75	
Base Capacity (vph)	226	840	180	768	159	1557	138	1366
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.76	1.08	0.65	0.78	0.88	0.64	0.80

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.

HCM Signalized Intersection Capacity Analysis

2: Waterman Ave & 9th St

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗		↖	↖↗		↖	↖↗		↖	↖↗	
Volume (vph)	213	492	111	184	360	113	118	1121	185	85	942	98
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	7.0	7.5		7.0	7.4		7.0	7.5		7.0	7.5	
Lane Util. Factor	1.00	*1.00		1.00	0.95		1.00	*1.00		1.00	0.95	
Frt	1.00	0.97		1.00	0.96		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3695		1710	3481		1710	3719		1710	3559	
Flt Permitted	0.31	1.00		0.25	1.00		0.11	1.00		0.12	1.00	
Satd. Flow (perm)	555	3695		446	3481		201	3719		210	3559	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	224	518	117	194	379	119	124	1180	195	89	992	103
RTOR Reduction (vph)	0	24	0	0	34	0	0	15	0	0	9	0
Lane Group Flow (vph)	224	611	0	194	464	0	124	1360	0	89	1086	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	27.7	19.7		25.8	18.8		44.3	38.3		40.3	36.3	
Effective Green, g (s)	23.7	17.7		21.8	16.8		40.3	36.3		36.3	34.3	
Actuated g/C Ratio	0.26	0.20		0.24	0.19		0.45	0.40		0.40	0.38	
Clearance Time (s)	5.0	5.5		5.0	5.4		5.0	5.5		5.0	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	223	727		178	650		157	1500		118	1356	
v/s Ratio Prot	c0.07	0.17		0.06	0.13		c0.04	c0.37		0.02	0.31	
v/s Ratio Perm	0.20			c0.20			0.32			0.29		
v/c Ratio	1.00	0.84		1.09	0.71		0.79	0.91		0.75	0.80	
Uniform Delay, d1	31.6	34.8		32.4	34.3		18.0	25.3		25.9	24.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	61.4	8.7		93.5	3.7		22.7	9.5		23.5	5.1	
Delay (s)	93.0	43.4		125.9	38.1		40.7	34.8		49.4	29.9	
Level of Service	F	D		F	D		D	C		D	C	
Approach Delay (s)		56.4			62.7			35.3			31.3	
Approach LOS		E			E			D			C	

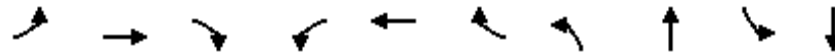
Intersection Summary

HCM Average Control Delay	42.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	93.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	188	425	239	303	667	220	167	1172	132	1129
v/c Ratio	0.69	0.59	0.47	0.76	0.78	0.43	0.69	0.74	0.59	0.80
Control Delay	29.1	30.6	7.0	29.1	33.3	9.9	32.3	28.0	27.5	31.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.1	30.6	7.0	29.1	33.3	9.9	32.3	28.0	27.5	31.1
Queue Length 50th (ft)	52	92	0	91	148	20	48	188	37	180
Queue Length 95th (ft)	#101	135	53	#164	203	72	#120	#268	#82	#261
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	280	818	551	408	963	551	246	1592	227	1405
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	0.67	0.52	0.43	0.74	0.69	0.40	0.68	0.74	0.58	0.80

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑	↗	↘	↑↑↔		↘	↑↑↔	
Volume (vph)	179	404	227	288	634	209	159	997	117	125	920	153
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0		5.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3610	1615	1710	3610	1615	1710	5105		1710	5076	
Flt Permitted	0.30	1.00	1.00	0.38	1.00	1.00	0.18	1.00		0.20	1.00	
Satd. Flow (perm)	532	3610	1615	678	3610	1615	320	5105		355	5076	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	188	425	239	303	667	220	167	1049	123	132	968	161
RTOR Reduction (vph)	0	0	192	0	0	125	0	18	0	0	29	0
Lane Group Flow (vph)	188	425	47	303	667	95	167	1154	0	132	1100	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	25.6	16.9	16.9	31.6	19.9	19.9	32.6	24.5		28.2	22.3	
Effective Green, g (s)	21.6	14.9	14.9	27.6	17.9	17.9	28.6	22.5		24.2	20.3	
Actuated g/C Ratio	0.29	0.20	0.20	0.37	0.24	0.24	0.38	0.30		0.32	0.27	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	258	717	321	383	862	385	235	1532		185	1374	
v/s Ratio Prot	0.06	0.12		c0.10	0.18		c0.06	c0.23		0.04	0.22	
v/s Ratio Perm	0.14		0.03	c0.19		0.06	0.21			0.19		
v/c Ratio	0.73	0.59	0.15	0.79	0.77	0.25	0.71	0.75		0.71	0.80	
Uniform Delay, d1	21.5	27.3	24.8	18.6	26.7	23.1	17.1	23.7		19.7	25.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.8	1.3	0.2	10.6	4.4	0.3	9.7	3.5		12.3	3.4	
Delay (s)	31.3	28.6	25.0	29.3	31.0	23.4	26.8	27.2		31.9	28.9	
Level of Service	C	C	C	C	C	C	C	C		C	C	
Approach Delay (s)		28.2			29.2			27.2			29.2	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	28.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Waterman & E Orange Show

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	291	1080	325	1240	334	1509	175	1372
v/c Ratio	1.45	1.01	1.35	1.07	1.39	1.11	1.29	1.22
Control Delay	255.3	74.4	212.2	90.6	227.2	100.4	199.3	145.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	255.3	74.4	212.2	90.6	227.2	100.4	199.3	145.2
Queue Length 50th (ft)	~284	~452	~309	~576	~325	~725	~135	~706
Queue Length 95th (ft)	#469	#596	#501	#710	#519	#860	#290	#841
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	201	1069	241	1156	241	1355	136	1127
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.45	1.01	1.35	1.07	1.39	1.11	1.29	1.22

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.

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	276	762	264	309	1021	157	317	1224	210	166	1121	182
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	6.0	7.0		6.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	*1.00		1.00	*1.00		1.00	*1.00		1.00	*1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3653		1710	3724		1710	3717		1710	3720	
Flt Permitted	0.11	1.00		0.10	1.00		0.09	1.00		0.10	1.00	
Satd. Flow (perm)	195	3653		180	3724		160	3717		185	3720	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	291	802	278	325	1075	165	334	1288	221	175	1180	192
RTOR Reduction (vph)	0	29	0	0	10	0	0	11	0	0	11	0
Lane Group Flow (vph)	291	1051	0	325	1230	0	334	1498	0	175	1362	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	52.0	39.0		58.0	42.0		61.0	49.0		49.0	41.0	
Effective Green, g (s)	48.0	37.0		54.0	40.0		59.0	47.0		45.0	39.0	
Actuated g/C Ratio	0.37	0.28		0.42	0.31		0.45	0.36		0.35	0.30	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	200	1040		240	1146		240	1344		134	1116	
v/s Ratio Prot	0.12	0.29		c0.15	0.33		c0.15	0.40		0.06	0.37	
v/s Ratio Perm	c0.41			c0.42			c0.48			0.39		
v/c Ratio	1.46	1.01		1.35	1.07		1.39	1.11		1.31	1.22	
Uniform Delay, d1	34.7	46.5		38.4	45.0		39.6	41.5		39.4	45.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	230.3	30.5		184.2	48.5		199.8	62.2		181.2	107.2	
Delay (s)	265.0	77.0		222.6	93.5		239.3	103.7		220.7	152.7	
Level of Service	F	E		F	F		F	F		F	F	
Approach Delay (s)		116.9			120.3			128.3			160.4	
Approach LOS		F			F			F			F	

Intersection Summary

HCM Average Control Delay	131.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.43		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	126.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	6	17	31	1791	1817	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	6	18	33	1885	1913	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						745
pX, platoon unblocked						
vC, conflicting volume	2923	959	1918			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2923	959	1918			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	43	93	90			
cM capacity (veh/h)	11	261	313			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	24	33	943	943	1275	643
Volume Left	6	33	0	0	0	0
Volume Right	18	0	0	0	0	5
cSH	38	313	1700	1700	1700	1700
Volume to Capacity	0.64	0.10	0.55	0.55	0.75	0.38
Queue Length 95th (ft)	57	9	0	0	0	0
Control Delay (s)	201.7	17.8	0.0	0.0	0.0	0.0
Lane LOS	F	C				
Approach Delay (s)	201.7	0.3			0.0	
Approach LOS	F					

Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			60.4%	ICU Level of Service	B	
Analysis Period (min)			15			

Queues

6: Waterman & Washington

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	686	1113	7	1408	741	15	205	205	802
v/c Ratio	1.10	0.42	0.03	0.77	0.76	0.16	0.80	0.76	0.94
Control Delay	116.3	8.1	20.0	30.6	20.6	51.4	76.6	71.3	25.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	116.3	8.1	20.0	30.6	20.6	51.4	76.6	71.3	25.6
Queue Length 50th (ft)	~328	146	3	455	265	9	168	167	59
Queue Length 95th (ft)	#447	263	13	664	530	33	#288	#274	#345
Internal Link Dist (ft)		433		239		527		537	
Turn Bay Length (ft)	225		100		200		125		
Base Capacity (vph)	621	2635	234	1832	979	504	263	279	861
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.10	0.42	0.03	0.77	0.76	0.03	0.78	0.73	0.93






























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.

HCM Signalized Intersection Capacity Analysis

6: Waterman & Washington

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 		 	 			 		 	 	 
Volume (vph)	652	1050	8	7	1338	704	4	7	4	381	9	762
Ideal Flow (vphpl)	1700	1900	1900	1800	1900	1900	1900	1900	1900	1800	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0	6.0		4.0		5.0	5.0	5.0
Lane Util. Factor	*1.00	0.95		1.00	0.95	1.00		1.00		*1.00	*1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	0.95	1.00
Satd. Flow (prot)	3230	3606		1710	3610	1615		1807		1710	1813	1615
Flt Permitted	0.95	1.00		0.26	1.00	1.00		0.99		0.95	0.95	1.00
Satd. Flow (perm)	3230	3606		461	3610	1615		1807		1710	1813	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	686	1105	8	7	1408	741	4	7	4	401	9	802
RTOR Reduction (vph)	0	0	0	0	0	165	0	4	0	0	0	616
Lane Group Flow (vph)	686	1113	0	7	1408	576	0	11	0	205	205	186
Turn Type	Prot	NA		Perm	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2			6		8	8		4	4	
Permitted Phases				6		6						4
Actuated Green, G (s)	25.0	92.6		63.6	63.6	63.6		3.0		19.4	19.4	19.4
Effective Green, g (s)	25.0	92.6		63.6	63.6	63.6		3.0		19.4	19.4	19.4
Actuated g/C Ratio	0.19	0.71		0.49	0.49	0.49		0.02		0.15	0.15	0.15
Clearance Time (s)	4.0	6.0		6.0	6.0	6.0		4.0		5.0	5.0	5.0
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)	621	2569		226	1766	790		42		255	271	241
v/s Ratio Prot	c0.21	0.31			c0.39			c0.01		c0.12	0.11	
v/s Ratio Perm				0.02		0.36						0.12
v/c Ratio	1.10	0.43		0.03	0.80	0.73		0.26		0.80	0.76	0.77
Uniform Delay, d1	52.5	7.8		17.2	27.8	26.3		62.4		53.5	53.0	53.2
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	68.2	0.5		0.3	3.8	5.8		3.3		16.6	11.4	14.2
Delay (s)	120.7	8.3		17.5	31.6	32.2		65.8		70.0	64.4	67.3
Level of Service	F	A		B	C	C		E		E	E	E
Approach Delay (s)		51.2			31.8			65.8			67.3	
Approach LOS		D			C			E			E	

Intersection Summary

HCM Average Control Delay	46.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	100.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues

7: S Tippecanoe & E Victoria

12/16/2013



Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	4	59	29	2	1677	76	1705
v/c Ratio	0.03	0.50	0.17	0.01	0.59	0.46	0.60
Control Delay	26.5	48.6	12.3	3.5	5.9	16.7	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.5	48.6	12.3	3.5	5.9	16.7	6.0
Queue Length 50th (ft)	1	29	0	0	163	12	168
Queue Length 95th (ft)	9	63	20	2	270	#86	280
Internal Link Dist (ft)	87		770		198		507
Turn Bay Length (ft)		100		150		115	
Base Capacity (vph)	304	272	351	161	2825	167	2842
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.22	0.08	0.01	0.59	0.46	0.60

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

7: S Tippecanoe & E Victoria

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↖	↗		↖	↗		↖	↗	
Volume (vph)	2	0	2	56	0	28	2	1524	69	72	1620	0
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)		6.0		6.0	6.0		7.5	7.5		7.5	7.5	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt		0.93		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1729		1710	1615		1710	3586		1710	3610	
Flt Permitted		0.85		0.76	1.00		0.11	1.00		0.12	1.00	
Satd. Flow (perm)		1513		1359	1615		204	3586		213	3610	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	2	0	2	59	0	29	2	1604	73	76	1705	0
RTOR Reduction (vph)	0	2	0	0	27	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	2	0	59	2	0	2	1674	0	76	1705	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.8		7.8	7.8		62.7	62.7		62.7	62.7	
Effective Green, g (s)		5.8		5.8	5.8		60.7	60.7		60.7	60.7	
Actuated g/C Ratio		0.07		0.07	0.07		0.76	0.76		0.76	0.76	
Clearance Time (s)		4.0		4.0	4.0		5.5	5.5		5.5	5.5	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		110		99	117		155	2721		162	2739	
v/s Ratio Prot					0.00			0.47			c0.47	
v/s Ratio Perm		0.00		c0.04			0.01			0.36		
v/c Ratio		0.02		0.60	0.02		0.01	0.62		0.47	0.62	
Uniform Delay, d1		34.5		36.0	34.5		2.4	4.4		3.6	4.4	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1		9.3	0.1		0.2	1.1		9.4	1.1	
Delay (s)		34.5		45.3	34.5		2.5	5.4		13.1	5.5	
Level of Service		C		D	C		A	A		B	A	
Approach Delay (s)		34.5			41.7			5.4			5.8	
Approach LOS		C			D			A			A	

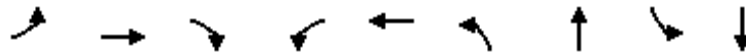
Intersection Summary

HCM Average Control Delay	6.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	461	572	911	187	313	823	1176	105	1780
v/c Ratio	1.30	1.10	0.98	1.18	0.41	1.50	0.48	0.98	1.20
Control Delay	186.8	107.6	45.9	162.2	26.9	274.1	16.6	130.8	138.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	186.8	107.6	45.9	162.2	26.9	274.1	16.6	130.8	138.9
Queue Length 50th (ft)	~496	~548	487	~188	171	~485	178	88	~603
Queue Length 95th (ft)	#708	#774	#809	#342	251	m#567	m197	#213	#693
Internal Link Dist (ft)		517			1151		769		1167
Turn Bay Length (ft)	210			85		260		100	
Base Capacity (vph)	355	518	926	159	765	547	2444	107	1480
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.30	1.10	0.98	1.18	0.41	1.50	0.48	0.98	1.20

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.

HCM Signalized Intersection Capacity Analysis

8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗		↖↗	↖↗↘		↖	↖↗↘	
Volume (vph)	600	381	865	178	209	88	782	992	125	100	1450	241
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1700	1900	1900	1800	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		6.0	7.0		7.0	7.0	
Lane Util. Factor	*1.00	*1.00	1.00	1.00	1.00		*1.00	0.91		1.00	*1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.98		1.00	0.98	
Flt Protected	0.95	0.99	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	1872	1615	1710	1815		3230	5100		1710	5578	
Flt Permitted	0.48	0.66	1.00	0.21	1.00		0.95	1.00		0.23	1.00	
Satd. Flow (perm)	855	1246	1615	383	1815		3230	5100		411	5578	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	632	401	911	187	220	93	823	1044	132	105	1526	254
RTOR Reduction (vph)	0	0	255	0	12	0	0	12	0	0	21	0
Lane Group Flow (vph)	461	572	656	187	301	0	823	1164	0	105	1759	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)	56.0	56.0	56.0	56.0	56.0		24.0	64.0		36.0	36.0	
Effective Green, g (s)	54.0	54.0	54.0	54.0	54.0		22.0	62.0		34.0	34.0	
Actuated g/C Ratio	0.42	0.42	0.42	0.42	0.42		0.17	0.48		0.26	0.26	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		4.0	5.0		5.0	5.0	
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)	355	518	671	159	754		547	2432		107	1459	
v/s Ratio Prot					0.17		c0.25	0.23			c0.32	
v/s Ratio Perm	c0.54	0.46	0.41	0.49						0.26		
v/c Ratio	1.30	1.10	0.98	1.18	0.40		1.50	0.48		0.98	1.21	
Uniform Delay, d1	38.0	38.0	37.4	38.0	26.6		54.0	23.0		47.7	48.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.11	0.71		1.00	1.00	
Incremental Delay, d2	153.7	71.2	28.7	126.6	0.3		234.1	0.5		82.1	99.4	
Delay (s)	191.7	109.2	66.1	164.6	27.0		294.3	16.8		129.8	147.4	
Level of Service	F	F	E	F	C		F	B		F	F	
Approach Delay (s)		108.5			78.4			131.1			146.4	
Approach LOS		F			E			F			F	

Intersection Summary

HCM Average Control Delay	124.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	123.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Intersection has too many lanes per leg.

HCM All-Way analysis is limited to two lanes per leg.

Channelized right turn lanes are not counted.

Queues

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

12/16/2013



Lane Group	EBL	EBT	EBR	NBT	SBL	SBT
Lane Group Flow (vph)	563	560	507	1671	814	1868
v/c Ratio	1.22	1.15	1.13	1.14	1.28	0.82
Control Delay	159.5	132.1	122.8	107.5	176.3	17.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	3.2
Total Delay	159.5	132.1	122.8	107.5	176.3	20.5
Queue Length 50th (ft)	~583	~553	~508	~806	~458	413
Queue Length 95th (ft)	#807	#783	#742	#941	m#491	m436
Internal Link Dist (ft)		1164		1201		347
Turn Bay Length (ft)	275					
Base Capacity (vph)	460	486	450	1465	638	2277
Starvation Cap Reductn	0	0	0	0	0	308
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.22	1.15	1.13	1.14	1.28	0.95

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.

HCM Signalized Intersection Capacity Analysis

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	973	22	554	0	0	0	0	1118	469	773	1775	0
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900	1900	1900	1900	1800	1900	1900
Total Lost time (s)	6.0	6.0	4.0					7.0		6.0	7.0	
Lane Util. Factor	*1.00	*1.00	0.95					*1.00		0.97	0.95	
Frt	1.00	0.98	0.85					0.96		1.00	1.00	
Flt Protected	0.95	0.96	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1710	1788	1534					3631		3317	3610	
Flt Permitted	0.95	0.96	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1710	1788	1534					3631		3317	3610	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1024	23	583	0	0	0	0	1177	494	814	1868	0
RTOR Reduction (vph)	0	4	14	0	0	0	0	40	0	0	0	0
Lane Group Flow (vph)	563	556	493	0	0	0	0	1631	0	814	1868	0
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)	37.0	37.0	37.0					53.0		27.0	84.0	
Effective Green, g (s)	35.0	35.0	37.0					51.0		25.0	82.0	
Actuated g/C Ratio	0.27	0.27	0.28					0.39		0.19	0.63	
Clearance Time (s)	4.0	4.0	4.0					5.0		4.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0					2.0		2.0	2.0	
Lane Grp Cap (vph)	460	481	437					1424		638	2277	
v/s Ratio Prot								c0.45		c0.25	0.52	
v/s Ratio Perm	c0.33	0.31	0.32									
v/c Ratio	1.22	1.16	1.13					1.15		1.28	0.82	
Uniform Delay, d1	47.5	47.5	46.5					39.5		52.5	18.4	
Progression Factor	1.00	1.00	1.00					1.00		1.10	0.82	
Incremental Delay, d2	118.9	91.1	83.2					74.2		130.5	1.8	
Delay (s)	166.4	138.6	129.7					113.7		188.5	16.9	
Level of Service	F	F	F					F		F	B	
Approach Delay (s)		145.5			0.0			113.7			69.0	
Approach LOS		F			A			F			E	

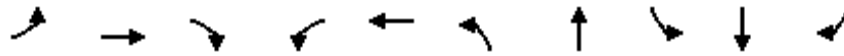
Intersection Summary

HCM Average Control Delay	102.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	169.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues

11: Anderson & Academy

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	334	142	172	99	198	73	1027	94	838	175
v/c Ratio	0.62	0.26	0.29	0.38	0.41	0.29	0.83	0.37	0.63	0.25
Control Delay	17.8	17.6	4.8	17.1	19.4	13.2	27.4	14.9	19.3	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.8	17.6	4.8	17.1	19.4	13.2	27.4	14.9	19.3	4.3
Queue Length 50th (ft)	81	38	0	21	23	15	187	19	143	0
Queue Length 95th (ft)	142	77	36	45	50	35	#308	43	#205	37
Internal Link Dist (ft)		21			32		1375		514	
Turn Bay Length (ft)	75			100		100		100		
Base Capacity (vph)	605	660	673	264	522	254	1251	251	1355	715
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	0.55	0.22	0.26	0.38	0.38	0.29	0.82	0.37	0.62	0.24

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

11: Anderson & Academy

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	317	135	163	94	123	66	69	914	62	89	796	166
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	4.0	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	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1710	1900	1615	1710	3421		1710	3576		1710	3610	1615
Flt Permitted	0.44	1.00	1.00	0.78	1.00		0.21	1.00		0.20	1.00	1.00
Satd. Flow (perm)	791	1900	1615	1412	3421		380	3576		358	3610	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	334	142	172	99	129	69	73	962	65	94	838	175
RTOR Reduction (vph)	0	0	125	0	63	0	0	8	0	0	0	113
Lane Group Flow (vph)	334	142	47	99	135	0	73	1019	0	94	838	62
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)	22.6	15.7	15.7	8.0	5.1		21.6	19.4		23.0	20.1	20.1
Effective Green, g (s)	22.6	15.7	15.7	8.0	5.1		21.6	19.4		23.0	20.1	20.1
Actuated g/C Ratio	0.40	0.28	0.28	0.14	0.09		0.38	0.34		0.40	0.35	0.35
Clearance Time (s)	4.0	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	3.0
Lane Grp Cap (vph)	532	524	446	214	307		196	1219		214	1275	571
v/s Ratio Prot	c0.15	0.07		0.02	0.04		0.01	c0.29		c0.02	0.23	
v/s Ratio Perm	c0.10		0.03	0.04			0.13			0.16		0.04
v/c Ratio	0.63	0.27	0.11	0.46	0.44		0.37	0.84		0.44	0.66	0.11
Uniform Delay, d1	13.0	16.1	15.4	22.3	24.5		12.0	17.3		12.3	15.5	12.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.3	0.3	0.1	1.6	1.0		1.2	5.1		1.4	1.2	0.1
Delay (s)	15.4	16.4	15.5	23.9	25.6		13.2	22.4		13.7	16.7	12.5
Level of Service	B	B	B	C	C		B	C		B	B	B
Approach Delay (s)		15.6			25.0			21.8			15.8	
Approach LOS		B			C			C			B	

Intersection Summary

HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	56.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues

12: California & WB I-10 Ramps

12/16/2013



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	993	277	1176	877	1434	1371
v/c Ratio	1.88	0.52	2.05	0.39	0.88	1.66
Control Delay	429.8	26.1	504.3	11.9	52.1	324.9
Queue Delay	124.6	0.0	202.8	1.3	2.4	0.0
Total Delay	554.4	26.1	707.1	13.2	54.4	324.9
Queue Length 50th (ft)	~1275	111	~1553	136	386	~1365
Queue Length 95th (ft)	#1531	202	m#1777	m214	442	#1636
Internal Link Dist (ft)	1118			276	113	
Turn Bay Length (ft)						
Base Capacity (vph)	529	533	575	2249	1622	824
Starvation Cap Reductn	0	0	231	1090	0	0
Spillback Cap Reductn	68	0	0	0	98	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	2.15	0.52	3.42	0.76	0.94	1.66




















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.

HCM Signalized Intersection Capacity Analysis

12: California & WB I-10 Ramps

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	936	8	263	1117	833	0	0	1362	1302
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1800	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	7.0	5.5	6.0			5.0	5.0
Lane Util. Factor					1.00	1.00	1.00	0.95			*1.00	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1810	1615	1710	3610			5700	1615
Flt Permitted					0.95	1.00	0.10	1.00			1.00	1.00
Satd. Flow (perm)					1810	1615	173	3610			5700	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	985	8	277	1176	877	0	0	1434	1371
RTOR Reduction (vph)	0	0	0	0	0	85	0	0	0	0	0	364
Lane Group Flow (vph)	0	0	0	0	993	192	1176	877	0	0	1434	1007
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases					8		5	6			2	
Permitted Phases				8		8	6					2
Actuated Green, G (s)					38.0	38.0	83.0	83.0			39.0	39.0
Effective Green, g (s)					38.0	36.0	81.0	81.0			37.0	37.0
Actuated g/C Ratio					0.29	0.28	0.62	0.62			0.28	0.28
Clearance Time (s)					5.0	5.0	3.5	4.0			3.0	3.0
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					529	447	575	2249			1622	460
v/s Ratio Prot							c0.62	0.24			0.25	
v/s Ratio Perm					0.55	0.12	0.65					c0.62
v/c Ratio					1.88	0.43	2.05	0.39			0.88	2.19
Uniform Delay, d1					46.0	38.6	38.3	12.2			44.5	46.5
Progression Factor					1.00	1.00	1.69	0.94			1.00	1.00
Incremental Delay, d2					401.9	0.2	474.5	0.4			7.4	542.1
Delay (s)					447.9	38.8	539.2	11.8			51.9	588.6
Level of Service					F	D	F	B			D	F
Approach Delay (s)		0.0			358.6			313.9			314.2	
Approach LOS		A			F			F			F	
Intersection Summary												
HCM Average Control Delay			323.3		HCM Level of Service						F	
HCM Volume to Capacity ratio			2.04									
Actuated Cycle Length (s)			130.0		Sum of lost time (s)						15.5	
Intersection Capacity Utilization			248.4%		ICU Level of Service						H	
Analysis Period (min)			15									
c Critical Lane Group												

Queues

13: EB I-10 Ramps & California

12/16/2013



Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	339	753	1744	1117	625	1563
v/c Ratio	1.01	2.30	0.66	1.10	1.45	0.60
Control Delay	104.6	615.5	28.3	79.3	243.6	9.3
Queue Delay	0.0	0.0	1.7	0.0	136.3	2.3
Total Delay	104.6	615.5	29.9	79.3	379.9	11.6
Queue Length 50th (ft)	~294	~1000	369	~831	~692	210
Queue Length 95th (ft)	#491	#1247	417	#1094	m#552	m182
Internal Link Dist (ft)	1294		46			276
Turn Bay Length (ft)						
Base Capacity (vph)	335	328	2653	1016	432	2596
Starvation Cap Reductn	0	0	0	0	75	858
Spillback Cap Reductn	0	0	685	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.01	2.30	0.89	1.10	1.75	0.90






















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.

HCM Signalized Intersection Capacity Analysis

13: EB I-10 Ramps & California

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			 	
Volume (vph)	312	10	715	0	0	0	0	1657	1061	594	1485	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1800	1900	1900
Lane Width	12	12	8	12	12	12	12	12	12	12	12	12
Total Lost time (s)		6.0	4.0					6.5	6.5	5.5	6.5	
Lane Util. Factor		1.00	1.00					*1.00	1.00	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1812	1400					5700	1615	1710	3610	
Flt Permitted		0.95	1.00					1.00	1.00	0.08	1.00	
Satd. Flow (perm)		1812	1400					5700	1615	136	3610	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	328	11	753	0	0	0	0	1744	1117	625	1563	0
RTOR Reduction (vph)	0	0	48	0	0	0	0	0	264	0	0	0
Lane Group Flow (vph)	0	339	705	0	0	0	0	1744	853	625	1563	0
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)		26.0	26.0					62.5	62.5	95.5	95.5	
Effective Green, g (s)		24.0	26.0					60.5	60.5	93.5	93.5	
Actuated g/C Ratio		0.18	0.20					0.47	0.47	0.72	0.72	
Clearance Time (s)		4.0	4.0					4.5	4.5	3.5	4.5	
Vehicle Extension (s)		2.0	2.0					2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		335	280					2653	752	431	2596	
v/s Ratio Prot								0.31		c0.31	0.43	
v/s Ratio Perm		0.19	c0.50						0.53	c0.73		
v/c Ratio		1.01	2.52					0.66	1.13	1.45	0.60	
Uniform Delay, d1		53.0	52.0					26.8	34.8	40.5	9.0	
Progression Factor		1.00	1.00					1.00	1.00	1.59	1.00	
Incremental Delay, d2		52.2	693.5					1.3	76.4	203.8	0.1	
Delay (s)		105.2	745.5					28.1	111.1	267.9	9.1	
Level of Service		F	F					C	F	F	A	
Approach Delay (s)		546.8			0.0			60.5			83.0	
Approach LOS		F			A			E			F	
Intersection Summary												
HCM Average Control Delay			155.0								HCM Level of Service	F
HCM Volume to Capacity ratio			1.64									
Actuated Cycle Length (s)			130.0								Sum of lost time (s)	9.5
Intersection Capacity Utilization			248.4%								ICU Level of Service	H
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

14: California & Shopping Center

12/16/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑↑↑		↔	↑↑
Volume (veh/h)	2	172	2662	97	502	1292
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	181	2802	102	528	1360
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)			652		447	
pX, platoon unblocked	0.79	0.79			0.79	
vC, conflicting volume	4590	985			2904	
vC1, stage 1 conf vol	2853					
vC2, stage 2 conf vol	1737					
vCu, unblocked vol	4614	42			2476	
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 %	0	78			0	
cM capacity (veh/h)	0	809			149	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	183	1121	1121	663	528	680	680
Volume Left	2	0	0	0	528	0	0
Volume Right	181	0	0	102	0	0	0
cSH	0	1700	1700	1700	149	1700	1700
Volume to Capacity	Err	0.66	0.66	0.39	3.54	0.40	0.40
Queue Length 95th (ft)	Err	0	0	0	Err	0	0
Control Delay (s)	Err	0.0	0.0	0.0	1205.3	0.0	0.0
Lane LOS	F				F		
Approach Delay (s)	Err	0.0			337.3		
Approach LOS	F						

Intersection Summary			
Average Delay		Err	
Intersection Capacity Utilization		103.7%	ICU Level of Service G
Analysis Period (min)		15	

Queues

15: California/California & W Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	409	1533	175	758	804	124	1223	577	761
v/c Ratio	1.74	1.26	1.59	0.71	1.09	0.69	1.31	1.69	0.45
Control Delay	374.2	160.3	330.5	46.6	81.1	63.4	186.8	349.5	21.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	374.2	160.3	330.5	46.6	81.1	63.4	186.8	349.5	21.6
Queue Length 50th (ft)	~422	~803	~155	288	~498	94	~698	~667	203
Queue Length 95th (ft)	#630	#939	#298	357	#747	#189	#838	#898	256
Internal Link Dist (ft)		1468		1180			268		572
Turn Bay Length (ft)	90		150		100			150	
Base Capacity (vph)	235	1217	110	1061	741	180	932	342	1703
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.74	1.26	1.59	0.71	1.09	0.69	1.31	1.69	0.45

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.

HCM Signalized Intersection Capacity Analysis

15: California/California & W Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↗	↖	↗		↖	↗	
Volume (vph)	389	1135	321	166	720	764	118	1058	104	548	544	179
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	6.0	7.7		6.0	7.7	7.7	5.2	7.2		7.2	7.2	
Lane Util. Factor	1.00	*1.00		1.00	*1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3674		1710	3800	1615	1710	3562		1710	3476	
Flt Permitted	0.17	1.00		0.11	1.00	1.00	0.36	1.00		0.10	1.00	
Satd. Flow (perm)	306	3674		198	3800	1615	653	3562		176	3476	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	409	1195	338	175	758	804	124	1114	109	577	573	188
RTOR Reduction (vph)	0	22	0	0	0	290	0	6	0	0	24	0
Lane Group Flow (vph)	409	1511	0	175	758	514	124	1217	0	577	737	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			4		3	8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	54.3	44.3		44.3	38.3	38.3	35.8	35.8		64.8	64.8	
Effective Green, g (s)	52.3	42.3		40.3	36.3	36.3	35.8	33.8		62.8	62.8	
Actuated g/C Ratio	0.40	0.33		0.31	0.28	0.28	0.28	0.26		0.48	0.48	
Clearance Time (s)	4.0	5.7		4.0	5.7	5.7	5.2	5.2		5.2	5.2	
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)	231	1195		108	1061	451	180	926		342	1679	
v/s Ratio Prot	c0.14	0.41		0.05	0.20			0.34		c0.28	0.21	
v/s Ratio Perm	c0.58			0.45		0.32	0.19			c0.53		
v/c Ratio	1.77	1.26		1.62	0.71	1.14	0.69	1.31		1.69	0.44	
Uniform Delay, d1	34.0	43.9		45.3	42.2	46.9	42.1	48.1		41.1	22.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	363.8	126.0		317.4	2.3	86.1	10.5	149.2		321.6	0.2	
Delay (s)	397.8	169.8		362.8	44.5	133.0	52.6	197.3		362.8	22.2	
Level of Service	F	F		F	D	F	D	F		F	C	
Approach Delay (s)		217.8			117.5			183.9			169.1	
Approach LOS		F			F			F			F	

Intersection Summary

HCM Average Control Delay	173.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.59		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.2
Intersection Capacity Utilization	139.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues

16: Alabama St & WB I-10 Ramps

12/16/2013



Lane Group	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	1059	460	1274	2015
v/c Ratio	1.23	1.38	0.53	1.21
Control Delay	154.8	219.3	9.5	130.3
Queue Delay	0.0	0.0	0.3	0.0
Total Delay	154.8	219.3	9.8	130.3
Queue Length 50th (ft)	~532	~477	192	~1022
Queue Length 95th (ft)	#664	m#562	m200	#1154
Internal Link Dist (ft)	765		376	271
Turn Bay Length (ft)				
Base Capacity (vph)	859	334	2388	1672
Starvation Cap Reductn	0	0	485	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.23	1.38	0.67	1.21


















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.

HCM Signalized Intersection Capacity Analysis

16: Alabama St & WB I-10 Ramps

12/16/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	0	0	0	240	448	317	437	1210	0	0	1286	628	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1800	1900	1900	1900	1900	1900	
Total Lost time (s)					6.5		6.0	8.0			8.0		
Lane Util. Factor					*1.00		1.00	0.95			*1.00		
Frt					0.95		1.00	1.00			0.95		
Flt Protected					0.99		0.95	1.00			1.00		
Satd. Flow (prot)					3577		1710	3610			3613		
Flt Permitted					0.99		0.06	1.00			1.00		
Satd. Flow (perm)					3577		111	3610			3613		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	0	0	0	253	472	334	460	1274	0	0	1354	661	
RTOR Reduction (vph)	0	0	0	0	47	0	0	0	0	0	32	0	
Lane Group Flow (vph)	0	0	0	0	1012	0	460	1274	0	0	1983	0	
Turn Type				Perm	NA		pm+pt	NA			NA		
Protected Phases					4		1	6			2		
Permitted Phases				4			6						
Actuated Green, G (s)					31.5		88.0	88.0			61.0		
Effective Green, g (s)					29.5		86.0	86.0			59.0		
Actuated g/C Ratio					0.23		0.66	0.66			0.45		
Clearance Time (s)					4.5		4.0	6.0			6.0		
Vehicle Extension (s)					3.0		3.0	3.0			3.0		
Lane Grp Cap (vph)					812		332	2388			1640		
v/s Ratio Prot							c0.22	0.35			0.55		
v/s Ratio Perm					0.28		c0.69						
v/c Ratio					1.25		1.39	0.53			1.21		
Uniform Delay, d1					50.2		45.1	11.5			35.5		
Progression Factor					1.00		1.52	0.79			1.00		
Incremental Delay, d2					121.0		179.6	0.3			100.0		
Delay (s)					171.3		248.0	9.4			135.5		
Level of Service					F		F	A			F		
Approach Delay (s)		0.0			171.3			72.7			135.5		
Approach LOS		A			F			E			F		
Intersection Summary													
HCM Average Control Delay			120.7		HCM Level of Service						F		
HCM Volume to Capacity ratio			1.29										
Actuated Cycle Length (s)			130.0		Sum of lost time (s)					12.5			
Intersection Capacity Utilization			127.8%		ICU Level of Service					H			
Analysis Period (min)			15										
c Critical Lane Group													

Queues

17: EB I-10 Ramps & Alabama St

12/16/2013



Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	1423	1626	408	1405
v/c Ratio	1.44dr	0.78	1.27	0.67
Control Delay	173.2	38.2	166.8	21.8
Queue Delay	0.0	1.5	0.0	8.4
Total Delay	173.2	39.7	166.8	30.1
Queue Length 50th (ft)	~754	389	~395	341
Queue Length 95th (ft)	#889	445	m#308	m243
Internal Link Dist (ft)	622	505		376
Turn Bay Length (ft)				
Base Capacity (vph)	1104	2075	320	2083
Starvation Cap Reductn	0	260	0	647
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.29	0.90	1.27	0.98



















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.
- dr Defacto Right Lane. Recode with 1 though lane as a right lane.

HCM Signalized Intersection Capacity Analysis

17: EB I-10 Ramps & Alabama St

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	592	11	749	0	0	0	0	1213	332	388	1335	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1800	1900	1900
Total Lost time (s)		7.0						8.0		6.0	7.0	
Lane Util. Factor		*1.00						*1.00		1.00	0.95	
Frt		0.92						0.97		1.00	1.00	
Flt Protected		0.98						1.00		0.95	1.00	
Satd. Flow (prot)		3410						5516		1710	3610	
Flt Permitted		0.98						1.00		0.07	1.00	
Satd. Flow (perm)		3410						5516		131	3610	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	623	12	788	0	0	0	0	1277	349	408	1405	0
RTOR Reduction (vph)	0	28	0	0	0	0	0	38	0	0	0	0
Lane Group Flow (vph)	0	1395	0	0	0	0	0	1588	0	408	1405	0
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		8						6		5	2	
Permitted Phases	8									2		
Actuated Green, G (s)		43.0						50.0		77.0	77.0	
Effective Green, g (s)		41.0						48.0		75.0	75.0	
Actuated g/C Ratio		0.32						0.37		0.58	0.58	
Clearance Time (s)		5.0						6.0		4.0	5.0	
Vehicle Extension (s)		2.0						2.0		2.0	2.0	
Lane Grp Cap (vph)		1075						2037		319	2083	
v/s Ratio Prot								0.29		c0.20	0.39	
v/s Ratio Perm		0.41								c0.54		
v/c Ratio		1.44dr						0.78		1.28	0.67	
Uniform Delay, d1		44.5						36.3		41.9	19.0	
Progression Factor		1.00						1.00		1.30	1.12	
Incremental Delay, d2		140.9						3.0		127.8	0.2	
Delay (s)		185.4						39.3		182.3	21.4	
Level of Service		F						D		F	C	
Approach Delay (s)		185.4			0.0			39.3			57.6	
Approach LOS		F			A			D			E	

Intersection Summary

HCM Average Control Delay	88.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	127.8%	ICU Level of Service	H
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

Queues

18: Alabama St & Industrial Park

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	313	304	77	451	60	1224	489	1366	209
v/c Ratio	1.23	0.39	0.21	0.52	0.57	0.82	1.46	0.91	0.31
Control Delay	165.8	23.3	24.4	11.0	44.3	46.0	249.0	43.1	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.8	0.0
Total Delay	165.8	23.3	24.4	11.0	44.3	46.0	249.0	55.9	19.6
Queue Length 50th (ft)	~303	145	38	83	24	290	~471	483	80
Queue Length 95th (ft)	#483	221	74	179	#57	341	#684	579	140
Internal Link Dist (ft)		298		379		236		505	
Turn Bay Length (ft)	100		50		150		215		55
Base Capacity (vph)	254	773	369	867	105	1574	336	1570	696
Starvation Cap Reductn	0	0	0	0	0	0	0	213	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.23	0.39	0.21	0.52	0.57	0.78	1.46	1.01	0.30

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.

HCM Signalized Intersection Capacity Analysis

18: Alabama St & Industrial Park

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	297	178	111	73	65	364	57	1067	96	465	1298	199
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	6.2	6.2		6.2	6.2		6.0	6.2		6.0	6.2	6.2
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	*1.00		1.00	*1.00	1.00
Frt	1.00	0.94		1.00	0.87		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1710	1790		1710	1658		1710	5629		1710	3800	1615
Flt Permitted	0.33	1.00		0.49	1.00		0.13	1.00		0.11	1.00	1.00
Satd. Flow (perm)	602	1790		875	1658		233	5629		195	3800	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	313	187	117	77	68	383	60	1123	101	489	1366	209
RTOR Reduction (vph)	0	19	0	0	167	0	0	10	0	0	0	30
Lane Group Flow (vph)	313	285	0	77	284	0	60	1214	0	489	1366	179
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4			6			2		2
Actuated Green, G (s)	51.8	51.8		51.8	51.8		37.9	32.9		57.9	48.9	48.9
Effective Green, g (s)	49.8	49.8		49.8	49.8		33.9	30.9		55.9	46.9	46.9
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.29	0.26		0.47	0.40	0.40
Clearance Time (s)	4.2	4.2		4.2	4.2		4.0	4.2		4.0	4.2	4.2
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)	254	755		369	699		104	1473		336	1509	641
v/s Ratio Prot		0.16			0.17		0.01	0.22		c0.23	0.36	
v/s Ratio Perm	c0.52			0.09			0.15			c0.45		0.11
v/c Ratio	1.23	0.38		0.21	0.41		0.58	0.82		1.46	0.91	0.28
Uniform Delay, d1	34.1	23.5		21.7	23.8		33.5	41.0		35.5	33.5	24.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	133.9	0.3		0.3	0.4		7.5	3.9		220.8	8.1	0.2
Delay (s)	168.0	23.8		21.9	24.2		41.1	44.9		256.3	41.6	24.4
Level of Service	F	C		C	C		D	D		F	D	C
Approach Delay (s)		97.0			23.9			44.7			90.7	
Approach LOS		F			C			D			F	

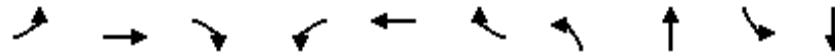
Intersection Summary

HCM Average Control Delay	70.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	118.1	Sum of lost time (s)	12.2
Intersection Capacity Utilization	113.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues

19: Alabama St & W Redlands

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	428	1038	121	133	471	261	136	814	292	1444
v/c Ratio	0.85	0.91	0.21	0.60	0.59	0.46	1.04	0.45	0.79	0.98
Control Delay	65.5	53.4	10.1	65.8	46.7	7.5	144.5	33.4	66.7	54.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.1
Total Delay	65.5	53.4	10.1	65.8	46.7	7.5	144.5	33.4	66.7	99.8
Queue Length 50th (ft)	165	385	14	51	165	0	-57	158	113	523
Queue Length 95th (ft)	228	487	59	88	231	70	#134	229	166	#767
Internal Link Dist (ft)		1247			345			380		164
Turn Bay Length (ft)	240		240	290			115		125	
Base Capacity (vph)	655	1138	576	522	944	620	131	1794	498	1470
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	172
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	0.65	0.91	0.21	0.25	0.50	0.42	1.04	0.45	0.59	1.11

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.

HCM Signalized Intersection Capacity Analysis

19: Alabama St & W Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	407	986	115	126	447	248	129	667	106	277	1025	347
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Total Lost time (s)	5.0	6.9	4.9	5.0	6.9	4.9	5.0	6.2		5.0	6.2	
Lane Util. Factor	0.97	*1.00	*1.00	0.97	*1.00	*1.00	0.97	*1.00		0.97	*1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3133	3800	1615	3133	3800	1615	3133	5582		3133	3656	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3133	3800	1615	3133	3800	1615	3133	5582		3133	3656	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	428	1038	121	133	471	261	136	702	112	292	1079	365
RTOR Reduction (vph)	0	0	65	0	0	202	0	18	0	0	27	0
Lane Group Flow (vph)	428	1038	56	133	471	59	136	796	0	292	1417	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	21.2	37.9	37.9	10.4	27.1	27.1	7.0	40.1		16.2	49.3	
Effective Green, g (s)	19.2	35.9	37.9	8.4	25.1	27.1	5.0	38.1		14.2	47.3	
Actuated g/C Ratio	0.16	0.30	0.32	0.07	0.21	0.23	0.04	0.32		0.12	0.40	
Clearance Time (s)	3.0	4.9	4.9	3.0	4.9	4.9	3.0	4.2		3.0	4.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	503	1140	511	220	797	366	131	1777		372	1445	
v/s Ratio Prot	c0.14	c0.27		0.04	0.12		0.04	0.14		c0.09	c0.39	
v/s Ratio Perm			0.03			0.04						
v/c Ratio	0.85	0.91	0.11	0.60	0.59	0.16	1.04	0.45		0.78	0.98	
Uniform Delay, d1	48.9	40.4	29.0	54.0	42.7	37.2	57.4	32.4		51.3	35.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.0	10.8	0.1	4.6	1.2	0.2	89.2	0.8		10.4	19.5	
Delay (s)	61.9	51.2	29.1	58.7	43.8	37.4	146.5	33.3		61.7	55.3	
Level of Service	E	D	C	E	D	D	F	C		E	E	
Approach Delay (s)		52.4			44.2			49.5			56.4	
Approach LOS		D			D			D			E	

Intersection Summary

HCM Average Control Delay	51.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	119.7	Sum of lost time (s)	23.1
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues

20: Tennessee & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	553	1507	48	550	793	776
v/c Ratio	1.02	0.97	0.29	0.71	0.93	0.99
Control Delay	67.3	45.7	20.3	35.8	49.9	64.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.3	45.7	20.3	35.8	49.9	64.8
Queue Length 50th (ft)	~289	455	14	143	239	243
Queue Length 95th (ft)	#512	#615	31	202	#357	#372
Internal Link Dist (ft)		2241		737	458	48
Turn Bay Length (ft)	145		140			
Base Capacity (vph)	544	1555	164	782	855	780
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.02	0.97	0.29	0.70	0.93	0.99

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.

HCM Signalized Intersection Capacity Analysis

20: Tennessee & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	525	1275	157	46	313	210	76	624	53	118	588	31
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	6.9		5.5	6.9			6.9			6.9	
Lane Util. Factor	1.00	*1.00		1.00	0.95			*1.00			*1.00	
Frt	1.00	0.98		1.00	0.94			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1710	3738		1710	3392			3741			3746	
Flt Permitted	0.21	1.00		0.19	1.00			0.66			0.60	
Satd. Flow (perm)	381	3738		348	3392			2474			2261	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	553	1342	165	48	329	221	80	657	56	124	619	33
RTOR Reduction (vph)	0	10	0	0	75	0	0	6	0	0	3	0
Lane Group Flow (vph)	553	1497	0	48	475	0	0	787	0	0	773	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	53.8	43.3		29.7	22.7			36.3			36.3	
Effective Green, g (s)	51.8	41.3		25.7	20.7			34.3			34.3	
Actuated g/C Ratio	0.52	0.41		0.26	0.21			0.34			0.34	
Clearance Time (s)	3.5	4.9		3.5	4.9			4.9			4.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	538	1545		158	703			849			776	
v/s Ratio Prot	c0.26	0.40		0.02	0.14							
v/s Ratio Perm	c0.27			0.06				0.32			c0.34	
v/c Ratio	1.03	0.97		0.30	0.68			0.93			1.00	
Uniform Delay, d1	24.7	28.7		29.5	36.5			31.6			32.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	46.1	15.9		1.1	2.6			15.8			31.0	
Delay (s)	70.8	44.6		30.6	39.1			47.4			63.8	
Level of Service	E	D		C	D			D			E	
Approach Delay (s)		51.6			38.4			47.4			63.8	
Approach LOS		D			D			D			E	

Intersection Summary

HCM Average Control Delay	51.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	99.9	Sum of lost time (s)	12.4
Intersection Capacity Utilization	109.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

21: Texas & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	3	11	59	57	43	51	20	580	31	18	318	14
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	3	12	62	60	45	54	21	611	33	19	335	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	804	1065	175	942	1056	322	349			643		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	804	1065	175	942	1056	322	349			643		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	95	93	69	79	92	98			98		
cM capacity (veh/h)	209	216	845	191	219	680	1221			951		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	77	159	326	338	186	182
Volume Left	3	60	21	0	19	0
Volume Right	62	54	0	33	0	15
cSH	540	265	1221	1700	951	1700
Volume to Capacity	0.14	0.60	0.02	0.20	0.02	0.11
Queue Length 95th (ft)	12	89	1	0	2	0
Control Delay (s)	12.8	37.2	0.7	0.0	1.1	0.0
Lane LOS	B	E	A		A	
Approach Delay (s)	12.8	37.2	0.3		0.5	
Approach LOS	B	E				

Intersection Summary		
Average Delay		5.8
Intersection Capacity Utilization	56.8%	ICU Level of Service
Analysis Period (min)		15
		B

HCM Unsignalized Intersection Capacity Analysis

22: Texas & Oriental

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	4	1	3	18	1	10	1	604	13	7	364	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	4	1	3	19	1	11	1	636	14	7	383	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	729	1049	192	855	1043	325	383			649		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	729	1049	192	855	1043	325	383			649		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	92	100	98	100			99		
cM capacity (veh/h)	306	227	824	252	229	677	1186			946		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	8	31	319	332	199	192
Volume Left	4	19	1	0	7	0
Volume Right	3	11	0	14	0	0
cSH	379	320	1186	1700	946	1700
Volume to Capacity	0.02	0.10	0.00	0.20	0.01	0.11
Queue Length 95th (ft)	2	8	0	0	1	0
Control Delay (s)	14.7	17.4	0.0	0.0	0.4	0.0
Lane LOS	B	C	A		A	
Approach Delay (s)	14.7	17.4	0.0		0.2	
Approach LOS	B	C				

Intersection Summary		
Average Delay		0.7
Intersection Capacity Utilization	27.8%	ICU Level of Service
Analysis Period (min)		15
		A

Queues

23: Eureka & EB I-10 off/Pearl

12/16/2013



Lane Group	EBT	EBR	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	1220	726	111	48	149	278	95
v/c Ratio	0.89	0.54	1.11	0.04	0.49	0.65	0.35
Control Delay	23.5	2.5	146.0	1.3	52.9	21.5	52.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.5	2.5	146.0	1.3	52.9	21.5	52.6
Queue Length 50th (ft)	700	22	~107	0	109	52	72
Queue Length 95th (ft)	1019	57	#147	10	173	117	127
Internal Link Dist (ft)	447				545		418
Turn Bay Length (ft)				75			
Base Capacity (vph)	1373	1348	100	1205	307	426	273
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.54	1.11	0.04	0.49	0.65	0.35

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.

HCM Signalized Intersection Capacity Analysis

23: Eureka & EB I-10 off/Pearl

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖		↗		↕	↗		↕	
Volume (vph)	252	907	690	105	0	46	0	142	264	23	67	0
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0	6.0		6.0		7.0	7.0		7.0	
Lane Util. Factor		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.99	1.00	0.95		1.00		1.00	1.00		0.99	
Satd. Flow (prot)		1880	1615	1710		1615		1900	1615		1876	
Flt Permitted		0.99	1.00	0.07		1.00		1.00	1.00		0.89	
Satd. Flow (perm)		1880	1615	135		1615		1900	1615		1688	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	265	955	726	111	0	48	0	149	278	24	71	0
RTOR Reduction (vph)	0	0	167	0	0	13	0	0	165	0	0	0
Lane Group Flow (vph)	0	1220	559	111	0	35	0	149	113	0	95	0
Turn Type	Perm	NA	Perm	custom		custom		NA	Perm	Perm	NA	
Protected Phases		8						2				6
Permitted Phases	8		8	3		3			2	6		
Actuated Green, G (s)		97.0	97.0	98.0		98.0		23.0	23.0		23.0	
Effective Green, g (s)		95.0	95.0	96.0		96.0		21.0	21.0		21.0	
Actuated g/C Ratio		0.73	0.73	0.74		0.74		0.16	0.16		0.16	
Clearance Time (s)		5.0	5.0	4.0		4.0		5.0	5.0		5.0	
Vehicle Extension (s)		2.0	2.0	2.0		2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)		1374	1180	100		1193		307	261		273	
v/s Ratio Prot								c0.08				
v/s Ratio Perm		0.65	0.35	c0.82		0.02			0.07		0.06	
v/c Ratio		0.89	0.47	1.11		0.03		0.49	0.43		0.35	
Uniform Delay, d1		13.4	7.2	17.0		4.5		49.6	49.1		48.4	
Progression Factor		1.00	1.00	1.00		1.00		0.95	0.88		1.00	
Incremental Delay, d2		7.1	0.1	122.7		0.0		5.4	5.1		3.5	
Delay (s)		20.5	7.3	139.7		4.5		52.3	48.1		51.9	
Level of Service		C	A	F		A		D	D		D	
Approach Delay (s)		15.6			98.9			49.6			51.9	
Approach LOS		B			F			D			D	

Intersection Summary

HCM Average Control Delay	27.5	HCM Level of Service	C
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	100.9%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues

24: Eureka & Stuart

12/16/2013



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	89	77	18	464	45	594
v/c Ratio	0.51	0.48	0.03	0.19	0.07	0.23
Control Delay	32.0	35.0	3.6	2.9	3.3	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.0	35.0	3.6	2.9	3.3	3.4
Queue Length 50th (ft)	26	27	2	19	5	36
Queue Length 95th (ft)	62	61	8	39	m9	m47
Internal Link Dist (ft)	380	399		136		545
Turn Bay Length (ft)			20		20	
Base Capacity (vph)	554	530	552	2504	623	2567
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.15	0.03	0.19	0.07	0.23

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

24: Eureka & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (vph)	25	41	19	43	24	7	17	338	103	43	532	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00			1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.97			0.99		1.00	0.97		1.00	0.99	
Flt Protected		0.99			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1803			1813		1710	3463		1705	3579	
Flt Permitted		0.87			0.83		0.43	1.00		0.49	1.00	
Satd. Flow (perm)		1599			1550		770	3463		871	3579	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	26	43	20	45	25	7	18	356	108	45	560	34
RTOR Reduction (vph)	0	18	0	0	6	0	0	24	0	0	4	0
Lane Group Flow (vph)	0	71	0	0	71	0	18	440	0	45	590	0
Confl. Peds. (#/hr)	9		6	6		9			3	3		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		8.4			8.4		48.6	48.6		48.6	48.6	
Effective Green, g (s)		6.4			6.4		46.6	46.6		46.6	46.6	
Actuated g/C Ratio		0.10			0.10		0.72	0.72		0.72	0.72	
Clearance Time (s)		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	
Lane Grp Cap (vph)		157			153		552	2483		624	2566	
v/s Ratio Prot								0.13			c0.16	
v/s Ratio Perm		0.04			c0.05		0.02			0.05		
v/c Ratio		0.45			0.46		0.03	0.18		0.07	0.23	
Uniform Delay, d1		27.6			27.7		2.7	3.0		2.7	3.1	
Progression Factor		1.00			1.00		1.00	1.00		0.94	0.98	
Incremental Delay, d2		2.1			2.2		0.1	0.2		0.2	0.2	
Delay (s)		29.7			29.9		2.8	3.1		2.8	3.2	
Level of Service		C			C		A	A		A	A	
Approach Delay (s)		29.7			29.9			3.1			3.2	
Approach LOS		C			C			A			A	

Intersection Summary

HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

25: Eureka & Oriental

12/16/2013



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	44	31	8	463	38	627
v/c Ratio	0.19	0.13	0.02	0.25	0.09	0.34
Control Delay	12.5	10.3	4.6	5.1	5.2	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.5	10.3	4.6	5.1	5.2	5.7
Queue Length 50th (ft)	5	2	1	21	3	31
Queue Length 95th (ft)	22	16	4	36	12	51
Internal Link Dist (ft)	432	448		184		93
Turn Bay Length (ft)			25		40	
Base Capacity (vph)	308	322	437	2107	511	2109
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.10	0.02	0.22	0.07	0.30

Intersection Summary

HCM Signalized Intersection Capacity Analysis

25: Eureka & Oriental

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (vph)	16	11	14	5	7	18	8	415	25	36	574	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)		6.2			6.2		6.2	6.2		6.2	6.2	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		0.99			0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Frt		0.95			0.92		1.00	0.99		1.00	0.99	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1758			1698		1709	3574		1705	3587	
Flt Permitted		0.86			0.93		0.41	1.00		0.49	1.00	
Satd. Flow (perm)		1541			1598		745	3574		872	3587	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	17	12	15	5	7	19	8	437	26	38	604	23
RTOR Reduction (vph)	0	13	0	0	16	0	0	11	0	0	7	0
Lane Group Flow (vph)	0	31	0	0	15	0	8	452	0	38	620	0
Confl. Peds. (#/hr)	8		2	2		8	1		6	6		1
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			5			7			3	
Permitted Phases	1			5			7			3		
Actuated Green, G (s)		7.1			7.1		20.0	20.0		20.0	20.0	
Effective Green, g (s)		5.1			5.1		18.0	18.0		18.0	18.0	
Actuated g/C Ratio		0.14			0.14		0.51	0.51		0.51	0.51	
Clearance Time (s)		4.2			4.2		4.2	4.2		4.2	4.2	
Vehicle Extension (s)		2.5			2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		221			230		378	1812		442	1819	
v/s Ratio Prot								0.13			c0.17	
v/s Ratio Perm		c0.02			0.01		0.01			0.04		
v/c Ratio		0.14			0.06		0.02	0.25		0.09	0.34	
Uniform Delay, d1		13.3			13.1		4.4	4.9		4.5	5.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.1		0.0	0.1		0.1	0.1	
Delay (s)		13.5			13.2		4.4	5.0		4.6	5.3	
Level of Service		B			B		A	A		A	A	
Approach Delay (s)		13.5			13.2			5.0			5.3	
Approach LOS		B			B			A			A	

Intersection Summary

HCM Average Control Delay	5.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	35.5	Sum of lost time (s)	12.4
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

26: Eureka & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	92	987	54	485	374	608
v/c Ratio	0.25	0.85	0.28	0.46	0.39	0.72
Control Delay	10.9	26.2	14.0	17.0	14.6	22.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.9	26.2	14.0	17.0	14.6	22.5
Queue Length 50th (ft)	17	166	10	68	45	94
Queue Length 95th (ft)	39	#266	26	106	76	145
Internal Link Dist (ft)		660		354	209	138
Turn Bay Length (ft)	35		40			
Base Capacity (vph)	371	1315	191	1200	1147	1021
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.75	0.28	0.40	0.33	0.60

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

26: Eureka & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↗	↖
Volume (vph)	87	872	66	51	400	61	32	258	65	137	398	43
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	6.6		5.7	6.6			6.2			6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.97			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1709	3568		1710	3532			3483			3521	
Flt Permitted	0.43	1.00		0.25	1.00			0.86			0.77	
Satd. Flow (perm)	774	3568		444	3532			3024			2737	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	92	918	69	54	421	64	34	272	68	144	419	45
RTOR Reduction (vph)	0	9	0	0	20	0	0	33	0	0	10	0
Lane Group Flow (vph)	92	978	0	54	465	0	0	341	0	0	598	0
Confl. Peds. (#/hr)	2		7	7		2	4		9	9		4
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			4	
Permitted Phases	6			2			4			4		
Actuated Green, G (s)	25.4	19.9		22.0	18.2			18.7			18.7	
Effective Green, g (s)	21.4	17.9		18.0	16.2			16.7			16.7	
Actuated g/C Ratio	0.39	0.33		0.33	0.30			0.30			0.30	
Clearance Time (s)	3.7	4.6		3.7	4.6			4.2			4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	361	1163		187	1042			920			833	
v/s Ratio Prot	c0.02	c0.27		0.01	0.13							
v/s Ratio Perm	0.08			0.09				0.11			c0.22	
v/c Ratio	0.25	0.84		0.29	0.45			0.37			0.72	
Uniform Delay, d1	10.8	17.2		13.2	15.7			15.0			17.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.4	5.6		0.9	0.3			0.3			3.0	
Delay (s)	11.2	22.8		14.1	16.0			15.2			20.0	
Level of Service	B	C		B	B			B			B	
Approach Delay (s)		21.8			15.8			15.2			20.0	
Approach LOS		C			B			B			B	

Intersection Summary

HCM Average Control Delay	19.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	54.9	Sum of lost time (s)	11.9
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Queues
27: Orange & Colton

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	248	893	179	283	128	143	894	103	599
v/c Ratio	0.42	0.86	1.44	0.26	0.14	0.88	0.86	1.14	0.58
Control Delay	12.9	24.6	261.9	9.8	5.9	77.2	35.6	172.1	26.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.9	24.6	261.9	9.8	5.9	77.2	35.6	172.1	26.5
Queue Length 50th (ft)	66	335	~124	67	17	68	209	~61	131
Queue Length 95th (ft)	120	#605	#187	109	41	#177	#313	#157	183
Internal Link Dist (ft)		502		260			472		133
Turn Bay Length (ft)	50		65		65	50		75	
Base Capacity (vph)	586	1041	124	1069	929	162	1038	90	1033
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.86	1.44	0.26	0.14	0.88	0.86	1.14	0.58

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.

HCM Signalized Intersection Capacity Analysis

27: Orange & Colton

12/16/2013



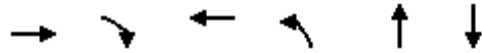
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↖	↖	↕		↖	↗	
Volume (vph)	236	606	242	170	269	122	136	646	203	98	520	49
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	1819		1710	1900	1615	1710	3480		1710	3563	
Flt Permitted	0.58	1.00		0.12	1.00	1.00	0.31	1.00		0.17	1.00	
Satd. Flow (perm)	1043	1819		220	1900	1615	563	3480		313	3563	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	248	638	255	179	283	128	143	680	214	103	547	52
RTOR Reduction (vph)	0	18	0	0	0	20	0	38	0	0	9	0
Lane Group Flow (vph)	248	875	0	179	283	108	143	856	0	103	590	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	47.0	47.0		47.0	47.0	47.0	25.0	25.0		25.0	25.0	
Effective Green, g (s)	45.0	45.0		45.0	45.0	45.0	23.0	23.0		23.0	23.0	
Actuated g/C Ratio	0.56	0.56		0.56	0.56	0.56	0.29	0.29		0.29	0.29	
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	3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	587	1023		124	1069	908	162	1001		90	1024	
v/s Ratio Prot		0.48			0.15			0.25			0.17	
v/s Ratio Perm	0.24			c0.81		0.07	0.25			c0.33		
v/c Ratio	0.42	0.86		1.44	0.26	0.12	0.88	0.86		1.14	0.58	
Uniform Delay, d1	10.0	14.8		17.5	9.0	8.2	27.2	26.9		28.5	24.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	7.1		239.0	0.1	0.1	39.6	7.4		139.1	0.9	
Delay (s)	10.5	21.9		256.5	9.1	8.3	66.8	34.4		167.6	25.2	
Level of Service	B	C		F	A	A	E	C		F	C	
Approach Delay (s)		19.4			84.0			38.8			46.1	
Approach LOS		B			F			D			D	

Intersection Summary

HCM Average Control Delay	41.6	HCM Level of Service	D
HCM Volume to Capacity ratio	1.34		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	106.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues
28: Pearl & Orange

12/16/2013



Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	1510	513	388	24	1152	718
v/c Ratio	1.91	0.52	1.64	0.21	1.09	1.24
Control Delay	434.2	12.7	326.6	33.4	90.1	153.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	434.2	12.7	326.6	33.4	90.1	153.4
Queue Length 50th (ft)	~1487	159	~362	12	~414	~286
Queue Length 95th (ft)	#1747	244	#395	36	#541	#399
Internal Link Dist (ft)	445		279		526	472
Turn Bay Length (ft)		20		75		
Base Capacity (vph)	791	987	237	113	1058	581
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.91	0.52	1.64	0.21	1.09	1.24

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.

HCM Signalized Intersection Capacity Analysis

28: Pearl & Orange

12/16/2013



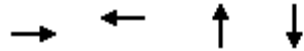
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↖	↕			↕	↖
Volume (vph)	584	850	487	54	48	266	23	1010	85	41	628	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1800	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	*1.00			*1.00	
Frt		1.00	0.85		0.90		1.00	0.99			1.00	
Flt Protected		0.98	1.00		0.99		0.95	1.00			1.00	
Satd. Flow (prot)		1862	1615		1702		1710	3756			3778	
Flt Permitted		0.69	1.00		0.23		0.23	1.00			0.55	
Satd. Flow (perm)		1318	1615		391		405	3756			2068	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	615	895	513	57	51	280	24	1063	89	43	661	14
RTOR Reduction (vph)	0	0	18	0	2	0	0	6	0	0	1	0
Lane Group Flow (vph)	0	1510	495	0	386	0	24	1146	0	0	717	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4		4	4		2	2		2	2	
Permitted Phases	4		4	4			2			2		
Actuated Green, G (s)		62.0	62.0		62.0		30.0	30.0			30.0	
Effective Green, g (s)		60.0	60.0		60.0		28.0	28.0			28.0	
Actuated g/C Ratio		0.60	0.60		0.60		0.28	0.28			0.28	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.5	3.5		3.5		3.5	3.5			3.5	
Lane Grp Cap (vph)		791	969		235		113	1052			579	
v/s Ratio Prot								0.30				
v/s Ratio Perm		c1.15	0.31		0.99		0.06				c0.35	
v/c Ratio		1.91	0.51		1.64		0.21	1.09			1.24	
Uniform Delay, d1		20.0	11.5		20.0		27.6	36.0			36.0	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		413.8	0.5		306.8		1.1	55.2			121.2	
Delay (s)		433.8	12.1		326.8		28.7	91.2			157.2	
Level of Service		F	B		F		C	F			F	
Approach Delay (s)		326.8			326.8			89.9			157.2	
Approach LOS		F			F			F			F	

Intersection Summary

HCM Average Control Delay	233.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	162.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues
29: Orange & Stuart

12/16/2013



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	335	296	1072	1559
v/c Ratio	1.01	1.10	0.51	1.01
Control Delay	89.0	121.2	10.3	45.7
Queue Delay	0.0	0.0	0.0	1.6
Total Delay	89.0	121.2	10.3	47.3
Queue Length 50th (ft)	~209	~207	167	~483
Queue Length 95th (ft)	#393	#375	215	#659
Internal Link Dist (ft)	305	198	150	526
Turn Bay Length (ft)				
Base Capacity (vph)	333	268	2102	1538
Starvation Cap Reductn	0	0	0	8
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.01	1.10	0.51	1.02

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.

HCM Signalized Intersection Capacity Analysis

29: Orange & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	119	127	72	146	54	81	9	845	165	131	1324	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.2			6.2			6.2			6.2	
Lane Util. Factor		1.00			1.00			0.95			*1.00	
Frbp, ped/bikes		0.99			0.98			0.99			1.00	
Flpb, ped/bikes		0.99			0.99			1.00			1.00	
Frt		0.97			0.96			0.98			1.00	
Flt Protected		0.98			0.97			1.00			1.00	
Satd. Flow (prot)		1771			1734			3478			3767	
Flt Permitted		0.75			0.60			0.94			0.64	
Satd. Flow (perm)		1355			1064			3266			2409	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	125	134	76	154	57	85	9	889	174	138	1394	27
RTOR Reduction (vph)	0	11	0	0	14	0	0	16	0	0	1	0
Lane Group Flow (vph)	0	324	0	0	282	0	0	1056	0	0	1558	0
Confl. Peds. (#/hr)	33		35	35		33	12		21	21		12
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		25.8			25.8			65.8			65.8	
Effective Green, g (s)		23.8			23.8			63.8			63.8	
Actuated g/C Ratio		0.24			0.24			0.64			0.64	
Clearance Time (s)		4.2			4.2			4.2			4.2	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		322			253			2084			1537	
v/s Ratio Prot												
v/s Ratio Perm		0.24			c0.26			0.32			c0.65	
v/c Ratio		1.01			1.11			0.51			1.01	
Uniform Delay, d1		38.1			38.1			9.7			18.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		52.0			90.2			0.2			26.3	
Delay (s)		90.1			128.3			9.9			44.4	
Level of Service		F			F			A			D	
Approach Delay (s)		90.1			128.3			9.9			44.4	
Approach LOS		F			F			A			D	

Intersection Summary

HCM Average Control Delay	45.4	HCM Level of Service	D
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	110.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

30: Orange & Oriental

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	48	23	11	954	1553	72
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	51	24	12	1004	1635	76
Pedestrians	16			24	1	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	1			2	0	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				464	395	
pX, platoon unblocked	0.87					
vC, conflicting volume	2215	895	1727			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2099	895	1727			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	91	97			
cM capacity (veh/h)	38	278	366			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	75	346	669	1090	621
Volume Left	51	12	0	0	0
Volume Right	24	0	0	0	76
cSH	53	366	1700	1700	1700
Volume to Capacity	1.41	0.03	0.39	0.64	0.37
Queue Length 95th (ft)	171	2	0	0	0
Control Delay (s)	394.5	1.1	0.0	0.0	0.0
Lane LOS	F	A			
Approach Delay (s)	394.5	0.4		0.0	
Approach LOS	F				

Intersection Summary

Average Delay	10.7				
Intersection Capacity Utilization	61.5%		ICU Level of Service	B	
Analysis Period (min)	15				

Queues

31: Orange & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	221	739	61	667	76	572	371	1194
v/c Ratio	0.82	0.57	0.50	0.82	0.74	0.72	0.95	0.74
Control Delay	43.8	19.3	40.3	25.8	67.3	30.3	54.5	18.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.8	19.3	40.3	25.8	67.3	30.3	54.5	18.4
Queue Length 50th (ft)	70	133	25	94	31	119	107	209
Queue Length 95th (ft)	#171	185	62	153	#100	176	#279	295
Internal Link Dist (ft)		387		273		223		384
Turn Bay Length (ft)	60		60		75		60	
Base Capacity (vph)	271	1483	160	986	125	957	389	1771
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.50	0.38	0.68	0.61	0.60	0.95	0.67

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

31: Orange & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	210	605	97	58	352	281	72	494	49	352	909	225
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	5.5	6.2		6.2	6.2		6.2	6.2		5.5	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.93		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1709	3520		1698	3325		1702	3549		1707	3477	
Flt Permitted	0.22	1.00		0.37	1.00		0.26	1.00		0.23	1.00	
Satd. Flow (perm)	391	3520		663	3325		468	3549		405	3477	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	221	637	102	61	371	296	76	520	52	371	957	237
RTOR Reduction (vph)	0	17	0	0	200	0	0	10	0	0	29	0
Lane Group Flow (vph)	221	722	0	61	467	0	76	562	0	371	1165	0
Confl. Peds. (#/hr)	16		15	15		16	26		23	23		26
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	27.0	27.0		14.9	14.9		17.3	17.3		33.5	33.5	
Effective Green, g (s)	25.0	25.0		12.9	12.9		15.3	15.3		31.5	31.5	
Actuated g/C Ratio	0.36	0.36		0.19	0.19		0.22	0.22		0.46	0.46	
Clearance Time (s)	3.5	4.2		4.2	4.2		4.2	4.2		3.5	4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	268	1277		124	623		104	788		387	1590	
v/s Ratio Prot	c0.08	0.21			0.14			0.16		c0.15	0.34	
v/s Ratio Perm	c0.22			0.09			0.16			c0.29		
v/c Ratio	0.82	0.57		0.49	0.75		0.73	0.71		0.96	0.73	
Uniform Delay, d1	17.5	17.6		25.1	26.5		24.9	24.8		14.4	15.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	18.3	0.6		3.1	4.9		23.0	3.1		34.7	1.8	
Delay (s)	35.8	18.2		28.1	31.4		47.9	27.8		49.0	17.0	
Level of Service	D	B		C	C		D	C		D	B	
Approach Delay (s)		22.2			31.1			30.2			24.6	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	26.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	68.9	Sum of lost time (s)	11.0
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

32: 6th St & WB I-10 Ramp

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↖	↗			↑			↘	↙
Volume (veh/h)	0	0	0	347	18	292	0	363	0	0	808	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	365	19	307	0	382	0	0	851	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWTL			TWTL	
Median storage veh								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1549	1233	851	1233	1233	382	851			382		
vC1, stage 1 conf vol	851	851		382	382							
vC2, stage 2 conf vol	699	382		851	851							
vCu, unblocked vol	1549	1233	851	1233	1233	382	851			382		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	0	95	54	100			100		
cM capacity (veh/h)	191	346	363	328	346	670	797			1187		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	365	326	382	851
Volume Left	365	0	0	0
Volume Right	0	307	0	0
cSH	328	635	1700	1700
Volume to Capacity	1.11	0.51	0.22	0.50
Queue Length 95th (ft)	357	74	0	0
Control Delay (s)	120.1	16.5	0.0	0.0
Lane LOS	F	C		
Approach Delay (s)	71.2		0.0	0.0
Approach LOS	F			

Intersection Summary			
Average Delay		25.6	
Intersection Capacity Utilization	69.5%		ICU Level of Service C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis

33: 6th St & EB I-10 Ramp

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔				↔	↔		↔	↔	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	187	301	257	0	0	0	217	193	137	467	491	214
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	197	317	271	0	0	0	228	203	144	492	517	225

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	514	271	228	347	492	742
Volume Left (vph)	197	0	228	0	492	0
Volume Right (vph)	0	271	0	144	0	225
Hadj (s)	0.19	-0.70	0.50	-0.29	0.50	-0.21
Departure Headway (s)	8.4	7.5	8.9	8.2	8.4	7.7
Degree Utilization, x	1.20	0.57	0.57	0.79	1.14	1.58
Capacity (veh/h)	433	462	391	435	439	473
Control Delay (s)	137.0	18.7	21.8	34.0	116.1	291.2
Approach Delay (s)	96.2		29.1		221.4	
Approach LOS	F		D		F	

Intersection Summary

Delay	140.9
HCM Level of Service	F
Intersection Capacity Utilization	87.8%
ICU Level of Service	E
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

34: 6th St & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (veh/h)	23	17	46	21	10	63	69	533	23	41	373	40
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	24	18	48	22	11	66	73	561	24	43	393	42
Pedestrians		2			2			4			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1282	1235	223	1064	1243	577	437			587		
vC1, stage 1 conf vol	502	502		720	720							
vC2, stage 2 conf vol	780	733		344	523							
vCu, unblocked vol	1282	1235	223	1064	1243	577	437			587		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	89	94	94	93	97	86	94			96		
cM capacity (veh/h)	220	318	782	314	325	463	1132			996		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	91	99	73	585	43	262	173
Volume Left	24	22	73	0	43	0	0
Volume Right	48	66	0	24	0	0	42
cSH	396	402	1132	1700	996	1700	1700
Volume to Capacity	0.23	0.25	0.06	0.34	0.04	0.15	0.10
Queue Length 95th (ft)	22	24	5	0	3	0	0
Control Delay (s)	16.8	16.9	8.4	0.0	8.8	0.0	0.0
Lane LOS	C	C	A		A		
Approach Delay (s)	16.8	16.9	0.9		0.8		
Approach LOS	C	C					

Intersection Summary			
Average Delay		3.1	
Intersection Capacity Utilization	50.9%		ICU Level of Service A
Analysis Period (min)		15	

Queues

35: Redlands Blvd & Citrus Ave

12/16/2013



Lane Group	EBT	WBT	SET	SER	NWT
Lane Group Flow (vph)	757	371	746	123	470
v/c Ratio	0.81	0.70	0.82	0.19	0.56
Control Delay	30.4	30.6	32.4	7.8	22.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	30.4	30.6	32.4	7.8	22.6
Queue Length 50th (ft)	148	64	158	8	84
Queue Length 95th (ft)	230	111	#306	47	154
Internal Link Dist (ft)	399	463	375		430
Turn Bay Length (ft)				100	
Base Capacity (vph)	1145	920	911	636	835
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.66	0.40	0.82	0.19	0.56

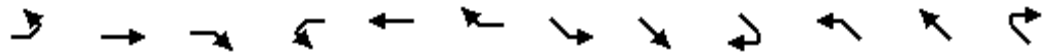
Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

35: Redlands Blvd & Citrus Ave

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕↕			↕↕			↕↕	↗		↕↕	
Volume (vph)	151	348	220	48	188	116	178	531	117	81	304	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.2			6.2	6.2		6.2	
Lane Util. Factor		0.95			0.95			0.95	1.00		0.95	
Frt		0.95			0.95			1.00	0.85		0.98	
Flt Protected		0.99			0.99			0.99	1.00		0.99	
Satd. Flow (prot)		3408			3409			3565	1615		3503	
Flt Permitted		0.99			0.99			0.71	1.00		0.65	
Satd. Flow (perm)		3408			3409			2558	1615		2308	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	159	366	232	51	198	122	187	559	123	85	320	65
RTOR Reduction (vph)	0	60	0	0	78	0	0	0	61	0	14	0
Lane Group Flow (vph)	0	697	0	0	293	0	0	746	62	0	456	0
Turn Type	Split	NA		Split	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	4	4		1	1			2			2	
Permitted Phases							2		2	2		
Actuated Green, G (s)		20.6			11.6			27.9	27.9		27.9	
Effective Green, g (s)		18.6			9.6			25.9	25.9		25.9	
Actuated g/C Ratio		0.26			0.13			0.36	0.36		0.36	
Clearance Time (s)		4.0			4.2			4.2	4.2		4.2	
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		874			451			914	577		825	
v/s Ratio Prot		c0.20			c0.09							
v/s Ratio Perm								c0.29	0.04		0.20	
v/c Ratio		0.80			0.65			0.82	0.11		0.55	
Uniform Delay, d1		25.2			29.9			21.1	15.6		18.7	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		5.1			3.2			5.7	0.1		0.8	
Delay (s)		30.3			33.1			26.8	15.7		19.5	
Level of Service		C			C			C	B		B	
Approach Delay (s)		30.3			33.1			25.3			19.5	
Approach LOS		C			C			C			B	

Intersection Summary

HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	72.5	Sum of lost time (s)	18.4
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

36: Stuart & Church

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	72	33	13	339	382	26
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	76	35	14	357	402	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	622	215	429			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	622	215	429			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	82	96	99			
cM capacity (veh/h)	419	796	1141			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	111	133	238	268	161
Volume Left	76	14	0	0	0
Volume Right	35	0	0	0	27
cSH	492	1141	1700	1700	1700
Volume to Capacity	0.22	0.01	0.14	0.16	0.09
Queue Length 95th (ft)	21	1	0	0	0
Control Delay (s)	14.4	0.9	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	14.4	0.3		0.0	
Approach LOS	B				

Intersection Summary					
Average Delay			1.9		
Intersection Capacity Utilization	31.5%		ICU Level of Service	A	
Analysis Period (min)	15				

HCM Unsignalized Intersection Capacity Analysis
 37: Universtiy & WB I-10 Ramp/E Central

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↔			↔	
Volume (veh/h)	0	0	0	2	25	18	418	820	57	11	207	488
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	2	26	19	440	863	60	12	218	514
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)												
pX, platoon unblocked												
vC, conflicting volume	1842	2301	366	1905	2528	462	732			923		
vC1, stage 1 conf vol	498	498		1773	1773							
vC2, stage 2 conf vol	1344	1803		132	755							
vCu, unblocked vol	1842	2301	366	1905	2528	462	732			923		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	95	0	97	50			98		
cM capacity (veh/h)	36	53	637	43	14	552	882			748		

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	47	872	492	121	623
Volume Left	2	440	0	12	0
Volume Right	19	0	60	0	514
cSH	24	882	1700	748	1700
Volume to Capacity	1.99	0.50	0.29	0.02	0.37
Queue Length 95th (ft)	148	71	0	1	0
Control Delay (s)	807.1	10.9	0.0	1.1	0.0
Lane LOS	F	B		A	
Approach Delay (s)	807.1	7.0		0.2	
Approach LOS	F				

Intersection Summary		
Average Delay		22.2
Intersection Capacity Utilization	71.7%	ICU Level of Service C
Analysis Period (min)		15

HCM Unsignalized Intersection Capacity Analysis

38: Universtiy & EB I-10 Ramp

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↶	↷		↑↑	↓↓	
Volume (veh/h)	628	810	0	625	265	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	661	853	0	658	279	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	12					
Median type				TWLTL	TWLTL	
Median storage veh				2	2	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	608	139	279			
vC1, stage 1 conf vol	279					
vC2, stage 2 conf vol	329					
vCu, unblocked vol	608	139	279			
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 %	0	4	100			
cM capacity (veh/h)	613	890	1295			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	1514	329	329	139	139	
Volume Left	661	0	0	0	0	
Volume Right	853	0	0	0	0	
cSH	1210	1700	1700	1700	1700	
Volume to Capacity	1.25	0.19	0.19	0.08	0.08	
Queue Length 95th (ft)	1236	0	0	0	0	
Control Delay (s)	134.2	0.0	0.0	0.0	0.0	
Lane LOS	F					
Approach Delay (s)	134.2	0.0	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay	82.9					
Intersection Capacity Utilization	64.1%			ICU Level of Service	C	
Analysis Period (min)	15					

Queues

39: Tippecanoe & Harriman PI

12/16/2013



Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	233	939	358	428	401	289	1184	780	2488
v/c Ratio	0.98	1.00	0.93	0.96	0.94	0.92	0.44	0.64	0.98
Control Delay	110.0	60.5	87.1	76.0	71.1	56.7	25.7	6.7	23.2
Queue Delay	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	110.0	62.9	87.1	76.0	71.1	56.7	25.7	6.7	23.2
Queue Length 50th (ft)	199	325	156	335	301	134	263	140	242
Queue Length 95th (ft)	#369	#491	#250	#558	#514	m116	m227	m96	m216
Internal Link Dist (ft)				848			384		769
Turn Bay Length (ft)	280		300		300	225		500	
Base Capacity (vph)	237	941	386	446	427	313	2713	1217	2541
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	9	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.98	1.01	0.93	0.96	0.94	0.92	0.44	0.64	0.98

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.

HCM Signalized Intersection Capacity Analysis

39: Tippecanoe & Harriman PI

12/16/2013



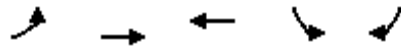
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	221	0	892	340	162	625	275	1125	741	0	2150	214
Ideal Flow (vphpl)	1800	1900	1800	1700	1900	1900	1700	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00		0.88	0.97	0.95	0.95	0.97	0.91	1.00		0.86	
Frt	1.00		0.85	1.00	0.91	0.85	1.00	1.00	0.85		0.99	
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (prot)	1710		2693	3133	1642	1534	3133	5187	1615		6447	
Flt Permitted	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (perm)	1710		2693	3133	1642	1534	3133	5187	1615		6447	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	233	0	939	358	171	658	289	1184	780	0	2263	225
RTOR Reduction (vph)	0	0	236	0	41	50	0	0	372	0	13	0
Lane Group Flow (vph)	233	0	703	358	387	351	289	1184	408	0	2475	0
Turn Type	Prot		custom	Prot	NA	Perm	Prot	NA	Perm		NA	
Protected Phases	7			3	8		5	2				6
Permitted Phases			4			8			2			
Actuated Green, G (s)	18.0		34.0	16.0	32.0	32.0	13.0	68.0	68.0		51.0	
Effective Green, g (s)	18.0		34.0	16.0	32.0	32.0	13.0	68.0	68.0		51.0	
Actuated g/C Ratio	0.14		0.26	0.12	0.25	0.25	0.10	0.52	0.52		0.39	
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)	237		704	386	404	378	313	2713	845		2529	
v/s Ratio Prot	c0.14			0.11	0.24		c0.09	0.23			c0.38	
v/s Ratio Perm			c0.26			0.23			0.25			
v/c Ratio	0.98		1.00	0.93	0.96	0.93	0.92	0.44	0.48		0.98	
Uniform Delay, d1	55.8		48.0	56.4	48.3	47.9	58.0	19.2	19.8		39.0	
Progression Factor	1.00		1.00	1.00	1.00	1.00	0.88	1.33	5.19		0.52	
Incremental Delay, d2	53.4		33.2	28.0	33.4	28.7	4.8	0.0	0.2		2.4	
Delay (s)	109.2		81.2	84.4	81.7	76.6	55.5	25.5	102.9		22.5	
Level of Service	F		F	F	F	E	E	C	F		C	
Approach Delay (s)		86.7			80.8			56.1			22.5	
Approach LOS		F			F			E			C	

Intersection Summary

HCM Average Control Delay	53.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Mill St

11/25/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	94	1011	1356	277	131
v/c Ratio	0.49	0.43	0.58	0.58	0.57
Control Delay	16.8	6.0	7.3	26.0	28.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	16.8	6.0	7.3	26.0	28.0
Queue Length 50th (ft)	14	74	114	42	32
Queue Length 95th (ft)	#74	132	202	75	84
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	211	2551	2538	1246	561
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.45	0.40	0.53	0.22	0.23

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: Mill St

11/25/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑↑	↑↑		↙↘	↗
Volume (vph)	89	960	1233	55	158	230
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.94	0.85
Flt Protected	0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	1710	3610	3587		3364	1470
Flt Permitted	0.17	1.00	1.00		0.97	1.00
Satd. Flow (perm)	299	3610	3587		3364	1470
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	94	1011	1298	58	166	242
RTOR Reduction (vph)	0	0	3	0	39	39
Lane Group Flow (vph)	94	1011	1353	0	238	92
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	40.2	40.2	40.2		9.7	9.7
Effective Green, g (s)	38.2	38.2	38.2		7.7	7.7
Actuated g/C Ratio	0.65	0.65	0.65		0.13	0.13
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	194	2341	2326		440	192
v/s Ratio Prot		0.28	c0.38		c0.07	
v/s Ratio Perm	0.31					0.06
v/c Ratio	0.48	0.43	0.58		0.54	0.48
Uniform Delay, d1	5.3	5.1	5.8		23.9	23.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.9	0.1	0.4		1.4	1.9
Delay (s)	7.2	5.2	6.2		25.3	25.6
Level of Service	A	A	A		C	C
Approach Delay (s)		5.4	6.2		25.4	
Approach LOS		A	A		C	

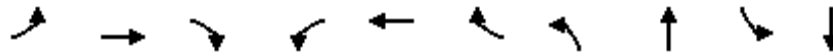
Intersection Summary

HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	58.9	Sum of lost time (s)	13.0
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

11/25/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	297	462	419	303	667	220	387	1592	132	1477
v/c Ratio	1.02	0.70	0.74	0.92	1.02	0.59	1.02	0.76	0.73	0.98
Control Delay	89.2	48.8	18.4	61.9	84.4	29.2	82.2	30.8	43.1	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	89.2	48.8	18.4	61.9	84.4	29.2	82.2	30.8	43.1	57.1
Queue Length 50th (ft)	~169	162	52	161	~256	76	~238	348	45	366
Queue Length 95th (ft)	#343	220	171	#288	#380	158	#430	409	#120	#477
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	290	656	567	331	656	375	380	2094	194	1503
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	1.02	0.70	0.74	0.92	1.02	0.59	1.02	0.76	0.68	0.98

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.

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	282	439	398	288	634	209	368	1396	117	125	1117	286
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0		5.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3610	1615	1710	3610	1615	1710	5127		1710	5028	
Flt Permitted	0.20	1.00	1.00	0.31	1.00	1.00	0.11	1.00		0.12	1.00	
Satd. Flow (perm)	360	3610	1615	566	3610	1615	195	5127		225	5028	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	297	462	419	303	667	220	387	1469	123	132	1176	301
RTOR Reduction (vph)	0	0	273	0	0	82	0	9	0	0	41	0
Lane Group Flow (vph)	297	462	146	303	667	138	387	1583	0	132	1436	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	38.0	22.0	22.0	38.0	22.0	22.0	59.0	46.8		43.2	34.0	
Effective Green, g (s)	34.0	20.0	20.0	34.0	20.0	20.0	57.0	44.8		39.2	32.0	
Actuated g/C Ratio	0.31	0.18	0.18	0.31	0.18	0.18	0.52	0.41		0.36	0.29	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	283	656	294	321	656	294	377	2088		177	1463	
v/s Ratio Prot	c0.13	0.13		0.12	0.18		c0.19	0.31		0.05	0.29	
v/s Ratio Perm	c0.19		0.09	0.17		0.09	c0.35			0.22		
v/c Ratio	1.05	0.70	0.50	0.94	1.02	0.47	1.03	0.76		0.75	0.98	
Uniform Delay, d1	33.6	42.2	40.5	33.5	45.0	40.3	33.6	28.0		25.6	38.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	67.1	3.4	1.3	35.5	39.4	1.2	53.3	2.6		15.6	19.1	
Delay (s)	100.7	45.7	41.8	69.0	84.4	41.4	86.9	30.6		41.3	57.8	
Level of Service	F	D	D	E	F	D	F	C		D	E	
Approach Delay (s)		58.2			72.5			41.6			56.5	
Approach LOS		E			E			D			E	

Intersection Summary

HCM Average Control Delay	55.1	HCM Level of Service	E
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	103.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Waterman & E Orange Show

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	397	1218	325	1240	457	1633	175	1690
v/c Ratio	1.74	1.10	1.73	1.22	1.80	1.11	1.42	1.43
Control Delay	376.8	100.6	374.0	150.0	400.8	96.8	255.6	232.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	376.8	100.6	374.0	150.0	400.8	96.8	255.6	232.5
Queue Length 50th (ft)	~449	~564	~357	~640	~533	~783	~146	~957
Queue Length 95th (ft)	#654	#697	#549	#775	#748	#918	#302	#1092
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	228	1104	188	1013	254	1471	123	1181
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.74	1.10	1.73	1.22	1.80	1.11	1.42	1.43

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.

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	377	797	360	309	1021	157	434	1341	210	166	1217	389
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	6.0	7.0		6.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	*1.00		1.00	*1.00		1.00	*1.00		1.00	*1.00	
Frt	1.00	0.95		1.00	0.98		1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3623		1710	3724		1710	3723		1710	3662	
Flt Permitted	0.11	1.00		0.11	1.00		0.09	1.00		0.10	1.00	
Satd. Flow (perm)	189	3623		206	3724		153	3723		176	3662	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	397	839	379	325	1075	165	457	1412	221	175	1281	409
RTOR Reduction (vph)	0	45	0	0	10	0	0	10	0	0	26	0
Lane Group Flow (vph)	397	1173	0	325	1230	0	457	1623	0	175	1664	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	55.0	40.0		49.0	37.0		64.0	53.0		50.0	43.0	
Effective Green, g (s)	51.0	38.0		45.0	35.0		62.0	51.0		46.0	41.0	
Actuated g/C Ratio	0.39	0.29		0.35	0.27		0.48	0.39		0.35	0.32	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	226	1059		187	1003		253	1461		121	1155	
v/s Ratio Prot	c0.18	0.32		0.13	0.33		c0.21	0.44		0.06	0.45	
v/s Ratio Perm	c0.51			0.47			c0.65			0.46		
v/c Ratio	1.76	1.11		1.74	1.23		1.81	1.11		1.45	1.44	
Uniform Delay, d1	37.0	46.0		36.3	47.5		40.5	39.5		40.4	44.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	358.1	62.0		353.4	110.7		378.1	60.0		241.0	203.3	
Delay (s)	395.1	108.0		389.7	158.2		418.7	99.5		281.4	247.8	
Level of Service	F	F		F	F		F	F		F	F	
Approach Delay (s)		178.6			206.3			169.3			250.9	
Approach LOS		F			F			F			F	

Intersection Summary

HCM Average Control Delay	200.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.75		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	148.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

11/25/2013



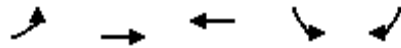
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	6	17	31	1978	1881	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	6	18	33	2082	1980	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						745
pX, platoon unblocked						
vC, conflicting volume	3089	993	1985			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3089	993	1985			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	25	93	89			
cM capacity (veh/h)	8	248	294			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	24	33	1041	1041	1320	665
Volume Left	6	33	0	0	0	0
Volume Right	18	0	0	0	0	5
cSH	30	294	1700	1700	1700	1700
Volume to Capacity	0.82	0.11	0.61	0.61	0.78	0.39
Queue Length 95th (ft)	67	9	0	0	0	0
Control Delay (s)	302.1	18.7	0.0	0.0	0.0	0.0
Lane LOS	F	C				
Approach Delay (s)	302.1	0.3	0.0			
Approach LOS	F					

Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization			64.7%	ICU Level of Service	C	
Analysis Period (min)			15			

Queues
1: Mill St

12/16/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	64	469	383	250	115
v/c Ratio	0.16	0.31	0.26	0.40	0.33
Control Delay	7.4	7.1	6.5	11.1	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.4	7.1	6.5	11.1	6.5
Queue Length 50th (ft)	6	23	17	12	0
Queue Length 95th (ft)	21	48	38	39	28
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	639	2442	2419	2340	1031
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.10	0.19	0.16	0.11	0.11

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St

12/16/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷↷	↷↶		↷↷↶	↶
Volume (vph)	61	446	334	29	188	159
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.97	0.85
Flt Protected	0.95	1.00	1.00		0.96	1.00
Satd. Flow (prot)	1710	3610	3566		3435	1470
Flt Permitted	0.52	1.00	1.00		0.96	1.00
Satd. Flow (perm)	945	3610	3566		3435	1470
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	64	469	352	31	198	167
RTOR Reduction (vph)	0	0	11	0	43	95
Lane Group Flow (vph)	64	469	372	0	207	20
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	15.2	15.2	15.2		7.4	7.4
Effective Green, g (s)	13.2	13.2	13.2		5.4	5.4
Actuated g/C Ratio	0.42	0.42	0.42		0.17	0.17
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	395	1508	1490		587	251
v/s Ratio Prot		c0.13	0.10		c0.06	
v/s Ratio Perm	0.07					0.01
v/c Ratio	0.16	0.31	0.25		0.35	0.08
Uniform Delay, d1	5.7	6.2	6.0		11.6	11.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.1	0.1		0.4	0.1
Delay (s)	5.9	6.3	6.1		11.9	11.1
Level of Service	A	A	A		B	B
Approach Delay (s)		6.2	6.1		11.7	
Approach LOS		A	A		B	

Intersection Summary

HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	31.6	Sum of lost time (s)	13.0
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

2: Waterman Ave & 9th St

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	114	572	191	616	55	590	93	982
v/c Ratio	0.48	0.51	0.77	0.54	0.37	0.46	0.34	0.76
Control Delay	22.0	14.3	39.3	14.1	20.4	12.7	16.0	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.0	14.3	39.3	14.1	20.4	12.7	16.0	18.0
Queue Length 50th (ft)	27	66	51	69	12	66	20	132
Queue Length 95th (ft)	69	106	#143	112	40	105	52	196
Internal Link Dist (ft)		852		841		893		996
Turn Bay Length (ft)	130		100		50		75	
Base Capacity (vph)	313	1479	329	1500	193	1647	355	1651
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.39	0.58	0.41	0.28	0.36	0.26	0.59

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

2: Waterman Ave & 9th St

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↕		↰	↕		↰	↕		↰	↕	
Volume (vph)	108	431	112	181	466	119	52	501	60	88	877	56
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	7.5	7.5		7.4	7.4		7.5	7.5		7.5	7.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.97		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3498		1710	3500		1710	3552		1710	3577	
Flt Permitted	0.42	1.00		0.44	1.00		0.23	1.00		0.43	1.00	
Satd. Flow (perm)	753	3498		786	3500		419	3552		773	3577	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	114	454	118	191	491	125	55	527	63	93	923	59
RTOR Reduction (vph)	0	29	0	0	43	0	0	17	0	0	9	0
Lane Group Flow (vph)	114	543	0	191	573	0	55	573	0	93	973	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	17.0	17.0		17.1	17.1		19.2	19.2		19.2	19.2	
Effective Green, g (s)	15.0	15.0		15.1	15.1		17.2	17.2		17.2	17.2	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.36	0.36		0.36	0.36	
Clearance Time (s)	5.5	5.5		5.4	5.4		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	239	1112		251	1120		153	1294		282	1303	
v/s Ratio Prot		0.16			0.16			0.16			c0.27	
v/s Ratio Perm	0.15			c0.24			0.13			0.12		
v/c Ratio	0.48	0.49		0.76	0.51		0.36	0.44		0.33	0.75	
Uniform Delay, d1	12.9	13.0		14.4	13.1		11.0	11.4		10.8	13.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	0.3		12.7	0.4		1.4	0.2		0.7	2.4	
Delay (s)	14.4	13.3		27.2	13.4		12.4	11.6		11.5	15.5	
Level of Service	B	B		C	B		B	B		B	B	
Approach Delay (s)		13.5			16.7			11.7			15.1	
Approach LOS		B			B			B			B	

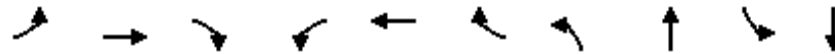
Intersection Summary

HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	47.2	Sum of lost time (s)	14.9
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	123	416	171	356	684	199	121	907	105	878
v/c Ratio	0.46	0.27	0.22	0.91	0.44	0.25	0.54	0.60	0.50	0.58
Control Delay	20.7	13.8	2.8	49.1	15.7	2.8	29.7	25.1	27.4	25.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.7	13.8	2.8	49.1	15.7	2.8	29.7	25.1	27.4	25.4
Queue Length 50th (ft)	36	58	0	138	104	0	37	135	32	133
Queue Length 95th (ft)	83	86	30	#297	145	32	#91	179	#75	176
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	291	1685	845	427	1685	860	224	1517	212	1511
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	0.42	0.25	0.20	0.83	0.41	0.23	0.54	0.60	0.50	0.58

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

12/16/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	117	395	162	338	650	189	115	737	124	100	753	81
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	7.0		5.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3610	1615	1710	3610	1615	1710	5075		1710	5112	
Flt Permitted	0.35	1.00	1.00	0.51	1.00	1.00	0.24	1.00		0.23	1.00	
Satd. Flow (perm)	623	3610	1615	915	3610	1615	435	5075		415	5112	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	123	416	171	356	684	199	121	776	131	105	793	85
RTOR Reduction (vph)	0	0	98	0	0	114	0	29	0	0	16	0
Lane Group Flow (vph)	123	416	73	356	684	85	121	878	0	105	862	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	34.1	34.1	34.1	34.1	34.1	34.1	28.0	23.4		27.8	23.3	
Effective Green, g (s)	32.1	32.1	32.1	32.1	32.1	32.1	24.0	21.4		23.8	21.3	
Actuated g/C Ratio	0.43	0.43	0.43	0.43	0.43	0.43	0.32	0.29		0.32	0.28	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	267	1545	691	392	1545	691	183	1448		175	1452	
v/s Ratio Prot		0.12			0.19		c0.02	0.17		0.02	0.17	
v/s Ratio Perm	0.20		0.05	c0.39		0.05	c0.19			0.17		
v/c Ratio	0.46	0.27	0.11	0.91	0.44	0.12	0.66	0.61		0.60	0.59	
Uniform Delay, d1	15.3	13.9	12.9	20.1	15.1	13.0	20.6	23.2		20.1	23.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	0.1	0.1	24.1	0.2	0.1	8.6	1.9		5.5	1.8	
Delay (s)	16.5	14.0	12.9	44.2	15.3	13.0	29.2	25.1		25.6	24.9	
Level of Service	B	B	B	D	B	B	C	C		C	C	
Approach Delay (s)		14.2			23.3			25.5			25.0	
Approach LOS		B			C			C			C	

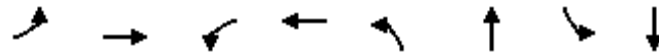
Intersection Summary

HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Waterman & E Orange Show

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	237	940	262	845	142	1253	81	1103
v/c Ratio	0.89	1.00	0.96	0.91	0.78	1.04	0.73	1.06
Control Delay	64.9	70.3	81.8	60.1	55.0	77.8	61.6	88.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.9	70.3	81.8	60.1	55.0	77.8	61.6	88.6
Queue Length 50th (ft)	140	~353	177	345	72	~570	39	~504
Queue Length 95th (ft)	#280	#496	#352	#471	145	#703	#119	#708
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	287	940	277	925	247	1204	111	1039
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	1.00	0.95	0.91	0.57	1.04	0.73	1.06

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.

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↕		↖	↕		↗	↕		↖	↕	
Volume (vph)	225	521	372	249	670	133	135	1107	84	77	936	112
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	6.0	7.0		6.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	*1.00		1.00	*1.00		1.00	*1.00		1.00	*1.00	
Frt	1.00	0.94		1.00	0.98		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1539	3206		1539	3335		1539	3384		1539	3365	
Flt Permitted	0.14	1.00		0.11	1.00		0.09	1.00		0.10	1.00	
Satd. Flow (perm)	226	3206		183	3335		141	3384		163	3365	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	237	548	392	262	705	140	142	1165	88	81	985	118
RTOR Reduction (vph)	0	100	0	0	14	0	0	5	0	0	7	0
Lane Group Flow (vph)	237	840	0	262	831	0	142	1248	0	81	1096	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	55.2	36.0		58.2	37.5		59.0	48.0		48.8	41.8	
Effective Green, g (s)	51.2	34.0		54.2	35.5		57.0	46.0		44.8	39.8	
Actuated g/C Ratio	0.39	0.26		0.42	0.27		0.44	0.35		0.35	0.31	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	263	840		272	913		183	1200		109	1033	
v/s Ratio Prot	0.12	0.26		c0.14	0.25		c0.07	c0.37		0.03	0.33	
v/s Ratio Perm	0.24			c0.26			0.27			0.23		
v/c Ratio	0.90	1.00		0.96	0.91		0.78	1.04		0.74	1.06	
Uniform Delay, d1	32.0	47.8		38.3	45.6		29.4	41.8		33.6	44.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	30.9	31.2		44.2	13.0		18.4	37.1		23.6	45.7	
Delay (s)	62.9	79.0		82.5	58.5		47.8	79.0		57.2	90.6	
Level of Service	E	E		F	E		D	E		E	F	
Approach Delay (s)		75.8			64.2			75.8			88.4	
Approach LOS		E			E			E			F	

Intersection Summary

HCM Average Control Delay	76.2	HCM Level of Service	E
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	129.7	Sum of lost time (s)	19.0
Intersection Capacity Utilization	109.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	8	1317	1289	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	8	1386	1357	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					87	
pX, platoon unblocked	0.97	0.97	0.97			
vC, conflicting volume	2069	681	1361			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2035	597	1302			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	98			
cM capacity (veh/h)	48	436	520			

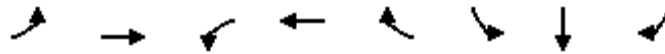
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	0	8	693	693	905	456
Volume Left	0	8	0	0	0	0
Volume Right	0	0	0	0	0	4
cSH	1700	520	1700	1700	1700	1700
Volume to Capacity	0.00	0.02	0.41	0.41	0.53	0.27
Queue Length 95th (ft)	0	1	0	0	0	0
Control Delay (s)	0.0	12.0	0.0	0.0	0.0	0.0
Lane LOS	A	B				
Approach Delay (s)	0.0	0.1	0.0			
Approach LOS	A					

Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			39.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Queues

6: Waterman & Washington

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	SBL	SBT	SBR
Lane Group Flow (vph)	726	1442	21	943	643	304	304	246
v/c Ratio	0.98	0.67	0.19	0.80	0.70	0.64	0.61	0.38
Control Delay	67.1	16.6	33.5	38.4	9.4	36.5	35.0	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.1	16.6	33.5	38.4	9.4	36.5	35.0	4.9
Queue Length 50th (ft)	231	316	10	293	31	172	170	0
Queue Length 95th (ft)	#348	437	33	#444	166	250	246	51
Internal Link Dist (ft)		433		239			537	
Turn Bay Length (ft)	225		100		200	125		
Base Capacity (vph)	743	2159	109	1185	916	568	600	725
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.67	0.19	0.80	0.70	0.54	0.51	0.34

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

6: Waterman & Washington

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	690	1367	3	20	896	611	0	0	0	566	11	234
Ideal Flow (vphpl)	1700	1900	1900	1800	1900	1900	1900	1900	1900	1800	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0	6.0				5.0	5.0	5.0
Lane Util. Factor	*1.00	0.95		1.00	0.95	1.00				0.95	0.95	1.00
Frt	1.00	1.00		1.00	1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00				0.95	0.95	1.00
Satd. Flow (prot)	3230	3609		1710	3610	1615				1624	1722	1615
Flt Permitted	0.95	1.00		0.18	1.00	1.00				0.95	0.95	1.00
Satd. Flow (perm)	3230	3609		331	3610	1615				1624	1715	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	726	1439	3	21	943	643	0	0	0	596	12	246
RTOR Reduction (vph)	0	0	0	0	0	386	0	0	0	0	0	174
Lane Group Flow (vph)	726	1442	0	21	943	257	0	0	0	304	304	72
Turn Type	Prot	NA		Perm	NA	Perm	Perm			Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases				6		6	8			4		4
Actuated Green, G (s)	23.0	59.8		32.8	32.8	32.8				29.2	29.2	29.2
Effective Green, g (s)	23.0	59.8		32.8	32.8	32.8				29.2	29.2	29.2
Actuated g/C Ratio	0.23	0.60		0.33	0.33	0.33				0.29	0.29	0.29
Clearance Time (s)	4.0	6.0		6.0	6.0	6.0				5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0				3.0	3.0	3.0
Lane Grp Cap (vph)	743	2158		109	1184	530				474	501	472
v/s Ratio Prot	c0.22	0.40			c0.26							
v/s Ratio Perm				0.06		0.16				c0.19	0.18	0.04
v/c Ratio	0.98	0.67		0.19	0.80	0.48				0.64	0.61	0.15
Uniform Delay, d1	38.2	13.5		24.1	30.6	26.8				30.8	30.5	26.2
Progression Factor	1.00	1.00		1.00	1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	27.1	1.7		3.9	5.6	3.1				3.0	2.1	0.2
Delay (s)	65.3	15.1		28.0	36.2	30.0				33.8	32.5	26.4
Level of Service	E	B		C	D	C				C	C	C
Approach Delay (s)		31.9			33.6			0.0			31.2	
Approach LOS		C			C			A			C	

Intersection Summary

HCM Average Control Delay	32.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Queues

7: S Tippecanoe & E Victoria

12/16/2013



Lane Group	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	65	35	1466	31	1281
v/c Ratio	0.34	0.18	0.52	0.14	0.45
Control Delay	28.8	14.9	5.5	6.4	5.0
Queue Delay	0.0	0.0	0.6	0.0	0.0
Total Delay	28.8	14.9	6.1	6.4	5.0
Queue Length 50th (ft)	22	3	123	3	99
Queue Length 95th (ft)	51	24	214	16	172
Internal Link Dist (ft)		770	198		507
Turn Bay Length (ft)	100			115	
Base Capacity (vph)	480	451	2829	221	2841
Starvation Cap Reductn	0	0	843	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.14	0.08	0.74	0.14	0.45

Intersection Summary

HCM Signalized Intersection Capacity Analysis

7: S Tippecanoe & E Victoria

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↖	↗		↖	↕		↖	↕	
Volume (vph)	0	0	0	62	1	32	0	1346	47	29	1214	3
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)				6.0	6.0			7.5		7.5	7.5	
Lane Util. Factor				1.00	1.00			0.95		1.00	0.95	
Frt				1.00	0.85			0.99		1.00	1.00	
Flt Protected				0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)				1710	1623			3592		1710	3609	
Flt Permitted				1.00	1.00			1.00		0.16	1.00	
Satd. Flow (perm)				1800	1623			3592		281	3609	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	65	1	34	0	1417	49	31	1278	3
RTOR Reduction (vph)	0	0	0	0	23	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	0	0	65	12	0	0	1464	0	31	1281	0
Turn Type	Perm			Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)				5.9	5.9			44.6		44.6	44.6	
Effective Green, g (s)				3.9	3.9			42.6		42.6	42.6	
Actuated g/C Ratio				0.06	0.06			0.71		0.71	0.71	
Clearance Time (s)				4.0	4.0			5.5		5.5	5.5	
Vehicle Extension (s)				3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)				117	105			2550		200	2562	
v/s Ratio Prot					0.01			c0.41			0.35	
v/s Ratio Perm				c0.04						0.11		
v/c Ratio				0.56	0.11			0.57		0.15	0.50	
Uniform Delay, d1				27.2	26.4			4.3		2.8	3.9	
Progression Factor				1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2				5.6	0.5			0.9		1.6	0.7	
Delay (s)				32.8	26.9			5.2		4.5	4.6	
Level of Service				C	C			A		A	A	
Approach Delay (s)		0.0			30.7			5.2			4.6	
Approach LOS		A			C			A			A	

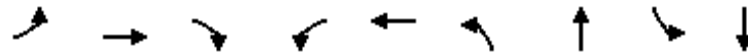
Intersection Summary

HCM Average Control Delay	5.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	99	119	157	156	333	577	1590	95	1067
v/c Ratio	0.83	0.70	0.35	0.63	0.84	0.90	0.52	0.79	0.69
Control Delay	74.1	46.0	6.3	33.1	41.1	50.0	7.1	65.8	20.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.1	46.0	6.3	33.1	41.1	50.0	7.1	65.8	20.8
Queue Length 50th (ft)	34	41	0	50	101	~143	77	31	119
Queue Length 95th (ft)	#110	#111	39	103	#214	#258	167	#106	161
Internal Link Dist (ft)		517			1151		767		1167
Turn Bay Length (ft)	210			85		260		100	
Base Capacity (vph)	136	193	497	284	446	638	3070	122	1555
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.62	0.32	0.55	0.75	0.90	0.52	0.78	0.69

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.

HCM Signalized Intersection Capacity Analysis

8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	62	149	148	207	109	548	1398	112	90	920	94
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1700	1900	1900	1800	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00		*1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	0.99	
Flt Protected	0.95	0.98	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1624	1765	1615	1710	1802		3230	5129		1710	5115	
Flt Permitted	0.34	0.46	1.00	0.68	1.00		0.95	1.00		0.22	1.00	
Satd. Flow (perm)	582	825	1615	1218	1802		3230	5129		404	5115	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	153	65	157	156	218	115	577	1472	118	95	968	99
RTOR Reduction (vph)	0	0	125	0	26	0	0	14	0	0	20	0
Lane Group Flow (vph)	99	119	32	156	307	0	577	1576	0	95	1047	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)	14.3	14.3	14.3	14.3	14.3		13.9	37.7		19.8	19.8	
Effective Green, g (s)	12.3	12.3	12.3	12.3	12.3		11.9	35.7		17.8	17.8	
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21		0.20	0.60		0.30	0.30	
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)	119	169	331	250	369		641	3052		120	1517	
v/s Ratio Prot					c0.17		c0.18	0.31				0.20
v/s Ratio Perm	0.17	0.14	0.02	0.13						c0.23		
v/c Ratio	0.83	0.70	0.10	0.62	0.83		0.90	0.52		0.79	0.69	
Uniform Delay, d1	22.9	22.2	19.3	21.7	22.9		23.5	7.1		19.4	18.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.29	0.90		1.00	1.00	
Incremental Delay, d2	36.7	12.5	0.1	4.8	14.7		13.8	0.5		40.0	2.6	
Delay (s)	59.6	34.7	19.5	26.5	37.5		44.0	6.9		59.4	21.3	
Level of Service	E	C	B	C	D		D	A		E	C	
Approach Delay (s)		34.9			34.0			16.8			24.4	
Approach LOS		C			C			B			C	

Intersection Summary

HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Intersection has too many lanes per leg.

HCM All-Way analysis is limited to two lanes per leg.

Channelized right turn lanes are not counted.

Queues

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

12/16/2013



Lane Group	EBL	EBT	EBR	NBT	SBL	SBT
Lane Group Flow (vph)	500	491	465	931	125	943
v/c Ratio	0.88	0.80	0.78	0.71	0.58	0.56
Control Delay	39.7	28.1	26.1	22.5	42.3	14.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.7	28.1	26.1	22.5	42.3	14.5
Queue Length 50th (ft)	177	146	138	156	25	140
Queue Length 95th (ft)	#335	#287	#286	#247	#58	194
Internal Link Dist (ft)		1164		1201		347
Turn Bay Length (ft)	275					
Base Capacity (vph)	605	653	630	1312	215	1692
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.83	0.75	0.74	0.71	0.58	0.56

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	743	0	640	0	0	0	0	659	225	119	896	0
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900	1900	1900	1900	1800	1900	1900
Total Lost time (s)	6.0	6.0	4.0					7.0		6.0	7.0	
Lane Util. Factor	*1.00	*1.00	0.95					*1.00		0.97	0.95	
Frt	1.00	0.94	0.85					0.96		1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1710	1729	1534					3655		3317	3610	
Flt Permitted	0.95	0.97	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1710	1729	1534					3655		3317	3610	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	782	0	674	0	0	0	0	694	237	125	943	0
RTOR Reduction (vph)	0	43	42	0	0	0	0	54	0	0	0	0
Lane Group Flow (vph)	500	448	424	0	0	0	0	877	0	125	943	0
Turn Type	Perm	NA	Perm					NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)	23.5	23.5	23.5					23.5		5.0	32.5	
Effective Green, g (s)	21.5	21.5	23.5					21.5		3.0	30.5	
Actuated g/C Ratio	0.33	0.33	0.36					0.33		0.05	0.47	
Clearance Time (s)	4.0	4.0	4.0					5.0		4.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0					2.0		3.0	2.0	
Lane Grp Cap (vph)	566	572	555					1209		153	1694	
v/s Ratio Prot								c0.24		0.04	c0.26	
v/s Ratio Perm	c0.29	0.26	0.28									
v/c Ratio	0.88	0.78	0.76					0.73		0.82	0.56	
Uniform Delay, d1	20.6	19.6	18.3					19.1		30.7	12.4	
Progression Factor	1.00	1.00	1.00					1.00		1.00	1.00	
Incremental Delay, d2	14.7	6.4	5.6					3.8		27.4	1.3	
Delay (s)	35.3	26.1	23.9					23.0		58.2	13.7	
Level of Service	D	C	C					C		E	B	
Approach Delay (s)		28.5			0.0			23.0			18.9	
Approach LOS		C			A			C			B	

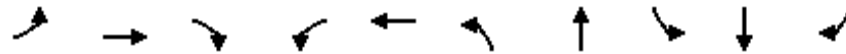
Intersection Summary

HCM Average Control Delay	24.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	114.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues

11: Anderson & Academy

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	579	298	476	100	339	213	549	32	1189	449
v/c Ratio	1.02	0.46	0.68	0.53	0.97	0.91	0.33	0.12	0.99	0.54
Control Delay	65.0	22.9	16.7	28.6	77.1	59.0	13.1	18.9	49.9	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.0	22.9	16.7	28.6	77.1	59.0	13.1	18.9	49.9	4.7
Queue Length 50th (ft)	~229	110	95	27	79	58	79	10	285	0
Queue Length 95th (ft)	#436	182	206	#58	#163	#175	113	29	#427	59
Internal Link Dist (ft)		21			32		1375		514	
Turn Bay Length (ft)	75			100		100		100		
Base Capacity (vph)	568	649	704	188	348	233	1679	268	1203	838
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	1.02	0.46	0.68	0.53	0.97	0.91	0.33	0.12	0.99	0.54

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.

HCM Signalized Intersection Capacity Analysis

11: Anderson & Academy

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	550	283	452	95	276	46	202	504	17	30	1130	427
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	4.0	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	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1710	1900	1615	1710	3533		1710	3592		1710	3610	1615
Flt Permitted	0.34	1.00	1.00	0.58	1.00		0.14	1.00		0.45	1.00	1.00
Satd. Flow (perm)	610	1900	1615	1041	3533		248	3592		804	3610	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	579	298	476	100	291	48	213	531	18	32	1189	449
RTOR Reduction (vph)	0	0	153	0	18	0	0	3	0	0	0	301
Lane Group Flow (vph)	579	298	323	100	321	0	213	546	0	32	1189	148
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)	32.8	25.6	25.6	11.0	7.8		35.0	35.0		25.0	25.0	25.0
Effective Green, g (s)	32.8	25.6	25.6	11.0	7.8		35.0	35.0		25.0	25.0	25.0
Actuated g/C Ratio	0.43	0.34	0.34	0.15	0.10		0.46	0.46		0.33	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	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	569	642	545	179	364		230	1659		265	1191	533
v/s Ratio Prot	c0.28	0.16		0.02	0.09		c0.07	0.15			0.33	
v/s Ratio Perm	c0.16		0.20	0.06			c0.35			0.04		0.09
v/c Ratio	1.02	0.46	0.59	0.56	0.88		0.93	0.33		0.12	1.00	0.28
Uniform Delay, d1	19.0	19.7	20.8	29.5	33.5		17.2	12.9		17.7	25.4	18.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	42.2	0.5	1.7	3.7	21.3		39.2	0.1		0.2	25.5	0.3
Delay (s)	61.2	20.2	22.5	33.2	54.9		56.5	13.1		17.9	50.9	19.0
Level of Service	E	C	C	C	D		E	B		B	D	B
Approach Delay (s)		38.6			49.9			25.2			41.7	
Approach LOS		D			D			C			D	

Intersection Summary

HCM Average Control Delay	38.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	75.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	97.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues

12: California & WB I-10 Ramps

12/16/2013



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	1329	1087	928	1274	436	404
v/c Ratio	1.56	1.46	1.72	0.79	0.64	0.72
Control Delay	286.5	242.3	349.3	37.7	58.5	12.9
Queue Delay	210.2	0.0	2.9	17.1	0.0	0.0
Total Delay	496.6	242.3	352.1	54.8	58.5	12.9
Queue Length 50th (ft)	~1582	~1248	~1111	540	129	0
Queue Length 95th (ft)	#1848	#1512	m#866	m428	169	102
Internal Link Dist (ft)	1118			276	113	
Turn Bay Length (ft)						
Base Capacity (vph)	851	746	541	1611	678	562
Starvation Cap Reductn	0	0	2	358	0	0
Spillback Cap Reductn	196	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	2.03	1.46	1.72	1.02	0.64	0.72



















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.

HCM Signalized Intersection Capacity Analysis

12: California & WB I-10 Ramps

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1213	49	1033	882	1210	0	0	414	384
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1800	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	7.0	6.0	6.0			5.0	5.0
Lane Util. Factor					1.00	1.00	1.00	0.95			0.91	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1813	1615	1710	3610			5187	1615
Flt Permitted					0.95	1.00	0.22	1.00			1.00	1.00
Satd. Flow (perm)					1813	1615	400	3610			5187	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	1277	52	1087	928	1274	0	0	436	404
RTOR Reduction (vph)	0	0	0	0	0	13	0	0	0	0	0	351
Lane Group Flow (vph)	0	0	0	0	1329	1074	928	1274	0	0	436	53
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases					8		1	6			2	
Permitted Phases				8		8	6					2
Actuated Green, G (s)					61.0	61.0	60.0	60.0			19.0	19.0
Effective Green, g (s)					61.0	59.0	58.0	58.0			17.0	17.0
Actuated g/C Ratio					0.47	0.45	0.45	0.45			0.13	0.13
Clearance Time (s)					5.0	5.0	4.0	4.0			3.0	3.0
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					851	733	541	1611			678	211
v/s Ratio Prot							c0.47	0.35			0.08	
v/s Ratio Perm					0.73	0.67	c0.29					0.03
v/c Ratio					1.56	1.47	1.72	0.79			0.64	0.25
Uniform Delay, d1					34.5	35.5	35.1	30.8			53.6	50.8
Progression Factor					1.00	1.00	1.03	1.20			1.00	1.00
Incremental Delay, d2					258.5	217.1	322.6	0.4			4.6	2.8
Delay (s)					293.0	252.6	358.9	37.2			58.3	53.6
Level of Service					F	F	F	D			E	D
Approach Delay (s)		0.0			274.8			172.8			56.0	
Approach LOS		A			F			F			E	
Intersection Summary												
HCM Average Control Delay			200.0		HCM Level of Service				F			
HCM Volume to Capacity ratio			1.60									
Actuated Cycle Length (s)			130.0		Sum of lost time (s)				11.0			
Intersection Capacity Utilization			180.7%		ICU Level of Service				H			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

13: EB I-10 Ramps & California

12/16/2013



Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	867	851	1174	537	166	1524
v/c Ratio	2.60	2.57	0.36	0.45	0.51	0.56
Control Delay	748.9	736.3	12.7	2.1	9.9	15.1
Queue Delay	0.0	0.0	156.7	6.8	0.0	143.4
Total Delay	748.9	736.3	169.4	8.9	9.9	158.5
Queue Length 50th (ft)	~1226	~1168	169	0	52	516
Queue Length 95th (ft)	#1476	#1422	205	44	m54	m368
Internal Link Dist (ft)	1294		46			276
Turn Bay Length (ft)						
Base Capacity (vph)	334	331	3218	1206	349	2733
Starvation Cap Reductn	0	0	2344	610	0	1574
Spillback Cap Reductn	46	0	769	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	3.01	2.57	1.34	0.90	0.48	1.31






















Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

13: EB I-10 Ramps & California

12/16/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations								  			 		
Volume (vph)	822	2	808	0	0	0	0	1115	510	158	1448	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1800	1900	1900	
Lane Width	12	12	8	12	12	12	12	12	12	12	12	12	
Total Lost time (s)		6.0	4.0					6.5	6.5	5.5	6.5		
Lane Util. Factor		1.00	1.00					0.91	1.00	1.00	*1.00		
Frt		1.00	0.85					1.00	0.85	1.00	1.00		
Flt Protected		0.95	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)		1810	1400					5187	1615	1710	3800		
Flt Permitted		0.95	1.00					1.00	1.00	0.19	1.00		
Satd. Flow (perm)		1810	1400					5187	1615	343	3800		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	865	2	851	0	0	0	0	1174	537	166	1524	0	
RTOR Reduction (vph)	0	0	51	0	0	0	0	0	204	0	0	0	
Lane Group Flow (vph)	0	867	800	0	0	0	0	1174	333	166	1524	0	
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA		
Protected Phases		4						2		1	6		
Permitted Phases	4		4						2	6			
Actuated Green, G (s)		26.0	26.0					82.7	82.7	95.5	95.5		
Effective Green, g (s)		24.0	26.0					80.7	80.7	93.5	93.5		
Actuated g/C Ratio		0.18	0.20					0.62	0.62	0.72	0.72		
Clearance Time (s)		4.0	4.0					4.5	4.5	3.5	4.5		
Vehicle Extension (s)		2.0	2.0					2.0	2.0	2.0	2.0		
Lane Grp Cap (vph)		334	280					3220	1003	323	2733		
v/s Ratio Prot								0.23		0.03	c0.40		
v/s Ratio Perm		0.48	c0.57						0.21	0.34			
v/c Ratio		2.60	2.86					0.36	0.33	0.51	0.56		
Uniform Delay, d1		53.0	52.0					12.1	11.8	7.0	8.6		
Progression Factor		1.00	1.00					1.00	1.00	1.72	1.73		
Incremental Delay, d2		726.8	845.2					0.3	0.9	0.1	0.1		
Delay (s)		779.8	897.2					12.4	12.7	12.1	14.9		
Level of Service		F	F					B	B	B	B		
Approach Delay (s)		837.9			0.0			12.5			14.6		
Approach LOS		F			A			B			B		
Intersection Summary													
HCM Average Control Delay			290.2									HCM Level of Service	F
HCM Volume to Capacity ratio			1.06										
Actuated Cycle Length (s)			130.0									Sum of lost time (s)	10.5
Intersection Capacity Utilization			180.7%									ICU Level of Service	H
Analysis Period (min)			15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

14: California & Shopping Center

12/16/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	1	46	1369	30	372	1367
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	48	1441	32	392	1439
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)			652		321	
pX, platoon unblocked	0.89					
vC, conflicting volume	2959	496			1473	
vC1, stage 1 conf vol	1457					
vC2, stage 2 conf vol	1503					
vCu, unblocked vol	2954	496			1473	
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	91			16	
cM capacity (veh/h)	29	525			464	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	49	576	576	320	392	719	719
Volume Left	1	0	0	0	392	0	0
Volume Right	48	0	0	32	0	0	0
cSH	385	1700	1700	1700	464	1700	1700
Volume to Capacity	0.13	0.34	0.34	0.19	0.84	0.42	0.42
Queue Length 95th (ft)	11	0	0	0	210	0	0
Control Delay (s)	15.7	0.0	0.0	0.0	42.3	0.0	0.0
Lane LOS	C				E		
Approach Delay (s)	15.7	0.0			9.1		
Approach LOS	C						

Intersection Summary							
Average Delay			5.2				
Intersection Capacity Utilization			62.2%		ICU Level of Service		B
Analysis Period (min)			15				

Queues

15: California/California & W Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	163	572	76	483	526	300	1161	703	915
v/c Ratio	1.21	0.63	0.68	0.59	0.81	1.27	0.83	1.66	0.75
Control Delay	186.9	38.2	76.6	48.5	24.5	185.0	41.7	335.0	19.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
Total Delay	186.9	38.2	76.6	48.5	24.5	185.0	41.7	335.0	20.3
Queue Length 50th (ft)	~167	169	59	193	129	~319	457	~814	470
Queue Length 95th (ft)	#314	230	#140	252	#291	#503	550	#1058	647
Internal Link Dist (ft)		1468		1180			268		572
Turn Bay Length (ft)	90		150		100				
Base Capacity (vph)	135	904	112	814	651	236	1405	424	1222
Starvation Cap Reductn	0	0	0	0	0	0	0	0	115
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.21	0.63	0.68	0.59	0.81	1.27	0.83	1.66	0.83

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.

HCM Signalized Intersection Capacity Analysis

15: California/California & W Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↗	↖	↗		↖	↗	
Volume (vph)	155	314	229	72	459	500	285	1066	37	668	691	179
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1900	1900	1900	1800	1900	1900
Total Lost time (s)	7.7	7.7		7.7	7.7	7.7	5.2	7.2		7.2	7.2	
Lane Util. Factor	1.00	*1.00		1.00	0.95	1.00	1.00	0.95		1.00	1.00	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3560		1710	3610	1615	1805	3592		1710	1841	
Flt Permitted	0.33	1.00		0.28	1.00	1.00	0.30	1.00		0.07	1.00	
Satd. Flow (perm)	598	3560		496	3610	1615	579	3592		131	1841	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	163	331	241	76	483	526	300	1122	39	703	727	188
RTOR Reduction (vph)	0	101	0	0	0	287	0	2	0	0	7	0
Lane Group Flow (vph)	163	471	0	76	483	239	300	1159	0	703	908	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		2			6			4		3	8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	31.3	31.3		31.3	31.3	31.3	52.8	52.8		87.8	87.8	
Effective Green, g (s)	29.3	29.3		29.3	29.3	29.3	52.8	50.8		85.8	85.8	
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.41	0.39		0.66	0.66	
Clearance Time (s)	5.7	5.7		5.7	5.7	5.7	5.2	5.2		5.2	5.2	
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)	135	802		112	814	364	235	1404		424	1215	
v/s Ratio Prot		0.13			0.13			0.32		c0.35	0.49	
v/s Ratio Perm	c0.27			0.15		0.15	0.52			c0.74		
v/c Ratio	1.21	0.59		0.68	0.59	0.66	1.28	0.83		1.66	0.75	
Uniform Delay, d1	50.4	44.9		46.0	45.0	45.8	38.6	35.6		41.9	14.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	143.7	1.1		15.1	1.2	4.3	153.2	4.1		306.4	2.6	
Delay (s)	194.1	46.0		61.2	46.2	50.0	191.8	39.7		348.3	17.4	
Level of Service	F	D		E	D	D	F	D		F	B	
Approach Delay (s)		78.9			49.1			70.9			161.2	
Approach LOS		E			D			E			F	

Intersection Summary

HCM Average Control Delay	97.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.48		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.9
Intersection Capacity Utilization	117.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues

16: Alabama St & WB I-10 Ramps

12/16/2013



Lane Group	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	1722	545	695	577
v/c Ratio	1.06	1.17	0.43	0.93
Control Delay	75.8	130.7	23.7	71.7
Queue Delay	0.0	5.4	0.3	0.0
Total Delay	75.8	136.1	24.1	71.7
Queue Length 50th (ft)	~786	~499	196	226
Queue Length 95th (ft)	#920	#719	226	#331
Internal Link Dist (ft)	765		376	271
Turn Bay Length (ft)				
Base Capacity (vph)	1619	467	1611	623
Starvation Cap Reductn	0	5	386	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.06	1.18	0.57	0.93


















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.

HCM Signalized Intersection Capacity Analysis

16: Alabama St & WB I-10 Ramps

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	539	671	427	518	660	0	0	395	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1800	1900	1900	1900	1900	1900
Total Lost time (s)					6.5		6.0	8.0			8.0	
Lane Util. Factor					*1.00		1.00	0.95			*1.00	
Fr _t					0.96		1.00	1.00			0.96	
Fl _t Protected					0.98		0.95	1.00			1.00	
Satd. Flow (prot)					3592		1710	3610			3641	
Fl _t Permitted					0.98		0.15	1.00			1.00	
Satd. Flow (perm)					3592		267	3610			3641	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	567	706	449	545	695	0	0	416	161
RTOR Reduction (vph)	0	0	0	0	30	0	0	0	0	0	35	0
Lane Group Flow (vph)	0	0	0	0	1692	0	545	695	0	0	542	0
Turn Type				Perm	NA		pm+pt	NA			NA	
Protected Phases					4		1	6			2	
Permitted Phases				4			6					
Actuated Green, G (s)					59.5		60.0	60.0			23.0	
Effective Green, g (s)					57.5		58.0	58.0			21.0	
Actuated g/C Ratio					0.44		0.45	0.45			0.16	
Clearance Time (s)					4.5		4.0	6.0			6.0	
Vehicle Extension (s)					3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)					1589		463	1611			588	
v/s Ratio Prot							c0.28	0.19			0.15	
v/s Ratio Perm					0.47		c0.24					
v/c Ratio					1.06		1.18	0.43			0.92	
Uniform Delay, d ₁					36.2		38.5	24.7			53.7	
Progression Factor					1.00		1.07	0.92			1.00	
Incremental Delay, d ₂					42.0		98.5	0.8			22.1	
Delay (s)					78.3		139.9	23.6			75.8	
Level of Service					E		F	C			E	
Approach Delay (s)		0.0			78.3			74.7			75.8	
Approach LOS		A			E			E			E	
Intersection Summary												
HCM Average Control Delay			76.6		HCM Level of Service						E	
HCM Volume to Capacity ratio			1.07									
Actuated Cycle Length (s)			130.0		Sum of lost time (s)					12.5		
Intersection Capacity Utilization			111.1%		ICU Level of Service					H		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

17: EB I-10 Ramps & Alabama St

12/16/2013



Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	1039	895	63	700
v/c Ratio	0.99dr	0.41	0.29	0.46
Control Delay	22.6	13.5	17.6	18.3
Queue Delay	0.6	0.0	0.0	0.0
Total Delay	23.2	13.5	17.6	18.3
Queue Length 50th (ft)	164	80	26	174
Queue Length 95th (ft)	208	124	m24	m158
Internal Link Dist (ft)	622	505		376
Turn Bay Length (ft)				
Base Capacity (vph)	1501	2174	221	1521
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	164	21	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.78	0.42	0.29	0.46




















Intersection Summary

- m Volume for 95th percentile queue is metered by upstream signal.
- dr Defacto Right Lane. Recode with 1 though lane as a right lane.

HCM Signalized Intersection Capacity Analysis

17: EB I-10 Ramps & Alabama St

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	374	3	610	0	0	0	0	707	143	60	665	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1800	1900	1900
Total Lost time (s)		7.0						7.0		7.0	7.0	
Lane Util. Factor		*1.00						0.91		1.00	0.95	
Frt		0.91						0.97		1.00	1.00	
Flt Protected		0.98						1.00		0.95	1.00	
Satd. Flow (prot)		3384						5056		1710	3610	
Flt Permitted		0.98						1.00		0.29	1.00	
Satd. Flow (perm)		3384						5056		523	3610	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	394	3	642	0	0	0	0	744	151	63	700	0
RTOR Reduction (vph)	0	50	0	0	0	0	0	42	0	0	0	0
Lane Group Flow (vph)	0	989	0	0	0	0	0	853	0	63	700	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		8						6			2	
Permitted Phases	8									2		
Actuated Green, G (s)		25.6						29.4		29.4	29.4	
Effective Green, g (s)		23.6						27.4		27.4	27.4	
Actuated g/C Ratio		0.36						0.42		0.42	0.42	
Clearance Time (s)		5.0						5.0		5.0	5.0	
Vehicle Extension (s)		2.0						2.0		2.0	2.0	
Lane Grp Cap (vph)		1229						2131		220	1522	
v/s Ratio Prot								0.17			c0.19	
v/s Ratio Perm		0.29								0.12		
v/c Ratio		0.99dr						0.40		0.29	0.46	
Uniform Delay, d1		18.6						13.1		12.4	13.5	
Progression Factor		1.00						1.00		1.17	1.27	
Incremental Delay, d2		3.7						0.6		0.3	0.1	
Delay (s)		22.3						13.6		14.7	17.2	
Level of Service		C						B		B	B	
Approach Delay (s)		22.3			0.0			13.6			17.0	
Approach LOS		C			A			B			B	

Intersection Summary

HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	111.1%	ICU Level of Service	H
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

Queues

18: Alabama St & Industrial Park

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	79	61	32	124	26	851	84	912	132
v/c Ratio	0.31	0.19	0.12	0.35	0.10	0.35	0.24	0.42	0.13
Control Delay	18.3	9.3	15.8	9.6	12.1	10.2	6.8	6.5	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.3	9.3	15.8	9.6	12.1	10.2	6.8	6.5	2.9
Queue Length 50th (ft)	15	3	6	6	4	54	8	55	4
Queue Length 95th (ft)	45	25	23	38	19	91	24	105	23
Internal Link Dist (ft)		298		379		236		505	
Turn Bay Length (ft)	100		50		150		215		55
Base Capacity (vph)	1064	1162	1064	1178	285	2614	345	2413	1108
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.05	0.03	0.11	0.09	0.33	0.24	0.38	0.12

Intersection Summary

HCM Signalized Intersection Capacity Analysis

18: Alabama St & Industrial Park

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	15	43	30	30	87	25	776	32	80	866	125
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	6.2	6.2		6.2	6.2		6.2	6.2		6.0	6.2	6.2
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.91		1.00	0.95	1.00
Frt	1.00	0.89		1.00	0.89		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1710	1690		1710	1689		1710	5156		1710	3610	1615
Flt Permitted	0.87	1.00		0.87	1.00		0.31	1.00		0.23	1.00	1.00
Satd. Flow (perm)	1565	1690		1565	1689		563	5156		417	3610	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	79	16	45	32	32	92	26	817	34	84	912	132
RTOR Reduction (vph)	0	40	0	0	81	0	0	6	0	0	0	38
Lane Group Flow (vph)	79	21	0	32	43	0	26	845	0	84	912	94
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		8			4			6		5	2	
Permitted Phases	8			4			6			2		2
Actuated Green, G (s)	6.6	6.6		6.6	6.6		17.7	17.7		24.3	24.3	24.3
Effective Green, g (s)	4.6	4.6		4.6	4.6		15.7	15.7		22.3	22.3	22.3
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.40	0.40		0.57	0.57	0.57
Clearance Time (s)	4.2	4.2		4.2	4.2		4.2	4.2		4.0	4.2	4.2
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)	183	198		183	198		225	2060		256	2048	916
v/s Ratio Prot		0.01			0.03			0.16		0.01	c0.25	
v/s Ratio Perm	c0.05			0.02			0.05			0.18		0.06
v/c Ratio	0.43	0.11		0.17	0.22		0.12	0.41		0.33	0.45	0.10
Uniform Delay, d1	16.1	15.5		15.6	15.7		7.4	8.5		5.4	4.9	3.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.6	0.2		0.5	0.6		0.2	0.1		0.8	0.2	0.0
Delay (s)	17.8	15.8		16.1	16.3		7.7	8.6		6.2	5.1	4.0
Level of Service	B	B		B	B		A	A		A	A	A
Approach Delay (s)		16.9			16.2			8.6			5.0	
Approach LOS		B			B			A			A	

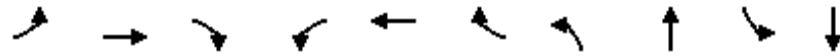
Intersection Summary

HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	39.3	Sum of lost time (s)	12.4
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

19: Alabama St & W Redlands

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	167	276	51	108	444	139	102	567	92	790
v/c Ratio	0.60	0.41	0.14	0.49	0.73	0.33	0.50	0.25	0.48	0.54
Control Delay	53.0	36.6	9.8	52.7	46.0	8.2	53.8	18.4	54.6	22.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.1
Total Delay	53.0	36.6	9.8	52.7	46.0	8.2	53.8	18.4	54.6	55.7
Queue Length 50th (ft)	52	79	0	33	138	0	31	78	28	174
Queue Length 95th (ft)	91	122	30	65	199	49	63	126	59	282
Internal Link Dist (ft)		1247			345			380		164
Turn Bay Length (ft)	240		240	290			115		125	
Base Capacity (vph)	623	1055	541	623	1055	601	261	2277	228	1474
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	723
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	0.26	0.09	0.17	0.42	0.23	0.39	0.25	0.40	1.05

Intersection Summary

HCM Signalized Intersection Capacity Analysis

19: Alabama St & W Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	159	262	48	103	422	132	97	481	58	87	544	206
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Total Lost time (s)	6.9	6.9	4.9	6.9	6.9	4.9	5.0	6.2		5.0	6.2	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91		0.97	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3133	3610	1615	3133	3610	1615	3133	5103		3133	3461	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3133	3610	1615	3133	3610	1615	3133	5103		3133	3461	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	167	276	51	108	444	139	102	506	61	92	573	217
RTOR Reduction (vph)	0	0	40	0	0	113	0	11	0	0	28	0
Lane Group Flow (vph)	167	276	11	108	444	26	102	556	0	92	762	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	10.6	20.1	20.1	8.8	18.3	18.3	8.4	45.0		6.5	43.1	
Effective Green, g (s)	8.6	18.1	20.1	6.8	16.3	18.3	6.4	43.0		4.5	41.1	
Actuated g/C Ratio	0.09	0.19	0.21	0.07	0.17	0.19	0.07	0.44		0.05	0.42	
Clearance Time (s)	4.9	4.9	4.9	4.9	4.9	4.9	3.0	4.2		3.0	4.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	277	671	333	219	604	303	206	2253		145	1460	
v/s Ratio Prot	c0.05	0.08		0.03	c0.12		c0.03	0.11		0.03	c0.22	
v/s Ratio Perm			0.01			0.02						
v/c Ratio	0.60	0.41	0.03	0.49	0.74	0.09	0.50	0.25		0.63	0.52	
Uniform Delay, d1	42.8	35.0	30.9	43.6	38.5	32.6	43.9	17.1		45.6	20.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.7	0.4	0.0	1.7	4.6	0.1	1.9	0.3		8.8	1.3	
Delay (s)	46.4	35.4	30.9	45.4	43.1	32.8	45.8	17.3		54.4	22.2	
Level of Service	D	D	C	D	D	C	D	B		D	C	
Approach Delay (s)		38.6			41.4			21.7			25.6	
Approach LOS		D			D			C			C	

Intersection Summary

HCM Average Control Delay	31.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	97.4	Sum of lost time (s)	25.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues

20: Tennessee & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	15	164	58	427	807	834
v/c Ratio	0.12	0.42	0.20	0.41	0.58	0.76
Control Delay	26.9	23.4	17.0	15.5	12.9	17.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	171.6
Total Delay	26.9	23.4	17.0	15.5	12.9	189.4
Queue Length 50th (ft)	5	23	15	54	96	113
Queue Length 95th (ft)	21	48	38	90	153	189
Internal Link Dist (ft)		2241		737	458	48
Turn Bay Length (ft)	145		140			
Base Capacity (vph)	438	1276	293	1925	1568	1229
Starvation Cap Reductn	0	0	0	0	0	623
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.13	0.20	0.22	0.51	1.38

Intersection Summary

HCM Signalized Intersection Capacity Analysis

20: Tennessee & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↗	↖
Volume (vph)	14	122	34	55	306	100	58	685	24	146	626	20
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.9	6.9		5.5	6.9			6.9			6.9	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frt	1.00	0.97		1.00	0.96			1.00			1.00	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1710	3491		1710	3477			3580			3563	
Flt Permitted	0.68	1.00		0.35	1.00			0.83			0.65	
Satd. Flow (perm)	1220	3491		632	3477			2971			2331	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	15	128	36	58	322	105	61	721	25	154	659	21
RTOR Reduction (vph)	0	32	0	0	51	0	0	3	0	0	2	0
Lane Group Flow (vph)	15	132	0	58	376	0	0	804	0	0	832	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		6		5	2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	7.9	7.9		18.5	18.5			29.1			29.1	
Effective Green, g (s)	5.9	5.9		16.5	16.5			27.1			27.1	
Actuated g/C Ratio	0.10	0.10		0.29	0.29			0.47			0.47	
Clearance Time (s)	4.9	4.9		3.5	4.9			4.9			4.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	125	359		277	999			1403			1101	
v/s Ratio Prot		0.04		0.02	c0.11							
v/s Ratio Perm	0.01			0.04				0.27			c0.36	
v/c Ratio	0.12	0.37		0.21	0.38			0.57			0.76	
Uniform Delay, d1	23.4	24.0		15.4	16.3			11.0			12.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.4	0.6		0.4	0.2			0.6			3.0	
Delay (s)	23.8	24.6		15.7	16.6			11.5			15.4	
Level of Service	C	C		B	B			B			B	
Approach Delay (s)		24.6			16.5			11.5			15.4	
Approach LOS		C			B			B			B	

Intersection Summary

HCM Average Control Delay	15.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	13.8
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

21: Texas & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	28	5	31	45	80	36	65	318	23	31	445	96
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	29	5	33	47	84	38	68	335	24	33	468	101
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								193				
pX, platoon unblocked												
vC, conflicting volume	968	1080	285	818	1118	179	569			359		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	968	1080	285	818	1118	179	569			359		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	76	97	95	80	56	95	93			97		
cM capacity (veh/h)	123	200	718	236	189	839	1013			1211		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	67	169	236	192	267	335
Volume Left	29	47	68	0	33	0
Volume Right	33	38	0	24	0	101
cSH	216	245	1013	1700	1211	1700
Volume to Capacity	0.31	0.69	0.07	0.11	0.03	0.20
Queue Length 95th (ft)	32	113	5	0	2	0
Control Delay (s)	29.0	47.1	3.0	0.0	1.2	0.0
Lane LOS	D	E	A		A	
Approach Delay (s)	29.0	47.1	1.7		0.5	
Approach LOS	D	E				

Intersection Summary		
Average Delay		8.7
Intersection Capacity Utilization	52.7%	ICU Level of Service
Analysis Period (min)		15
		A

HCM Unsignalized Intersection Capacity Analysis

22: Texas & Oriental

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	35	17	30	67	3	37	3	633	18	5	456	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	37	18	32	71	3	39	3	666	19	5	480	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											212	
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99		0.99					
vC, conflicting volume	873	1184	242	973	1177	343	484			685		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	855	1169	219	956	1162	343	463			685		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	91	96	63	98	94	100			99		
cM capacity (veh/h)	234	191	785	189	193	659	1099			918		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	86	113	336	352	245	244
Volume Left	37	71	3	0	5	0
Volume Right	32	39	0	19	0	4
cSH	296	251	1099	1700	918	1700
Volume to Capacity	0.29	0.45	0.00	0.21	0.01	0.14
Queue Length 95th (ft)	30	54	0	0	0	0
Control Delay (s)	22.1	30.5	0.1	0.0	0.3	0.0
Lane LOS	C	D	A		A	
Approach Delay (s)	22.1	30.5	0.1		0.1	
Approach LOS	C	D				

Intersection Summary		
Average Delay		3.9
Intersection Capacity Utilization	36.2%	ICU Level of Service
Analysis Period (min)		15
		A

Queues

23: Eureka & EB I-10 off/Pearl

12/16/2013



Lane Group	EBT	EBR	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	727	688	118	28	39	78	54
v/c Ratio	0.81	0.61	0.86	0.04	0.06	0.13	0.08
Control Delay	25.3	3.4	65.9	3.2	21.1	6.6	21.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.3	3.4	65.9	3.2	21.1	6.6	21.2
Queue Length 50th (ft)	283	0	44	0	13	0	18
Queue Length 95th (ft)	364	44	#130	10	38	31	48
Internal Link Dist (ft)	447				545		418
Turn Bay Length (ft)				75			
Base Capacity (vph)	1060	1209	181	941	666	616	656
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.57	0.65	0.03	0.06	0.13	0.08

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

23: Eureka & EB I-10 off/Pearl

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖		↗		↕	↗		↕	
Volume (vph)	110	580	654	112	0	27	0	37	74	5	47	0
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0	6.0		6.0		7.0	7.0		7.0	
Lane Util. Factor		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.99	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1885	1615	1710		1615		1900	1615		1891	
Flt Permitted		0.99	1.00	0.17		1.00		1.00	1.00		0.99	
Satd. Flow (perm)		1885	1615	315		1615		1900	1615		1872	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	116	611	688	118	0	28	0	39	78	5	49	0
RTOR Reduction (vph)	0	0	361	0	0	14	0	0	51	0	0	0
Lane Group Flow (vph)	0	727	327	118	0	14	0	39	27	0	54	0
Turn Type	Perm	NA	Perm	custom		custom		NA	Perm	Perm	NA	
Protected Phases		8						2				6
Permitted Phases	8		8	3		3			2	6		
Actuated Green, G (s)		40.0	40.0	41.0		41.0		30.0	30.0		30.0	
Effective Green, g (s)		38.0	38.0	39.0		39.0		28.0	28.0		28.0	
Actuated g/C Ratio		0.48	0.48	0.49		0.49		0.35	0.35		0.35	
Clearance Time (s)		5.0	5.0	4.0		4.0		5.0	5.0		5.0	
Vehicle Extension (s)		2.0	2.0	2.0		2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)		895	767	154		787		665	565		655	
v/s Ratio Prot								0.02				
v/s Ratio Perm		0.39	0.20	0.37		0.01			0.02		c0.03	
v/c Ratio		0.81	0.43	0.77		0.02		0.06	0.05		0.08	
Uniform Delay, d1		18.0	13.8	16.8		10.6		17.3	17.2		17.4	
Progression Factor		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Incremental Delay, d2		5.4	0.1	18.3		0.0		0.2	0.2		0.2	
Delay (s)		23.3	14.0	35.0		10.6		17.4	17.4		17.6	
Level of Service		C	B	D		B		B	B		B	
Approach Delay (s)		18.8			30.4			17.4			17.6	
Approach LOS		B			C			B			B	

Intersection Summary

HCM Average Control Delay	19.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues

24: Eureka & Stuart

12/16/2013



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	43	38	11	106	27	669
v/c Ratio	0.17	0.15	0.04	0.08	0.06	0.52
Control Delay	11.7	10.8	5.4	5.1	5.4	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	10.8	5.4	5.1	5.4	7.5
Queue Length 50th (ft)	4	3	1	3	2	28
Queue Length 95th (ft)	19	17	5	10	8	53
Internal Link Dist (ft)	380	399		136		545
Turn Bay Length (ft)			20		20	
Base Capacity (vph)	874	875	431	1996	686	1996
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.04	0.03	0.05	0.04	0.34

Intersection Summary

HCM Signalized Intersection Capacity Analysis

24: Eureka & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕		↗	↕	
Volume (vph)	19	19	3	15	15	6	10	96	5	26	580	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.98		1.00	0.99		1.00	0.99	
Flt Protected		0.98			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1837			1817		1710	3581		1709	3563	
Flt Permitted		0.83			0.84		0.43	1.00		0.69	1.00	
Satd. Flow (perm)		1565			1565		774	3581		1232	3563	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	20	20	3	16	16	6	11	101	5	27	611	58
RTOR Reduction (vph)	0	2	0	0	5	0	0	3	0	0	17	0
Lane Group Flow (vph)	0	41	0	0	33	0	11	103	0	27	652	0
Confl. Peds. (#/hr)	1		2	2		1			1	1		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.3			6.3		11.3	11.3		11.3	11.3	
Effective Green, g (s)		4.3			4.3		9.3	9.3		9.3	9.3	
Actuated g/C Ratio		0.17			0.17		0.36	0.36		0.36	0.36	
Clearance Time (s)		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	
Lane Grp Cap (vph)		263			263		281	1301		448	1294	
v/s Ratio Prot								0.03			c0.18	
v/s Ratio Perm		c0.03			0.02		0.01			0.02		
v/c Ratio		0.15			0.13		0.04	0.08		0.06	0.50	
Uniform Delay, d1		9.1			9.1		5.3	5.3		5.3	6.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			0.2		0.1	0.0		0.1	0.3	
Delay (s)		9.4			9.3		5.3	5.4		5.4	6.7	
Level of Service		A			A		A	A		A	A	
Approach Delay (s)		9.4			9.3			5.4			6.6	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	25.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	31.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

25: Eureka & Oriental

12/16/2013



Lane Group	EBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	15	6	107	9	612
v/c Ratio	0.07	0.02	0.06	0.01	0.34
Control Delay	11.8	4.5	4.5	4.4	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.6
Total Delay	11.8	4.5	4.5	4.4	6.1
Queue Length 50th (ft)	2	1	4	1	28
Queue Length 95th (ft)	11	3	10	4	47
Internal Link Dist (ft)	432		184		93
Turn Bay Length (ft)		25		40	
Base Capacity (vph)	346	422	2017	688	2004
Starvation Cap Reductn	0	0	0	0	956
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.04	0.01	0.05	0.01	0.58
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

25: Eureka & Oriental

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (vph)	6	3	6	0	0	0	6	101	1	9	531	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)		6.2					6.2	6.2		6.2	6.2	
Lane Util. Factor		1.00					1.00	0.95		1.00	0.95	
Frbp, ped/bikes		0.99					1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99					1.00	1.00		1.00	1.00	
Frt		0.95					1.00	1.00		1.00	0.99	
Flt Protected		0.98					0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1743					1709	3604		1709	3556	
Flt Permitted		0.87					0.42	1.00		0.68	1.00	
Satd. Flow (perm)		1545					756	3604		1231	3556	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	3	6	0	0	0	6	106	1	9	559	53
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	17	0
Lane Group Flow (vph)	0	10	0	0	0	0	6	107	0	9	595	0
Confl. Peds. (#/hr)	6		1	1		6	2		1	1		2
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	
Protected Phases		1			5			7				3
Permitted Phases	1			5			7			3		
Actuated Green, G (s)		7.0					20.0	20.0		20.0	20.0	
Effective Green, g (s)		5.0					18.0	18.0		18.0	18.0	
Actuated g/C Ratio		0.14					0.51	0.51		0.51	0.51	
Clearance Time (s)		4.2					4.2	4.2		4.2	4.2	
Vehicle Extension (s)		2.5					2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		218					384	1833		626	1808	
v/s Ratio Prot								0.03			c0.17	
v/s Ratio Perm		c0.01					0.01			0.01		
v/c Ratio		0.05					0.02	0.06		0.01	0.33	
Uniform Delay, d1		13.1					4.3	4.4		4.3	5.1	
Progression Factor		1.00					1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1					0.0	0.0		0.0	0.1	
Delay (s)		13.2					4.3	4.4		4.3	5.2	
Level of Service		B					A	A		A	A	
Approach Delay (s)		13.2			0.0			4.4			5.2	
Approach LOS		B			A			A			A	

Intersection Summary

HCM Average Control Delay	5.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	35.4	Sum of lost time (s)	12.4
Intersection Capacity Utilization	32.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

26: Eureka & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	11	195	20	665	139	511
v/c Ratio	0.05	0.18	0.06	0.60	0.15	0.53
Control Delay	10.2	9.2	9.9	12.9	8.4	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.2	9.2	9.9	12.9	8.4	10.9
Queue Length 50th (ft)	1	11	2	48	7	31
Queue Length 95th (ft)	10	34	14	113	24	76
Internal Link Dist (ft)		660		354	209	138
Turn Bay Length (ft)	35		40			
Base Capacity (vph)	386	1926	605	1929	1948	1958
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.10	0.03	0.34	0.07	0.26

Intersection Summary

HCM Signalized Intersection Capacity Analysis

26: Eureka & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	174	11	19	602	29	14	98	20	67	321	97
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6		6.6	6.6			6.2			6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.98			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1709	3573		1705	3582			3502			3469	
Flt Permitted	0.40	1.00		0.63	1.00			0.88			0.89	
Satd. Flow (perm)	718	3573		1129	3582			3106			3092	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	183	12	20	634	31	15	103	21	71	338	102
RTOR Reduction (vph)	0	8	0	0	8	0	0	15	0	0	51	0
Lane Group Flow (vph)	11	187	0	20	657	0	0	124	0	0	460	0
Confl. Peds. (#/hr)	3		7	7		3	2		1	1		2
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			4			4	
Permitted Phases	6			2			4			4		
Actuated Green, G (s)	12.5	12.5		12.5	12.5			12.2			12.2	
Effective Green, g (s)	10.5	10.5		10.5	10.5			10.2			10.2	
Actuated g/C Ratio	0.31	0.31		0.31	0.31			0.30			0.30	
Clearance Time (s)	4.6	4.6		4.6	4.6			4.2			4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	225	1120		354	1123			946			941	
v/s Ratio Prot		0.05			c0.18							
v/s Ratio Perm	0.02			0.02				0.04			c0.15	
v/c Ratio	0.05	0.17		0.06	0.59			0.13			0.49	
Uniform Delay, d1	8.0	8.3		8.0	9.7			8.4			9.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	0.1		0.1	0.8			0.1			0.4	
Delay (s)	8.1	8.4		8.1	10.5			8.5			9.9	
Level of Service	A	A		A	B			A			A	
Approach Delay (s)		8.4			10.4			8.5			9.9	
Approach LOS		A			B			A			A	

Intersection Summary

HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	33.5	Sum of lost time (s)	12.8
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues
27: Orange & Colton

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	154	551	295	352	123	16	264	93	733
v/c Ratio	0.35	0.61	1.03	0.38	0.14	0.10	0.22	0.26	0.60
Control Delay	12.6	14.2	81.5	12.0	2.3	19.8	16.3	21.1	22.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	14.2	81.5	12.0	2.3	19.8	16.3	21.1	22.2
Queue Length 50th (ft)	35	130	111	81	0	5	39	31	141
Queue Length 95th (ft)	72	216	#268	133	21	19	66	67	198
Internal Link Dist (ft)		502		260			472		133
Turn Bay Length (ft)	50		65		65	50		75	
Base Capacity (vph)	483	978	311	1004	912	166	1221	361	1223
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.56	0.95	0.35	0.13	0.10	0.22	0.26	0.60
























Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

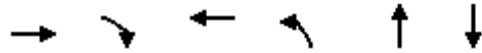
27: Orange & Colton

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	146	340	183	280	334	117	15	213	38	88	629	67
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	1800		1710	1900	1615	1710	3528		1710	3558	
Flt Permitted	0.51	1.00		0.33	1.00	1.00	0.27	1.00		0.59	1.00	
Satd. Flow (perm)	912	1800		588	1900	1615	485	3528		1060	3558	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	154	358	193	295	352	123	16	224	40	93	662	71
RTOR Reduction (vph)	0	29	0	0	0	63	0	20	0	0	11	0
Lane Group Flow (vph)	154	522	0	295	352	60	16	244	0	93	722	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	36.2	36.2		36.2	36.2	36.2	25.8	25.8		25.8	25.8	
Effective Green, g (s)	34.2	34.2		34.2	34.2	34.2	23.8	23.8		23.8	23.8	
Actuated g/C Ratio	0.49	0.49		0.49	0.49	0.49	0.34	0.34		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	3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	446	879		287	928	789	165	1200		360	1210	
v/s Ratio Prot		0.29			0.19			0.07			c0.20	
v/s Ratio Perm	0.17			c0.50		0.04	0.03			0.09		
v/c Ratio	0.35	0.59		1.03	0.38	0.08	0.10	0.20		0.26	0.60	
Uniform Delay, d1	11.0	12.9		17.9	11.2	9.5	15.8	16.4		16.7	19.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.1		60.5	0.3	0.0	1.2	0.4		1.7	2.2	
Delay (s)	11.5	14.0		78.4	11.5	9.5	16.9	16.8		18.4	21.3	
Level of Service	B	B		E	B	A	B	B		B	C	
Approach Delay (s)		13.4			36.8			16.8			21.0	
Approach LOS		B			D			B			C	
Intersection Summary												
HCM Average Control Delay			23.2								HCM Level of Service	C
HCM Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			70.0								Sum of lost time (s)	12.0
Intersection Capacity Utilization			88.3%								ICU Level of Service	E
Analysis Period (min)			15									
c Critical Lane Group												

Queues
28: Pearl & Orange

12/16/2013



Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	874	209	349	2	818	364
v/c Ratio	1.00	0.20	0.34	0.01	0.92	0.49
Control Delay	50.7	6.7	9.5	28.5	52.7	34.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.7	6.7	9.5	28.5	52.7	34.3
Queue Length 50th (ft)	~517	40	92	1	266	103
Queue Length 95th (ft)	#818	72	143	7	#379	148
Internal Link Dist (ft)	445		279		526	472
Turn Bay Length (ft)		20		75		
Base Capacity (vph)	874	1036	1013	213	904	749
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.20	0.34	0.01	0.90	0.49

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.

HCM Signalized Intersection Capacity Analysis

28: Pearl & Orange

12/16/2013



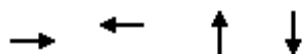
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↖	↕			↕	↗
Volume (vph)	321	509	199	18	47	267	2	764	13	10	318	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1800	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95			0.95	
Frt		1.00	0.85		0.89		1.00	1.00			0.99	
Flt Protected		0.98	1.00		1.00		0.95	1.00			1.00	
Satd. Flow (prot)		1864	1615		1689		1710	3601			3578	
Flt Permitted		0.73	1.00		0.94		0.47	1.00			0.83	
Satd. Flow (perm)		1383	1615		1596		848	3601			2971	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	338	536	209	19	49	281	2	804	14	11	335	18
RTOR Reduction (vph)	0	0	15	0	5	0	0	2	0	0	4	0
Lane Group Flow (vph)	0	874	194	0	344	0	2	816	0	0	360	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4			2			2		
Actuated Green, G (s)		65.0	65.0		65.0		26.7	26.7			26.7	
Effective Green, g (s)		63.0	63.0		63.0		24.7	24.7			24.7	
Actuated g/C Ratio		0.63	0.63		0.63		0.25	0.25			0.25	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.5	3.5			3.5	
Lane Grp Cap (vph)		874	1021		1009		210	892			736	
v/s Ratio Prot								c0.23				
v/s Ratio Perm		c0.63	0.12		0.22		0.00				0.12	
v/c Ratio		1.00	0.19		0.34		0.01	0.92			0.49	
Uniform Delay, d1		18.4	7.7		8.6		28.3	36.5			32.1	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		30.4	0.1		0.2		0.0	14.0			0.6	
Delay (s)		48.8	7.8		8.8		28.3	50.4			32.7	
Level of Service		D	A		A		C	D			C	
Approach Delay (s)		40.9			8.8			50.4			32.7	
Approach LOS		D			A			D			C	

Intersection Summary

HCM Average Control Delay	38.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	99.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	101.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues
29: Orange & Stuart

12/16/2013



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	28	74	826	745
v/c Ratio	0.10	0.27	0.63	0.57
Control Delay	9.2	11.2	9.2	8.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	9.2	11.2	9.2	8.6
Queue Length 50th (ft)	1	6	41	37
Queue Length 95th (ft)	14	29	81	72
Internal Link Dist (ft)	305	198	150	526
Turn Bay Length (ft)				
Base Capacity (vph)	1172	1124	2623	2639
Starvation Cap Reductn	0	0	85	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.02	0.07	0.33	0.28
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

29: Orange & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	7	5	15	35	9	27	6	721	58	6	689	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.2			6.2			6.2			6.2	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frbp, ped/bikes		0.99			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.92			0.95			0.99			1.00	
Flt Protected		0.99			0.98			1.00			1.00	
Satd. Flow (prot)		1719			1749			3563			3597	
Flt Permitted		0.89			0.83			0.95			0.95	
Satd. Flow (perm)		1551			1484			3380			3406	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	7	5	16	37	9	28	6	759	61	6	725	14
RTOR Reduction (vph)	0	13	0	0	23	0	0	11	0	0	2	0
Lane Group Flow (vph)	0	15	0	0	51	0	0	815	0	0	743	0
Confl. Peds. (#/hr)	4		2	2		4	3		2	2		3
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.9			6.9			13.1			13.1	
Effective Green, g (s)		4.9			4.9			11.1			11.1	
Actuated g/C Ratio		0.17			0.17			0.39			0.39	
Clearance Time (s)		4.2			4.2			4.2			4.2	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		268			256			1321			1331	
v/s Ratio Prot												
v/s Ratio Perm		0.01			0.03			0.24			0.22	
v/c Ratio		0.06			0.20			0.62			0.56	
Uniform Delay, d1		9.8			10.1			6.9			6.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.4			0.9			0.5	
Delay (s)		9.9			10.5			7.8			7.2	
Level of Service		A			B			A			A	
Approach Delay (s)		9.9			10.5			7.8			7.2	
Approach LOS		A			B			A			A	

Intersection Summary

HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	28.4	Sum of lost time (s)	12.4
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 30: Orange & Oriental

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	1	756	715	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	1	796	753	2
Pedestrians	2			1		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	4.0			4.0		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				464	165	
pX, platoon unblocked	0.86	0.98	0.98			
vC, conflicting volume	1156	380	757			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	780	340	722			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	289	650	874			

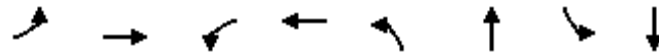
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	0	266	531	502	253
Volume Left	0	1	0	0	0
Volume Right	0	0	0	0	2
cSH	1700	874	1700	1700	1700
Volume to Capacity	0.00	0.00	0.31	0.30	0.15
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS	A	A			
Approach Delay (s)	0.0	0.0		0.0	
Approach LOS	A				

Intersection Summary					
Average Delay			0.0		
Intersection Capacity Utilization			31.9%	ICU Level of Service	A
Analysis Period (min)			15		

Queues

31: Orange & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	48	161	24	486	38	643	105	714
v/c Ratio	0.19	0.13	0.12	0.69	0.23	0.74	0.35	0.46
Control Delay	15.2	10.8	22.4	21.3	22.6	26.3	13.2	12.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.2	10.8	22.4	21.3	22.6	26.3	13.2	12.2
Queue Length 50th (ft)	11	14	7	58	11	108	20	81
Queue Length 95th (ft)	32	34	26	108	36	178	51	142
Internal Link Dist (ft)		387		273		223		384
Turn Bay Length (ft)	60		60		75		60	
Base Capacity (vph)	253	1662	356	1134	231	1217	324	1960
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.10	0.07	0.43	0.16	0.53	0.32	0.36

Intersection Summary

HCM Signalized Intersection Capacity Analysis

31: Orange & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	46	112	41	23	296	165	36	593	18	100	590	88
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	5.5	6.2		6.2	6.2		6.2	6.2		5.5	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.95		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3465		1710	3400		1708	3593		1710	3533	
Flt Permitted	0.26	1.00		0.65	1.00		0.38	1.00		0.21	1.00	
Satd. Flow (perm)	465	3465		1170	3400		684	3593		380	3533	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	48	118	43	24	312	174	38	624	19	105	621	93
RTOR Reduction (vph)	0	28	0	0	119	0	0	3	0	0	17	0
Lane Group Flow (vph)	48	133	0	24	367	0	38	640	0	105	697	0
Confl. Peds. (#/hr)	1					1	3		1	1		3
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	21.7	21.7		12.1	12.1		15.9	15.9		27.2	27.2	
Effective Green, g (s)	19.7	19.7		10.1	10.1		13.9	13.9		25.2	25.2	
Actuated g/C Ratio	0.34	0.34		0.18	0.18		0.24	0.24		0.44	0.44	
Clearance Time (s)	3.5	4.2		4.2	4.2		4.2	4.2		3.5	4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	249	1191		206	599		166	872		302	1554	
v/s Ratio Prot	c0.01	0.04			c0.11			c0.18		0.04	c0.20	
v/s Ratio Perm	0.05			0.02			0.06			0.12		
v/c Ratio	0.19	0.11		0.12	0.61		0.23	0.73		0.35	0.45	
Uniform Delay, d1	13.2	12.8		19.8	21.8		17.4	20.0		10.5	11.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.0		0.3	1.9		0.7	3.2		0.7	0.2	
Delay (s)	13.5	12.9		20.1	23.7		18.1	23.2		11.2	11.4	
Level of Service	B	B		C	C		B	C		B	B	
Approach Delay (s)		13.0			23.5			22.9			11.4	
Approach LOS		B			C			C			B	

















Intersection Summary

HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	57.3	Sum of lost time (s)	24.1
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 32: 6th St & WB I-10 Ramp

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	531	50	552	0	180	0	0	340	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	559	53	581	0	189	0	0	358	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage (veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1155	547	358	547	547	189	358				189	
vC1, stage 1 conf vol	358	358		189	189							
vC2, stage 2 conf vol	797	189		358	358							
vCu, unblocked vol	1155	547	358	547	547	189	358				189	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	9	91	32	100				100	
cM capacity (veh/h)	112	582	691	612	582	858	1212				1397	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1								
Volume Total	559	634	189	358								
Volume Left	559	0	0	0								
Volume Right	0	581	0	0								
cSH	612	825	1700	1700								
Volume to Capacity	0.91	0.77	0.11	0.21								
Queue Length 95th (ft)	289	189	0	0								
Control Delay (s)	44.4	22.2	0.0	0.0								
Lane LOS	E	C										
Approach Delay (s)	32.6		0.0	0.0								
Approach LOS	D											
Intersection Summary												
Average Delay			22.4									
Intersection Capacity Utilization			61.3%		ICU Level of Service					B		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

33: 6th St & EB I-10 Ramp

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔				↔	↔		↔	↔	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	128	67	331	0	0	0	236	103	36	162	353	127
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	135	71	348	0	0	0	248	108	38	171	372	134

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	205	348	248	146	171	505
Volume Left (vph)	135	0	248	0	171	0
Volume Right (vph)	0	348	0	38	0	134
Hadj (s)	0.33	-0.70	0.50	-0.18	0.50	-0.19
Departure Headway (s)	7.7	6.7	8.0	7.2	7.5	6.8
Degree Utilization, x	0.44	0.65	0.55	0.29	0.36	0.96
Capacity (veh/h)	459	524	441	488	463	505
Control Delay (s)	15.5	19.9	19.0	12.1	13.5	54.9
Approach Delay (s)	18.3		16.4		44.5	
Approach LOS	C		C		E	

Intersection Summary

Delay	28.7
HCM Level of Service	D
Intersection Capacity Utilization	60.7%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

34: 6th St & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (veh/h)	5	6	12	19	9	75	10	275	7	137	580	22
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	5	6	13	20	9	79	11	289	7	144	611	23
Pedestrians		1						1			2	
Lane Width (ft)		12.0						12.0			12.0	
Walking Speed (ft/s)		4.0						4.0			4.0	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh								2			2	
Upstream signal (ft)								231				
pX, platoon unblocked	0.99	0.99		0.99	0.99	0.99				0.99		
vC, conflicting volume	1308	1229	319	925	1237	295	635			297		
vC1, stage 1 conf vol	912	912		314	314							
vC2, stage 2 conf vol	396	318		610	923							
vCu, unblocked vol	1306	1227	319	919	1235	283	635			284		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	98	98	94	97	89	99			89		
cM capacity (veh/h)	228	288	682	351	285	712	957			1276		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	24	108	11	297	144	407	227
Volume Left	5	20	11	0	144	0	0
Volume Right	13	79	0	7	0	0	23
cSH	381	539	957	1700	1276	1700	1700
Volume to Capacity	0.06	0.20	0.01	0.17	0.11	0.24	0.13
Queue Length 95th (ft)	5	19	1	0	10	0	0
Control Delay (s)	15.1	13.4	8.8	0.0	8.2	0.0	0.0
Lane LOS	C	B	A		A		
Approach Delay (s)	15.1	13.4	0.3		1.5		
Approach LOS	C	B					

Intersection Summary			
Average Delay		2.5	
Intersection Capacity Utilization	41.2%		ICU Level of Service A
Analysis Period (min)	15		

Queues

35: Redlands Blvd & Citrus Ave

12/16/2013



Lane Group	EBT	WBT	SET	SER	NWT
Lane Group Flow (vph)	541	609	356	36	689
v/c Ratio	0.72	0.77	0.51	0.07	0.76
Control Delay	29.0	26.9	23.2	7.6	28.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	29.0	26.9	23.2	7.6	28.2
Queue Length 50th (ft)	103	98	60	0	127
Queue Length 95th (ft)	165	171	116	20	#224
Internal Link Dist (ft)	399	463	375		430
Turn Bay Length (ft)				100	
Base Capacity (vph)	1273	1050	855	653	1109
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.42	0.58	0.42	0.06	0.62

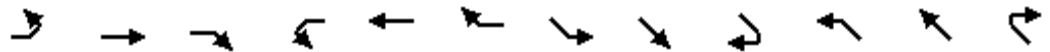
Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

35: Redlands Blvd & Citrus Ave

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕↕			↕↕			↕↕	↗		↕↕	
Volume (vph)	28	342	144	54	296	228	141	198	34	187	428	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.2			6.2	6.2		6.2	
Lane Util. Factor		0.95			0.95			*1.00	1.00		*1.00	
Frt		0.96			0.94			1.00	0.85		0.99	
Flt Protected		1.00			1.00			0.98	1.00		0.99	
Satd. Flow (prot)		3449			3381			3723	1615		3713	
Flt Permitted		1.00			1.00			0.58	1.00		0.75	
Satd. Flow (perm)		3449			3381			2189	1615		2828	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	29	360	152	57	312	240	148	208	36	197	451	41
RTOR Reduction (vph)	0	53	0	0	127	0	0	0	24	0	5	0
Lane Group Flow (vph)	0	488	0	0	482	0	0	356	12	0	684	0
Turn Type	Split	NA		Split	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	4	4		1	1			2			2	
Permitted Phases							2		2	2		
Actuated Green, G (s)		15.7			15.4			23.7	23.7		23.7	
Effective Green, g (s)		13.7			13.4			21.7	21.7		21.7	
Actuated g/C Ratio		0.20			0.20			0.32	0.32		0.32	
Clearance Time (s)		4.0			4.2			4.2	4.2		4.2	
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		703			674			707	522		913	
v/s Ratio Prot		c0.14			c0.14							
v/s Ratio Perm								0.16	0.01		c0.24	
v/c Ratio		0.69			0.71			0.50	0.02		0.75	
Uniform Delay, d1		24.8			25.1			18.4	15.5		20.3	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		3.0			3.6			0.6	0.0		3.4	
Delay (s)		27.8			28.7			19.0	15.5		23.7	
Level of Service		C			C			B	B		C	
Approach Delay (s)		27.8			28.7			18.6			23.7	
Approach LOS		C			C			B			C	

Intersection Summary

HCM Average Control Delay	25.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	67.2	Sum of lost time (s)	18.4
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

36: Stuart & Church

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	23	36	44	306	316	56
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	24	38	46	322	333	59
Pedestrians					40	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					3	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				203		
pX, platoon unblocked	0.99					
vC, conflicting volume	656	196	392			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	642	196	392			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	95	96			
cM capacity (veh/h)	380	819	1178			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	62	154	215	222	170
Volume Left	24	46	0	0	0
Volume Right	38	0	0	0	59
cSH	564	1178	1700	1700	1700
Volume to Capacity	0.11	0.04	0.13	0.13	0.10
Queue Length 95th (ft)	9	3	0	0	0
Control Delay (s)	12.2	2.7	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	12.2	1.1		0.0	
Approach LOS	B				

Intersection Summary					
Average Delay			1.4		
Intersection Capacity Utilization	33.7%		ICU Level of Service	A	
Analysis Period (min)	15				

HCM Unsignalized Intersection Capacity Analysis

37: Universtiy & WB I-10 Ramp/E Central

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↔			↔	
Volume (veh/h)	0	0	0	0	6	22	558	494	26	7	151	1006
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	0	6	23	587	520	27	7	159	1059
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)							563					
pX, platoon unblocked	0.97	0.97	0.97	0.97	0.97		0.97					
vC, conflicting volume	2164	2425	609	1803	2941	274	1218			547		
vC1, stage 1 conf vol	703	703		1708	1708							
vC2, stage 2 conf vol	1461	1722		94	1233							
vCu, unblocked vol	2139	2408	536	1766	2939	274	1163			547		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	100	100	0	97	0			99		
cM capacity (veh/h)	0	0	480	0	0	730	590			1032		

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	29	847	287	87	1138
Volume Left	0	587	0	7	0
Volume Right	23	0	27	0	1059
cSH	0	590	1700	1032	1700
Volume to Capacity	107.69	1.00	0.17	0.01	0.67
Queue Length 95th (ft)	Err	367	0	1	0
Control Delay (s)	Err	62.5	0.0	0.8	0.0
Lane LOS	F	F		A	
Approach Delay (s)	Err	46.7		0.1	
Approach LOS	F				

Intersection Summary				
Average Delay		145.5		
Intersection Capacity Utilization	81.2%		ICU Level of Service	D
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis

38: Universtiy & EB I-10 Ramp

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	315	487	0	830	178	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	332	513	0	874	187	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		12				
Median type				TWLTL	TWLTL	
Median storage veh				2	2	
Upstream signal (ft)					1022	
pX, platoon unblocked						
vC, conflicting volume	624	94	187			
vC1, stage 1 conf vol	187					
vC2, stage 2 conf vol	437					
vCu, unblocked vol	624	94	187			
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 %	43	46	100			
cM capacity (veh/h)	582	951	1399			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	844	437	437	94	94
Volume Left	332	0	0	0	0
Volume Right	513	0	0	0	0
cSH	1482	1700	1700	1700	1700
Volume to Capacity	0.57	0.26	0.26	0.06	0.06
Queue Length 95th (ft)	95	0	0	0	0
Control Delay (s)	15.5	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	15.5	0.0		0.0	
Approach LOS	C				

Intersection Summary					
Average Delay			6.8		
Intersection Capacity Utilization		48.0%		ICU Level of Service	A
Analysis Period (min)		15			

Queues

39: Tippecanoe & Harriman PI

12/16/2013



Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	200	429	711	290	278	274	1474	633	1357
v/c Ratio	0.75	0.70	0.84	0.77	0.73	0.70	0.52	0.54	0.54
Control Delay	65.9	11.4	51.3	47.6	40.2	59.8	19.2	3.4	23.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.9	11.4	51.3	47.6	40.2	59.8	19.2	3.4	23.0
Queue Length 50th (ft)	149	1	265	174	142	105	252	0	193
Queue Length 95th (ft)	224	52	324	263	230	150	359	63	227
Internal Link Dist (ft)				563			384		767
Turn Bay Length (ft)	280		300		300	225		500	
Base Capacity (vph)	328	727	966	461	456	447	2841	1171	2517
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.59	0.74	0.63	0.61	0.61	0.52	0.54	0.54

Intersection Summary

HCM Signalized Intersection Capacity Analysis

39: Tippecanoe & Harriman PI

12/16/2013



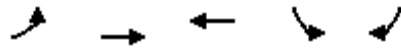
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖		↖↖	↖↖	↖	↖	↖↖	↖↖↖	↖		↖↖↖	
Volume (vph)	190	0	408	675	100	440	260	1400	601	0	1167	123
Ideal Flow (vphpl)	1800	1900	1800	1700	1900	1900	1700	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00		0.88	0.97	0.95	0.95	0.97	0.91	1.00		0.86	
Frt	1.00		0.85	1.00	0.90	0.85	1.00	1.00	0.85		0.99	
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (prot)	1710		2693	3133	1632	1534	3133	5187	1615		6443	
Flt Permitted	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (perm)	1710		2693	3133	1632	1534	3133	5187	1615		6443	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	200	0	429	711	105	463	274	1474	633	0	1228	129
RTOR Reduction (vph)	0	0	389	0	56	78	0	0	286	0	12	0
Lane Group Flow (vph)	200	0	40	711	234	200	274	1474	347	0	1345	0
Turn Type	Prot		custom	Prot	NA	Perm	Prot	NA	Perm		NA	
Protected Phases	7			3	8		5	2				6
Permitted Phases			4			8			2			
Actuated Green, G (s)	18.6		10.1	32.2	23.7	23.7	15.1	65.7	65.7		46.6	
Effective Green, g (s)	18.6		10.1	32.2	23.7	23.7	15.1	65.7	65.7		46.6	
Actuated g/C Ratio	0.16		0.08	0.27	0.20	0.20	0.13	0.55	0.55		0.39	
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)	265		227	841	322	303	394	2840	884		2502	
v/s Ratio Prot	0.12			c0.23	c0.14		c0.09	c0.28			0.21	
v/s Ratio Perm			0.01			0.13			0.21			
v/c Ratio	0.75		0.18	0.85	0.73	0.66	0.70	0.52	0.39		0.54	
Uniform Delay, d1	48.5		51.1	41.5	45.1	44.4	50.2	17.2	15.6		28.4	
Progression Factor	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.75	
Incremental Delay, d2	11.5		0.4	7.8	7.9	5.3	5.3	0.7	1.3		0.7	
Delay (s)	60.1		51.4	49.4	53.0	49.8	55.5	17.8	16.9		21.9	
Level of Service	E		D	D	D	D	E	B	B		C	
Approach Delay (s)		54.2			50.3			21.9			21.9	
Approach LOS		D			D			C			C	

Intersection Summary

HCM Average Control Delay	31.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Mill St

11/25/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	64	606	637	250	115
v/c Ratio	0.18	0.35	0.37	0.44	0.35
Control Delay	7.1	6.7	6.7	13.5	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.1	6.7	6.7	13.5	7.6
Queue Length 50th (ft)	6	33	34	15	0
Queue Length 95th (ft)	22	62	65	44	31
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	441	2156	2145	2071	924
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.15	0.28	0.30	0.12	0.12

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St

11/25/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	61	576	576	29	188	159
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.97	0.85
Flt Protected	0.95	1.00	1.00		0.96	1.00
Satd. Flow (prot)	1710	3610	3584		3435	1470
Flt Permitted	0.41	1.00	1.00		0.96	1.00
Satd. Flow (perm)	738	3610	3584		3435	1470
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	64	606	606	31	198	167
RTOR Reduction (vph)	0	0	6	0	44	97
Lane Group Flow (vph)	64	606	631	0	206	18
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	19.1	19.1	19.1		7.6	7.6
Effective Green, g (s)	17.1	17.1	17.1		5.6	5.6
Actuated g/C Ratio	0.48	0.48	0.48		0.16	0.16
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	353	1729	1717		539	231
v/s Ratio Prot		0.17	c0.18		c0.06	
v/s Ratio Perm	0.09					0.01
v/c Ratio	0.18	0.35	0.37		0.38	0.08
Uniform Delay, d1	5.3	5.8	5.9		13.5	12.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.1	0.1		0.5	0.1
Delay (s)	5.6	5.9	6.0		14.0	13.0
Level of Service	A	A	A		B	B
Approach Delay (s)		5.9	6.0		13.7	
Approach LOS		A	A		B	

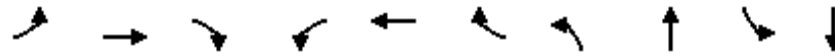
Intersection Summary

HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	35.7	Sum of lost time (s)	13.0
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

11/25/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	157	456	235	356	684	199	280	1136	105	1073
v/c Ratio	0.61	0.29	0.28	0.97	0.44	0.25	0.93	0.67	0.58	0.88
Control Delay	31.5	17.1	3.1	66.4	18.9	5.0	60.5	29.0	31.0	41.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	17.1	3.1	66.4	18.9	5.0	60.5	29.0	31.0	41.4
Queue Length 50th (ft)	65	83	0	186	135	13	~112	210	36	208
Queue Length 95th (ft)	139	117	40	#366	181	51	#274	262	#72	#284
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	266	1604	848	382	1604	806	300	1686	186	1224
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	0.59	0.28	0.28	0.93	0.43	0.25	0.93	0.67	0.56	0.88

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.

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑	↗	↘	↑↑↑		↘	↑↑↑	
Volume (vph)	149	433	223	338	650	189	266	955	124	100	846	173
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	7.0		5.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91		1.00	0.91	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3610	1615	1710	3610	1615	1710	5097		1710	5055	
Flt Permitted	0.33	1.00	1.00	0.48	1.00	1.00	0.15	1.00		0.20	1.00	
Satd. Flow (perm)	598	3610	1615	860	3610	1615	276	5097		353	5055	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	157	456	235	356	684	199	280	1005	131	105	891	182
RTOR Reduction (vph)	0	0	134	0	0	91	0	18	0	0	34	0
Lane Group Flow (vph)	157	456	101	356	684	108	280	1118	0	105	1039	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	40.6	40.6	40.6	40.6	40.6	40.6	39.4	30.8		28.7	23.1	
Effective Green, g (s)	38.6	38.6	38.6	38.6	38.6	38.6	37.4	28.8		24.7	21.1	
Actuated g/C Ratio	0.43	0.43	0.43	0.43	0.43	0.43	0.42	0.32		0.27	0.23	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	256	1548	693	369	1548	693	295	1631		151	1185	
v/s Ratio Prot		0.13			0.19		c0.12	0.22		0.03	0.21	
v/s Ratio Perm	0.26		0.06	c0.41		0.07	c0.28			0.16		
v/c Ratio	0.61	0.29	0.15	0.96	0.44	0.16	0.95	0.69		0.70	0.88	
Uniform Delay, d1	19.9	16.8	15.7	25.0	18.1	15.7	21.2	26.7		26.1	33.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.3	0.1	0.1	37.3	0.2	0.1	38.4	2.4		13.0	9.2	
Delay (s)	24.2	16.9	15.8	62.3	18.3	15.8	59.6	29.0		39.1	42.4	
Level of Service	C	B	B	E	B	B	E	C		D	D	
Approach Delay (s)		17.9			30.6			35.1			42.1	
Approach LOS		B			C			D			D	

Intersection Summary

HCM Average Control Delay	32.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Waterman & E Orange Show

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	269	1044	262	845	251	1362	81	1315
v/c Ratio	1.09	1.04	1.12	0.98	1.08	0.90	0.68	1.05
Control Delay	114.3	76.5	126.9	70.2	113.1	43.2	48.9	78.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0
Total Delay	114.3	76.5	126.9	70.2	113.1	45.9	48.9	78.7
Queue Length 50th (ft)	~184	~388	~184	337	~166	487	33	~548
Queue Length 95th (ft)	#357	#517	#356	#474	#337	#598	#84	#682
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	247	1005	233	864	232	1509	119	1249
Starvation Cap Reductn	0	0	0	0	0	77	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	1.09	1.04	1.12	0.98	1.08	0.95	0.68	1.05

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.

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	256	560	432	249	670	133	238	1210	84	77	997	253
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	6.0	7.0		6.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	*1.00		1.00	0.95		1.00	*1.00		1.00	*1.00	
Frt	1.00	0.93		1.00	0.98		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3552		1710	3520		1710	3763		1710	3685	
Flt Permitted	0.13	1.00		0.14	1.00		0.09	1.00		0.10	1.00	
Satd. Flow (perm)	240	3552		248	3520		157	3763		180	3685	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	269	589	455	262	705	140	251	1274	88	81	1049	266
RTOR Reduction (vph)	0	117	0	0	14	0	0	4	0	0	21	0
Lane Group Flow (vph)	269	927	0	262	831	0	251	1358	0	81	1294	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	47.0	32.0		45.0	31.0		60.0	50.0		48.0	42.0	
Effective Green, g (s)	43.0	30.0		41.0	29.0		58.0	48.0		44.0	40.0	
Actuated g/C Ratio	0.36	0.25		0.34	0.24		0.48	0.40		0.37	0.33	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	245	888		231	851		231	1505		117	1228	
v/s Ratio Prot	c0.12	0.26		0.11	0.24		c0.11	0.36		0.02	0.35	
v/s Ratio Perm	c0.27			0.27			c0.42			0.23		
v/c Ratio	1.10	1.04		1.13	0.98		1.09	0.90		0.69	1.05	
Uniform Delay, d1	32.3	45.0		33.6	45.2		35.8	33.8		29.2	40.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	86.2	42.3		100.1	25.0		84.2	7.9		16.2	41.2	
Delay (s)	118.5	87.3		133.7	70.2		120.0	41.7		45.5	81.2	
Level of Service	F	F		F	E		F	D		D	F	
Approach Delay (s)		93.7			85.2			53.9			79.1	
Approach LOS		F			F			D			E	

Intersection Summary

HCM Average Control Delay	76.4	HCM Level of Service	E
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	115.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

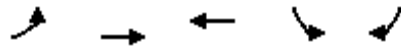
11/25/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	8	1531	1673	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	8	1612	1761	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					87	
pX, platoon unblocked	0.95	0.95	0.95			
vC, conflicting volume	2586	883	1765			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2563	768	1698			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	98			
cM capacity (veh/h)	20	331	361			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	0	8	806	806	1174	591
Volume Left	0	8	0	0	0	0
Volume Right	0	0	0	0	0	4
cSH	1700	361	1700	1700	1700	1700
Volume to Capacity	0.00	0.02	0.47	0.47	0.69	0.35
Queue Length 95th (ft)	0	2	0	0	0	0
Control Delay (s)	0.0	15.2	0.0	0.0	0.0	0.0
Lane LOS	A	C				
Approach Delay (s)	0.0	0.1			0.0	
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			49.7%		ICU Level of Service	A
Analysis Period (min)			15			

Queues
1: Mill St

12/16/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	85	694	935	225	106
v/c Ratio	0.25	0.31	0.43	0.42	0.41
Control Delay	8.4	5.8	6.4	14.4	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	8.4	5.8	6.4	14.4	14.8
Queue Length 50th (ft)	9	38	56	18	13
Queue Length 95th (ft)	34	74	105	40	46
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	348	2276	2260	1922	852
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.24	0.30	0.41	0.12	0.12

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St

12/16/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	81	659	838	50	128	186
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.94	0.85
Flt Protected	0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	1710	3610	3579		3364	1470
Flt Permitted	0.31	1.00	1.00		0.97	1.00
Satd. Flow (perm)	550	3610	3579		3364	1470
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	85	694	882	53	135	196
RTOR Reduction (vph)	0	0	6	0	44	44
Lane Group Flow (vph)	85	694	929	0	181	62
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	23.3	23.3	23.3		6.1	6.1
Effective Green, g (s)	21.3	21.3	21.3		4.1	4.1
Actuated g/C Ratio	0.55	0.55	0.55		0.11	0.11
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	305	2002	1985		359	157
v/s Ratio Prot		0.19	c0.26		c0.05	
v/s Ratio Perm	0.15					0.04
v/c Ratio	0.28	0.35	0.47		0.50	0.40
Uniform Delay, d1	4.5	4.7	5.1		16.2	16.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.5	0.1	0.2		1.1	1.6
Delay (s)	5.0	4.8	5.3		17.3	17.6
Level of Service	A	A	A		B	B
Approach Delay (s)		4.8	5.3		17.4	
Approach LOS		A	A		B	

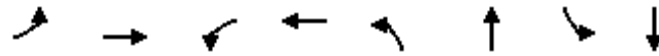
Intersection Summary

HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	38.4	Sum of lost time (s)	13.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

2: Waterman Ave & 9th St

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	224	635	194	496	124	1373	89	1094
v/c Ratio	0.99	0.85	1.08	0.73	0.78	0.88	0.64	0.80
Control Delay	85.7	44.4	118.4	37.8	50.1	33.8	38.7	30.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.7	44.4	118.4	37.8	50.1	33.8	38.7	30.7
Queue Length 50th (ft)	95	165	-86	126	36	368	26	288
Queue Length 95th (ft)	#224	220	#211	178	#122	#530	#73	#390
Internal Link Dist (ft)		852		841		893		996
Turn Bay Length (ft)	130		100		50		75	
Base Capacity (vph)	227	840	180	768	159	1557	138	1366
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.76	1.08	0.65	0.78	0.88	0.64	0.80

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.

HCM Signalized Intersection Capacity Analysis

2: Waterman Ave & 9th St

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	213	492	111	184	359	112	118	1120	184	85	941	98
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	7.0	7.5		7.0	7.4		7.0	7.5		7.0	7.5	
Lane Util. Factor	1.00	*1.00		1.00	0.95		1.00	*1.00		1.00	0.95	
Frt	1.00	0.97		1.00	0.96		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3695		1710	3481		1710	3719		1710	3559	
Flt Permitted	0.31	1.00		0.25	1.00		0.11	1.00		0.12	1.00	
Satd. Flow (perm)	559	3695		446	3481		202	3719		210	3559	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	224	518	117	194	378	118	124	1179	194	89	991	103
RTOR Reduction (vph)	0	24	0	0	34	0	0	15	0	0	9	0
Lane Group Flow (vph)	224	611	0	194	462	0	124	1358	0	89	1085	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	27.7	19.7		25.8	18.8		44.3	38.3		40.3	36.3	
Effective Green, g (s)	23.7	17.7		21.8	16.8		40.3	36.3		36.3	34.3	
Actuated g/C Ratio	0.26	0.20		0.24	0.19		0.45	0.40		0.40	0.38	
Clearance Time (s)	5.0	5.5		5.0	5.4		5.0	5.5		5.0	5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	224	727		178	650		157	1500		118	1356	
v/s Ratio Prot	c0.07	0.17		0.06	0.13		c0.03	c0.37		0.02	0.30	
v/s Ratio Perm	0.20			c0.20			0.32			0.29		
v/c Ratio	1.00	0.84		1.09	0.71		0.79	0.91		0.75	0.80	
Uniform Delay, d1	31.6	34.8		32.4	34.3		18.0	25.2		25.9	24.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	60.1	8.7		93.5	3.7		22.7	9.4		23.5	5.0	
Delay (s)	91.7	43.4		125.9	38.0		40.7	34.6		49.4	29.8	
Level of Service	F	D		F	D		D	C		D	C	
Approach Delay (s)		56.0			62.7			35.1			31.3	
Approach LOS		E			E			D			C	

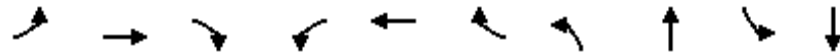
Intersection Summary

HCM Average Control Delay	42.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	93.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	215	481	272	332	731	240	181	1272	143	1230
v/c Ratio	0.80	0.64	0.53	0.88	0.85	0.47	0.79	0.81	0.70	0.83
Control Delay	40.0	31.1	10.9	44.1	37.7	12.1	43.4	29.7	36.8	30.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.0	31.1	10.9	44.1	37.7	12.1	43.4	29.7	36.8	30.7
Queue Length 50th (ft)	62	105	21	103	167	29	52	190	40	183
Queue Length 95th (ft)	#142	153	84	#201	#237	89	#136	241	#106	#239
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	268	818	534	377	915	529	229	1562	205	1490
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	0.80	0.59	0.51	0.88	0.80	0.45	0.79	0.81	0.70	0.83

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗↗	↖	↖	↗↗	↖	↖	↗↗↗		↖	↗↗↗	
Volume (vph)	204	457	258	315	694	228	172	1081	127	136	1002	166
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0		5.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	*0.95		1.00	*0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3610	1615	1710	3610	1615	1710	5329		1710	5299	
Flt Permitted	0.25	1.00	1.00	0.34	1.00	1.00	0.19	1.00		0.19	1.00	
Satd. Flow (perm)	459	3610	1615	620	3610	1615	333	5329		350	5299	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	215	481	272	332	731	240	181	1138	134	143	1055	175
RTOR Reduction (vph)	0	0	172	0	0	122	0	21	0	0	33	0
Lane Group Flow (vph)	215	481	100	332	731	118	181	1251	0	143	1197	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	26.7	17.7	17.7	31.3	20.0	20.0	31.0	23.6		29.0	22.6	
Effective Green, g (s)	22.7	15.7	15.7	27.3	18.0	18.0	27.0	21.6		25.0	20.6	
Actuated g/C Ratio	0.30	0.21	0.21	0.36	0.24	0.24	0.36	0.29		0.33	0.27	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	256	756	338	361	866	388	219	1535		196	1455	
v/s Ratio Prot	0.08	0.13		c0.11	0.20		c0.06	0.23		0.04	0.23	
v/s Ratio Perm	0.18		0.06	c0.22		0.07	c0.24			0.20		
v/c Ratio	0.84	0.64	0.30	0.92	0.84	0.31	0.83	0.82		0.73	0.82	
Uniform Delay, d1	21.7	27.0	25.0	20.3	27.2	23.4	18.8	24.8		19.3	25.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	20.8	1.8	0.5	27.7	7.6	0.4	21.8	4.9		12.7	3.9	
Delay (s)	42.5	28.8	25.5	48.0	34.7	23.8	40.6	29.7		32.0	29.4	
Level of Service	D	C	C	D	C	C	D	C		C	C	
Approach Delay (s)		30.9			36.1			31.1			29.7	
Approach LOS		C			D			C			C	

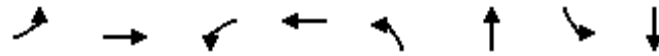
Intersection Summary

HCM Average Control Delay	31.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Waterman & E Orange Show

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	288	1074	324	1233	333	1503	174	1361
v/c Ratio	1.43	1.00	1.34	1.07	1.38	1.11	1.28	1.21
Control Delay	249.2	73.2	210.6	88.7	225.6	98.8	196.6	141.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	14.2	0.0	0.0
Total Delay	249.2	73.2	210.6	88.7	225.6	112.9	196.6	141.3
Queue Length 50th (ft)	~279	~444	~307	~570	~324	~719	~133	~697
Queue Length 95th (ft)	#464	#591	#499	#703	#518	#854	#287	#831
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	201	1069	241	1156	241	1355	136	1127
Starvation Cap Reductn	0	0	0	0	0	39	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	1.43	1.00	1.34	1.07	1.38	1.14	1.28	1.21

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.

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	274	758	262	308	1016	156	316	1219	209	165	1114	179
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	6.0	7.0		6.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	*1.00		1.00	*1.00		1.00	*1.00		1.00	*1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3654		1710	3724		1710	3717		1710	3721	
Flt Permitted	0.11	1.00		0.10	1.00		0.09	1.00		0.10	1.00	
Satd. Flow (perm)	195	3654		180	3724		160	3717		185	3721	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	288	798	276	324	1069	164	333	1283	220	174	1173	188
RTOR Reduction (vph)	0	29	0	0	10	0	0	11	0	0	11	0
Lane Group Flow (vph)	288	1045	0	324	1223	0	333	1492	0	174	1351	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	52.0	39.0		58.0	42.0		61.0	49.0		49.0	41.0	
Effective Green, g (s)	48.0	37.0		54.0	40.0		59.0	47.0		45.0	39.0	
Actuated g/C Ratio	0.37	0.28		0.42	0.31		0.45	0.36		0.35	0.30	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	200	1040		240	1146		240	1344		134	1116	
v/s Ratio Prot	0.12	0.29		c0.15	0.33		c0.15	0.40		0.06	0.36	
v/s Ratio Perm	0.41			c0.42			c0.48			0.39		
v/c Ratio	1.44	1.00		1.35	1.07		1.39	1.11		1.30	1.21	
Uniform Delay, d1	34.7	46.5		38.3	45.0		39.6	41.5		39.4	45.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	224.0	29.0		182.5	46.6		198.0	60.5		178.3	103.1	
Delay (s)	258.7	75.5		220.8	91.6		237.6	102.0		217.8	148.6	
Level of Service	F	E		F	F		F	F		F	F	
Approach Delay (s)		114.2			118.5			126.6			156.4	
Approach LOS		F			F			F			F	

Intersection Summary

HCM Average Control Delay	129.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.35		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	125.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	0	29	1661	1685	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	31	1748	1774	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					87	
pX, platoon unblocked	0.95	0.95	0.95			
vC, conflicting volume	2711	889	1778			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2695	773	1711			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	91			
cM capacity (veh/h)	15	328	356			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	0	31	874	874	1182	595
Volume Left	0	31	0	0	0	0
Volume Right	0	0	0	0	0	4
cSH	1700	356	1700	1700	1700	1700
Volume to Capacity	0.00	0.09	0.51	0.51	0.70	0.35
Queue Length 95th (ft)	0	7	0	0	0	0
Control Delay (s)	0.0	16.0	0.0	0.0	0.0	0.0
Lane LOS	A	C				
Approach Delay (s)	0.0	0.3			0.0	
Approach LOS	A					

Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			50.0%	ICU Level of Service	A	
Analysis Period (min)			15			

Queues

6: Waterman & Washington

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	688	1117	7	1413	743	23	206	206	806
v/c Ratio	1.15	0.44	0.03	0.79	0.77	0.23	0.80	0.75	0.95
Control Delay	134.0	9.2	20.6	32.4	21.7	52.2	76.2	70.9	29.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	134.0	9.2	20.6	32.4	21.7	52.2	76.2	70.9	29.7
Queue Length 50th (ft)	~341	210	3	540	315	14	169	168	83
Queue Length 95th (ft)	#460	270	13	665	528	44	#290	#276	#378
Internal Link Dist (ft)		433		239		527		537	
Turn Bay Length (ft)	225		100		200		125		
Base Capacity (vph)	596	2564	227	1789	965	506	263	279	848
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.15	0.44	0.03	0.79	0.77	0.05	0.78	0.74	0.95

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.

HCM Signalized Intersection Capacity Analysis

6: Waterman & Washington

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	654	1054	8	7	1342	706	6	10	6	383	9	766
Ideal Flow (vphpl)	1700	1900	1900	1800	1900	1900	1900	1900	1900	1800	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0	6.0		4.0		5.0	5.0	5.0
Lane Util. Factor	*1.00	0.95		1.00	0.95	1.00		1.00		*1.00	*1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	0.95	1.00
Satd. Flow (prot)	3230	3606		1710	3610	1615		1809		1710	1813	1615
Flt Permitted	0.95	1.00		0.26	1.00	1.00		0.99		0.95	0.95	1.00
Satd. Flow (perm)	3230	3606		459	3610	1615		1809		1710	1813	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	688	1109	8	7	1413	743	6	11	6	403	9	806
RTOR Reduction (vph)	0	0	0	0	0	169	0	6	0	0	0	601
Lane Group Flow (vph)	688	1117	0	7	1413	574	0	17	0	206	206	205
Turn Type	Prot	NA		Perm	NA	Perm	Split	NA		Split	NA	Perm
Protected Phases	5	2			6		8	8		4	4	
Permitted Phases				6		6						4
Actuated Green, G (s)	24.0	90.8		62.8	62.8	62.8		4.6		19.6	19.6	19.6
Effective Green, g (s)	24.0	90.8		62.8	62.8	62.8		4.6		19.6	19.6	19.6
Actuated g/C Ratio	0.18	0.70		0.48	0.48	0.48		0.04		0.15	0.15	0.15
Clearance Time (s)	4.0	6.0		6.0	6.0	6.0		4.0		5.0	5.0	5.0
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)	596	2519		222	1744	780		64		258	273	243
v/s Ratio Prot	c0.21	0.31			c0.39			c0.01		0.12	0.11	
v/s Ratio Perm				0.02		0.36						c0.13
v/c Ratio	1.15	0.44		0.03	0.81	0.74		0.27		0.80	0.75	0.84
Uniform Delay, d1	53.0	8.6		17.6	28.5	26.9		61.1		53.3	52.9	53.7
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	87.4	0.6		0.3	4.2	6.1		2.3		15.7	11.2	22.4
Delay (s)	140.4	9.1		17.9	32.7	33.1		63.3		69.0	64.1	76.1
Level of Service	F	A		B	C	C		E		E	E	E
Approach Delay (s)		59.2			32.8			63.3			72.9	
Approach LOS		E			C			E			E	

Intersection Summary

HCM Average Control Delay	51.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	100.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues

7: S Tippecanoe & E Victoria

12/16/2013






















Lane Group	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	40	20	2	1648	75	1678
v/c Ratio	0.30	0.13	0.01	0.54	0.38	0.55
Control Delay	40.0	7.2	3.0	4.4	11.1	4.4
Queue Delay	0.0	0.0	0.0	1.1	0.0	0.0
Total Delay	40.0	7.2	3.0	5.4	11.1	4.4
Queue Length 50th (ft)	19	0	0	145	10	151
Queue Length 95th (ft)	48	11	2	235	52	243
Internal Link Dist (ft)		770		198		507
Turn Bay Length (ft)	100		150		115	
Base Capacity (vph)	360	353	188	3031	196	3051
Starvation Cap Reductn	0	0	0	1042	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.06	0.01	0.83	0.38	0.55

Intersection Summary

HCM Signalized Intersection Capacity Analysis

7: S Tippecanoe & E Victoria

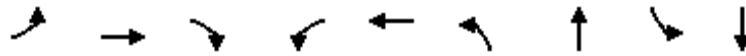
12/16/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	0	0	0	38	0	19	2	1497	68	71	1594	0	
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900	
Total Lost time (s)				6.0	6.0		7.5	7.5		7.5	7.5		
Lane Util. Factor				1.00	1.00		1.00	0.95		1.00	0.95		
Fr _t				1.00	0.85		1.00	0.99		1.00	1.00		
Fl _t Protected				0.95	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)				1710	1615		1710	3586		1710	3610		
Fl _t Permitted				1.00	1.00		0.12	1.00		0.13	1.00		
Satd. Flow (perm)				1800	1615		224	3586		233	3610		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	0	0	0	40	0	20	2	1576	72	75	1678	0	
RTOR Reduction (vph)	0	0	0	0	19	0	0	2	0	0	0	0	
Lane Group Flow (vph)	0	0	0	40	1	0	2	1646	0	75	1678	0	
Turn Type	Perm			Perm	NA		Perm	NA		Perm	NA		
Protected Phases		4			8			2			6		
Permitted Phases	4			8			2			6			
Actuated Green, G (s)				5.5	5.5		65.0	65.0		65.0	65.0		
Effective Green, g (s)				3.5	3.5		63.0	63.0		63.0	63.0		
Actuated g/C Ratio				0.04	0.04		0.79	0.79		0.79	0.79		
Clearance Time (s)				4.0	4.0		5.5	5.5		5.5	5.5		
Vehicle Extension (s)				3.0	3.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)				79	71		176	2824		183	2843		
v/s Ratio Prot					0.00			0.46			c0.46		
v/s Ratio Perm				c0.02			0.01			0.32			
v/c Ratio				0.51	0.01		0.01	0.58		0.41	0.59		
Uniform Delay, d ₁				37.4	36.6		1.8	3.3		2.7	3.4		
Progression Factor				1.00	1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d ₂				5.0	0.1		0.1	0.9		6.7	0.9		
Delay (s)				42.4	36.7		1.9	4.2		9.3	4.3		
Level of Service				D	D		A	A		A	A		
Approach Delay (s)		0.0			40.5			4.2			4.5		
Approach LOS		A			D			A			A		
Intersection Summary													
HCM Average Control Delay			5.0									HCM Level of Service	A
HCM Volume to Capacity ratio			0.59										
Actuated Cycle Length (s)			80.0									Sum of lost time (s)	13.5
Intersection Capacity Utilization			73.2%									ICU Level of Service	D
Analysis Period (min)			15										
c	Critical Lane Group												

Queues

8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	453	562	895	175	291	809	1130	103	1748
v/c Ratio	1.28	1.10	0.98	1.18	0.39	1.42	0.45	0.84	1.15
Control Delay	180.0	106.4	46.1	167.6	27.8	236.5	21.0	93.0	116.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	180.0	106.4	46.1	167.6	27.8	236.5	21.0	93.0	116.8
Queue Length 50th (ft)	~483	~536	469	~177	161	~465	205	82	~571
Queue Length 95th (ft)	#693	#760	#788	#327	239	m#561	m227	#194	#661
Internal Link Dist (ft)		517			1151		770		1167
Turn Bay Length (ft)	210			85		260		100	
Base Capacity (vph)	354	512	910	148	738	571	2527	123	1523
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.28	1.10	0.98	1.18	0.39	1.42	0.45	0.84	1.15

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.

HCM Signalized Intersection Capacity Analysis
 8: Tippecanoe/S Tippecanoe & E Hospitality/Coulston

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗		↖↗	↑↑↑		↖	↑↑↑	
Volume (vph)	589	375	850	166	195	82	769	976	98	98	1424	237
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1700	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0		6.0	7.0		7.0	7.0	
Lane Util. Factor	*1.00	*1.00	1.00	1.00	1.00		*1.00	0.91		1.00	*1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99		1.00	0.98	
Flt Protected	0.95	0.99	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	1872	1615	1710	1816		3230	5116		1805	5578	
Flt Permitted	0.49	0.67	1.00	0.21	1.00		0.95	1.00		0.24	1.00	
Satd. Flow (perm)	885	1278	1615	370	1816		3230	5116		455	5578	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	620	395	895	175	205	86	809	1027	103	103	1499	249
RTOR Reduction (vph)	0	0	264	0	11	0	0	9	0	0	20	0
Lane Group Flow (vph)	453	562	631	175	280	0	809	1121	0	103	1728	0
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)	54.0	54.0	54.0	54.0	54.0		25.0	66.0		37.0	37.0	
Effective Green, g (s)	52.0	52.0	52.0	52.0	52.0		23.0	64.0		35.0	35.0	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40		0.18	0.49		0.27	0.27	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		4.0	5.0		5.0	5.0	
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)	354	511	646	148	726		571	2519		123	1502	
v/s Ratio Prot					0.15		c0.25	0.22			c0.31	
v/s Ratio Perm	c0.51	0.44	0.39	0.47						0.23		
v/c Ratio	1.28	1.10	0.98	1.18	0.39		1.42	0.44		0.84	1.15	
Uniform Delay, d1	39.0	39.0	38.4	39.0	27.7		53.5	21.5		44.8	47.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.07	0.97		1.00	1.00	
Incremental Delay, d2	145.9	69.9	29.3	131.4	0.3		195.5	0.4		46.2	75.8	
Delay (s)	184.9	108.9	67.7	170.4	28.0		252.8	21.2		91.0	123.3	
Level of Service	F	F	E	F	C		F	C		F	F	
Approach Delay (s)		107.6			81.5			117.8			121.5	
Approach LOS		F			F			F			F	

Intersection Summary

HCM Average Control Delay	113.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.27		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	121.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Intersection has too many lanes per leg.

HCM All-Way analysis is limited to two lanes per leg.

Channelized right turn lanes are not counted.

Queues

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

12/16/2013



Lane Group	EBL	EBT	EBR	NBT	SBL	SBT
Lane Group Flow (vph)	565	562	509	1677	816	1874
v/c Ratio	1.26	1.19	1.16	1.14	1.23	0.81
Control Delay	175.6	146.7	134.9	109.1	149.0	18.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.6
Total Delay	175.6	146.7	134.9	109.1	149.0	19.1
Queue Length 50th (ft)	~598	~569	~521	~811	~433	711
Queue Length 95th (ft)	#824	#797	#755	#945	m#475	m767
Internal Link Dist (ft)		1164		1201		347
Turn Bay Length (ft)	275					
Base Capacity (vph)	447	472	439	1465	663	2305
Starvation Cap Reductn	0	0	0	0	0	148
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.26	1.19	1.16	1.14	1.23	0.87

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.

HCM Signalized Intersection Capacity Analysis

10: Anderson/Anderson/Tippecanoe & EB I-10 Ramps

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	977	22	556	0	0	0	0	1122	471	775	1780	0
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900	1900	1900	1900	1800	1900	1900
Total Lost time (s)	6.0	6.0	4.0					7.0		6.0	7.0	
Lane Util. Factor	*1.00	*1.00	0.95					*1.00		0.97	0.95	
Frt	1.00	0.98	0.85					0.96		1.00	1.00	
Flt Protected	0.95	0.96	1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1710	1788	1534					3631		3317	3610	
Flt Permitted	0.95	0.96	1.00					1.00		0.95	1.00	
Satd. Flow (perm)	1710	1788	1534					3631		3317	3610	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1028	23	585	0	0	0	0	1181	496	816	1874	0
RTOR Reduction (vph)	0	4	14	0	0	0	0	40	0	0	0	0
Lane Group Flow (vph)	565	558	495	0	0	0	0	1637	0	816	1874	0
Turn Type	pm+pt	NA	Perm					NA		Prot	NA	
Protected Phases	7	4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)	36.0	36.0	36.0					53.0		28.0	85.0	
Effective Green, g (s)	34.0	34.0	36.0					51.0		26.0	83.0	
Actuated g/C Ratio	0.26	0.26	0.28					0.39		0.20	0.64	
Clearance Time (s)	4.0	4.0	4.0					5.0		4.0	5.0	
Vehicle Extension (s)	3.0	2.0	2.0					2.0		2.0	2.0	
Lane Grp Cap (vph)	447	468	425					1424		663	2305	
v/s Ratio Prot	c0.33	0.31						c0.45		c0.25	0.52	
v/s Ratio Perm			0.32									
v/c Ratio	1.26	1.19	1.16					1.15		1.23	0.81	
Uniform Delay, d1	48.0	48.0	47.0					39.5		52.0	17.7	
Progression Factor	1.00	1.00	1.00					1.00		0.83	0.92	
Incremental Delay, d2	135.7	105.6	96.6					75.9		111.3	1.8	
Delay (s)	183.7	153.6	143.6					115.4		154.5	18.1	
Level of Service	F	F	F					F		F	B	
Approach Delay (s)		160.9			0.0			115.4			59.4	
Approach LOS		F			A			F			E	

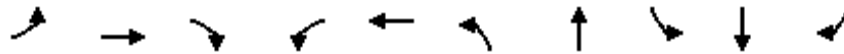
Intersection Summary

HCM Average Control Delay	102.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	168.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues

11: Anderson & Academy

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	342	145	176	104	209	73	1041	95	849	177
v/c Ratio	0.63	0.24	0.28	0.42	0.49	0.31	0.89	0.40	0.67	0.26
Control Delay	17.8	17.4	4.6	18.6	21.2	13.7	31.9	15.6	20.4	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.8	17.4	4.6	18.6	21.2	13.7	31.9	15.6	20.4	4.4
Queue Length 50th (ft)	83	39	0	22	24	15	189	19	145	0
Queue Length 95th (ft)	145	78	37	47	53	35	#315	44	#212	37
Internal Link Dist (ft)		21			32		1375		514	
Turn Bay Length (ft)	75			100		100		100		
Base Capacity (vph)	589	623	648	250	435	238	1168	239	1272	684
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	0.58	0.23	0.27	0.42	0.48	0.31	0.89	0.40	0.67	0.26

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

11: Anderson & Academy

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	138	167	99	129	69	69	927	62	90	807	168
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	4.0	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	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1710	1900	1615	1710	3421		1710	3576		1710	3610	1615
Flt Permitted	0.39	1.00	1.00	0.66	1.00		0.21	1.00		0.20	1.00	1.00
Satd. Flow (perm)	707	1900	1615	1196	3421		377	3576		364	3610	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	342	145	176	104	136	73	73	976	65	95	849	177
RTOR Reduction (vph)	0	0	123	0	64	0	0	8	0	0	0	117
Lane Group Flow (vph)	342	145	53	104	145	0	73	1033	0	95	849	60
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)	24.7	17.7	17.7	9.9	6.9		21.4	19.1		22.8	19.8	19.8
Effective Green, g (s)	24.7	17.7	17.7	9.9	6.9		21.4	19.1		22.8	19.8	19.8
Actuated g/C Ratio	0.42	0.30	0.30	0.17	0.12		0.36	0.32		0.39	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	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	532	572	486	228	401		189	1162		210	1216	544
v/s Ratio Prot	c0.15	0.08		0.02	0.04		0.02	c0.29		c0.02	0.24	
v/s Ratio Perm	c0.12		0.03	0.05			0.13			0.15		0.04
v/c Ratio	0.64	0.25	0.11	0.46	0.36		0.39	0.89		0.45	0.70	0.11
Uniform Delay, d1	12.6	15.6	14.9	21.7	23.9		13.1	18.8		13.5	16.9	13.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.7	0.2	0.1	1.4	0.6		1.3	8.6		1.5	1.8	0.1
Delay (s)	15.2	15.8	15.0	23.1	24.5		14.4	27.4		15.0	18.7	13.5
Level of Service	B	B	B	C	C		B	C		B	B	B
Approach Delay (s)		15.3			24.0			26.5			17.6	
Approach LOS		B			C			C			B	

Intersection Summary

HCM Average Control Delay	20.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	58.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues

12: California & WB I-10 Ramps

12/16/2013



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	1002	281	1181	880	1438	1375
v/c Ratio	1.89	0.53	2.05	0.39	0.89	1.67
Control Delay	437.2	26.5	508.0	11.9	52.3	328.0
Queue Delay	125.7	0.0	198.9	1.3	2.4	0.0
Total Delay	562.9	26.5	707.0	13.2	54.6	328.0
Queue Length 50th (ft)	~1291	115	~1562	136	387	~1374
Queue Length 95th (ft)	#1546	206	m#1786	m214	443	#1642
Internal Link Dist (ft)	1118			276	113	
Turn Bay Length (ft)						
Base Capacity (vph)	529	533	575	2249	1622	823
Starvation Cap Reductn	0	0	231	1088	0	0
Spillback Cap Reductn	68	0	0	0	96	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	2.17	0.53	3.43	0.76	0.94	1.67

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

12: California & WB I-10 Ramps

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕	↗	↘	↕↕			↕↕↕	↗
Volume (vph)	0	0	0	944	8	267	1122	836	0	0	1366	1306
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1800	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	7.0	5.5	6.0			5.0	5.0
Lane Util. Factor					1.00	1.00	1.00	0.95			*1.00	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1810	1615	1710	3610			5700	1615
Flt Permitted					0.95	1.00	0.10	1.00			1.00	1.00
Satd. Flow (perm)					1810	1615	173	3610			5700	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	994	8	281	1181	880	0	0	1438	1375
RTOR Reduction (vph)	0	0	0	0	0	85	0	0	0	0	0	363
Lane Group Flow (vph)	0	0	0	0	1002	196	1181	880	0	0	1438	1012
Turn Type				Perm	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases					8		5	6			2	
Permitted Phases				8		8	6					2
Actuated Green, G (s)					38.0	38.0	83.0	83.0			39.0	39.0
Effective Green, g (s)					38.0	36.0	81.0	81.0			37.0	37.0
Actuated g/C Ratio					0.29	0.28	0.62	0.62			0.28	0.28
Clearance Time (s)					5.0	5.0	3.5	4.0			3.0	3.0
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					529	447	575	2249			1622	460
v/s Ratio Prot							c0.62	0.24			0.25	
v/s Ratio Perm					0.55	0.12	0.65					c0.63
v/c Ratio					1.89	0.44	2.05	0.39			0.89	2.20
Uniform Delay, d1					46.0	38.7	38.3	12.2			44.5	46.5
Progression Factor					1.00	1.00	1.69	0.94			1.00	1.00
Incremental Delay, d2					409.4	0.3	478.4	0.4			7.6	546.7
Delay (s)					455.4	38.9	543.1	11.8			52.0	593.2
Level of Service					F	D	F	B			D	F
Approach Delay (s)		0.0			364.2			316.3			316.6	
Approach LOS		A			F			F			F	

Intersection Summary

HCM Average Control Delay	326.4	HCM Level of Service	F
HCM Volume to Capacity ratio	2.05		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	15.5
Intersection Capacity Utilization	249.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues

13: EB I-10 Ramps & California

12/16/2013



Lane Group	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	338	752	1743	1117	624	1562
v/c Ratio	1.01	2.29	0.66	1.10	1.44	0.60
Control Delay	104.0	614.1	28.2	79.3	242.6	9.3
Queue Delay	0.0	0.0	409.9	110.3	136.1	2.3
Total Delay	104.0	614.1	438.2	189.6	378.7	11.6
Queue Length 50th (ft)	~292	~998	369	~831	~690	210
Queue Length 95th (ft)	#490	#1243	417	#1094	m#541	m182
Internal Link Dist (ft)	1294		46			276
Turn Bay Length (ft)						
Base Capacity (vph)	335	328	2653	1016	432	2596
Starvation Cap Reductn	0	0	1740	189	75	859
Spillback Cap Reductn	0	0	685	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.01	2.29	1.91	1.35	1.75	0.90






















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.

HCM Signalized Intersection Capacity Analysis

13: EB I-10 Ramps & California

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			 	
Volume (vph)	311	10	714	0	0	0	0	1656	1061	593	1484	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1800	1900	1900
Lane Width	12	12	8	12	12	12	12	12	12	12	12	12
Total Lost time (s)		6.0	4.0					6.5	6.5	5.5	6.5	
Lane Util. Factor		1.00	1.00					*1.00	1.00	1.00	0.95	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1812	1400					5700	1615	1710	3610	
Flt Permitted		0.95	1.00					1.00	1.00	0.08	1.00	
Satd. Flow (perm)		1812	1400					5700	1615	137	3610	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	327	11	752	0	0	0	0	1743	1117	624	1562	0
RTOR Reduction (vph)	0	0	48	0	0	0	0	0	264	0	0	0
Lane Group Flow (vph)	0	338	704	0	0	0	0	1743	853	624	1562	0
Turn Type	Perm	NA	Perm					NA	Perm	pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2	6		
Actuated Green, G (s)		26.0	26.0					62.5	62.5	95.5	95.5	
Effective Green, g (s)		24.0	26.0					60.5	60.5	93.5	93.5	
Actuated g/C Ratio		0.18	0.20					0.47	0.47	0.72	0.72	
Clearance Time (s)		4.0	4.0					4.5	4.5	3.5	4.5	
Vehicle Extension (s)		2.0	2.0					2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		335	280					2653	752	431	2596	
v/s Ratio Prot								0.31		c0.31	0.43	
v/s Ratio Perm		0.19	c0.50						0.53	c0.74		
v/c Ratio		1.01	2.51					0.66	1.13	1.45	0.60	
Uniform Delay, d1		53.0	52.0					26.8	34.8	40.4	9.0	
Progression Factor		1.00	1.00					1.00	1.00	1.58	1.00	
Incremental Delay, d2		51.4	691.9					1.3	76.4	202.7	0.1	
Delay (s)		104.4	743.9					28.0	111.1	266.7	9.1	
Level of Service		F	F					C	F	F	A	
Approach Delay (s)		545.6			0.0			60.5			82.6	
Approach LOS		F			A			E			F	
Intersection Summary												
HCM Average Control Delay			154.6								HCM Level of Service	F
HCM Volume to Capacity ratio			1.63									
Actuated Cycle Length (s)			130.0								Sum of lost time (s)	9.5
Intersection Capacity Utilization			249.1%								ICU Level of Service	H
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

14: California & Shopping Center

12/16/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑↑↑		↔	↑↑
Volume (veh/h)	2	154	2646	97	495	1281
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	162	2785	102	521	1348
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)			652		321	
pX, platoon unblocked	0.83	0.79			0.79	
vC, conflicting volume	4553	979			2887	
vC1, stage 1 conf vol	2836					
vC2, stage 2 conf vol	1716					
vCu, unblocked vol	4017	35			2455	
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 %	0	80			0	
cM capacity (veh/h)	0	817			152	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	164	1114	1114	659	521	674	674
Volume Left	2	0	0	0	521	0	0
Volume Right	162	0	0	102	0	0	0
cSH	0	1700	1700	1700	152	1700	1700
Volume to Capacity	Err	0.66	0.66	0.39	3.42	0.40	0.40
Queue Length 95th (ft)	Err	0	0	0	Err	0	0
Control Delay (s)	Err	0.0	0.0	0.0	1152.2	0.0	0.0
Lane LOS	F				F		
Approach Delay (s)	Err	0.0			321.1		
Approach LOS	F						

Intersection Summary			
Average Delay		Err	
Intersection Capacity Utilization		101.9%	ICU Level of Service G
Analysis Period (min)		15	

Queues

15: California/California & W Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	406	1523	174	753	799	123	1210	572	754
v/c Ratio	1.71	1.25	1.58	0.71	1.08	0.95	1.30	1.68	0.83
Control Delay	362.3	157.0	326.7	46.5	78.1	115.2	181.1	345.5	37.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	362.3	157.0	326.7	46.5	78.1	115.2	181.1	345.5	37.0
Queue Length 50th (ft)	~413	~795	~153	286	~488	102	~686	~661	520
Queue Length 95th (ft)	#619	#930	#294	355	#739	#232	#826	#890	711
Internal Link Dist (ft)		1468		1180			268		572
Turn Bay Length (ft)	90		150		100				
Base Capacity (vph)	237	1217	110	1061	742	129	932	341	910
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.71	1.25	1.58	0.71	1.08	0.95	1.30	1.68	0.83

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.

HCM Signalized Intersection Capacity Analysis

15: California/California & W Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↗	↖	↗		↖	↗	
Volume (vph)	386	1128	319	165	715	759	117	1047	103	543	540	177
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1900	1900	1900	1800	1900	1900
Total Lost time (s)	6.0	7.7		6.0	7.7	7.7	5.2	7.2		7.2	6.0	
Lane Util. Factor	1.00	*1.00		1.00	*1.00	1.00	1.00	0.95		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3674		1710	3800	1615	1805	3562		1710	1830	
Flt Permitted	0.17	1.00		0.11	1.00	1.00	0.25	1.00		0.09	1.00	
Satd. Flow (perm)	311	3674		198	3800	1615	468	3562		171	1830	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	406	1187	336	174	753	799	123	1102	108	572	568	186
RTOR Reduction (vph)	0	22	0	0	0	291	0	6	0	0	9	0
Lane Group Flow (vph)	406	1501	0	174	753	508	123	1204	0	572	745	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			4		3	8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	54.3	44.3		44.3	38.3	38.3	35.8	35.8		66.0	66.0	
Effective Green, g (s)	52.3	42.3		40.3	36.3	36.3	35.8	33.8		64.0	64.0	
Actuated g/C Ratio	0.40	0.33		0.31	0.28	0.28	0.28	0.26		0.49	0.49	
Clearance Time (s)	4.0	5.7		4.0	5.7	5.7	5.2	5.2		5.2	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)	233	1195		108	1061	451	129	926		342	901	
v/s Ratio Prot	c0.13	0.41		0.05	0.20			0.34		c0.28	0.41	
v/s Ratio Perm	c0.57			0.45		0.31	0.26			c0.54		
v/c Ratio	1.74	1.26		1.61	0.71	1.13	0.95	1.30		1.67	0.83	
Uniform Delay, d1	34.1	43.9		45.3	42.1	46.9	46.3	48.1		41.3	28.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	351.4	122.3		313.5	2.2	81.5	64.5	143.1		315.2	6.3	
Delay (s)	385.5	166.2		358.9	44.3	128.3	110.8	191.2		356.5	34.5	
Level of Service	F	F		F	D	F	F	F		F	C	
Approach Delay (s)		212.4			114.9			183.8			173.4	
Approach LOS		F			F			F			F	

Intersection Summary

HCM Average Control Delay	171.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.59		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.2
Intersection Capacity Utilization	138.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues

16: Alabama St & WB I-10 Ramps

12/16/2013



Lane Group	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	1061	461	1276	2018
v/c Ratio	1.24	1.38	0.53	1.21
Control Delay	155.7	220.4	9.5	131.1
Queue Delay	0.0	0.0	0.3	0.0
Total Delay	155.7	220.4	9.8	131.1
Queue Length 50th (ft)	~534	~478	194	~1025
Queue Length 95th (ft)	#666	m#563	m201	#1157
Internal Link Dist (ft)	765		376	271
Turn Bay Length (ft)				
Base Capacity (vph)	859	334	2388	1672
Starvation Cap Reductn	0	0	485	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.24	1.38	0.67	1.21


















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.

HCM Signalized Intersection Capacity Analysis

16: Alabama St & WB I-10 Ramps

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	240	449	318	438	1212	0	0	1288	629
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1800	1900	1900	1900	1900	1900
Total Lost time (s)					6.5		6.0	8.0			8.0	
Lane Util. Factor					*1.00		1.00	0.95			*1.00	
Frt					0.95		1.00	1.00			0.95	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					3577		1710	3610			3613	
Flt Permitted					0.99		0.06	1.00			1.00	
Satd. Flow (perm)					3577		111	3610			3613	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	253	473	335	461	1276	0	0	1356	662
RTOR Reduction (vph)	0	0	0	0	47	0	0	0	0	0	32	0
Lane Group Flow (vph)	0	0	0	0	1014	0	461	1276	0	0	1986	0
Turn Type				Perm	NA		pm+pt	NA			NA	
Protected Phases					4		1	6			2	
Permitted Phases				4			6					
Actuated Green, G (s)					31.5		88.0	88.0			61.0	
Effective Green, g (s)					29.5		86.0	86.0			59.0	
Actuated g/C Ratio					0.23		0.66	0.66			0.45	
Clearance Time (s)					4.5		4.0	6.0			6.0	
Vehicle Extension (s)					3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)					812		332	2388			1640	
v/s Ratio Prot							c0.22	0.35			0.55	
v/s Ratio Perm					0.28		c0.70					
v/c Ratio					1.25		1.39	0.53			1.21	
Uniform Delay, d1					50.2		45.1	11.5			35.5	
Progression Factor					1.00		1.51	0.79			1.00	
Incremental Delay, d2					122.1		180.8	0.3			101.0	
Delay (s)					172.3		249.1	9.4			136.5	
Level of Service					F		F	A			F	
Approach Delay (s)		0.0			172.3			73.0			136.5	
Approach LOS		A			F			E			F	
Intersection Summary												
HCM Average Control Delay			121.5		HCM Level of Service						F	
HCM Volume to Capacity ratio			1.29									
Actuated Cycle Length (s)			130.0		Sum of lost time (s)					12.5		
Intersection Capacity Utilization			128.0%		ICU Level of Service					H		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

17: EB I-10 Ramps & Alabama St

12/16/2013



Lane Group	EBT	NBT	SBL	SBT
Lane Group Flow (vph)	1426	1630	409	1407
v/c Ratio	1.44dr	0.79	1.28	0.68
Control Delay	174.3	38.3	168.2	21.7
Queue Delay	0.0	1.5	0.0	8.5
Total Delay	174.3	39.9	168.2	30.2
Queue Length 50th (ft)	~757	391	~398	340
Queue Length 95th (ft)	#892	446	m#307	m243
Internal Link Dist (ft)	622	505		376
Turn Bay Length (ft)				
Base Capacity (vph)	1104	2075	320	2083
Starvation Cap Reductn	0	260	0	646
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.29	0.90	1.28	0.98

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.
- dr Defacto Right Lane. Recode with 1 though lane as a right lane.

HCM Signalized Intersection Capacity Analysis

17: EB I-10 Ramps & Alabama St

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕						↕↕↕		↕	↕↕	
Volume (vph)	594	11	750	0	0	0	0	1215	333	389	1337	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1800	1900	1900
Total Lost time (s)		7.0						8.0		6.0	7.0	
Lane Util. Factor		*1.00						*1.00		1.00	0.95	
Frt		0.92						0.97		1.00	1.00	
Flt Protected		0.98						1.00		0.95	1.00	
Satd. Flow (prot)		3410						5516		1710	3610	
Flt Permitted		0.98						1.00		0.07	1.00	
Satd. Flow (perm)		3410						5516		131	3610	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	625	12	789	0	0	0	0	1279	351	409	1407	0
RTOR Reduction (vph)	0	28	0	0	0	0	0	38	0	0	0	0
Lane Group Flow (vph)	0	1398	0	0	0	0	0	1592	0	409	1407	0
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		8						6		5	2	
Permitted Phases	8									2		
Actuated Green, G (s)		43.0						50.0		77.0	77.0	
Effective Green, g (s)		41.0						48.0		75.0	75.0	
Actuated g/C Ratio		0.32						0.37		0.58	0.58	
Clearance Time (s)		5.0						6.0		4.0	5.0	
Vehicle Extension (s)		2.0						2.0		2.0	2.0	
Lane Grp Cap (vph)		1075						2037		319	2083	
v/s Ratio Prot								0.29		c0.20	0.39	
v/s Ratio Perm		0.41								c0.54		
v/c Ratio		1.44dr						0.78		1.28	0.68	
Uniform Delay, d1		44.5						36.4		41.9	19.1	
Progression Factor		1.00						1.00		1.30	1.11	
Incremental Delay, d2		142.1						3.1		129.2	0.2	
Delay (s)		186.6						39.4		183.8	21.4	
Level of Service		F						D		F	C	
Approach Delay (s)		186.6			0.0			39.4			58.0	
Approach LOS		F			A			D			E	

Intersection Summary

HCM Average Control Delay	89.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	128.0%	ICU Level of Service	H
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

Queues

18: Alabama St & Industrial Park

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	326	316	81	474	61	1249	496	1384	212
v/c Ratio	1.39	0.41	0.23	0.55	0.59	0.84	1.48	0.91	0.32
Control Delay	228.0	23.7	24.8	12.4	45.7	46.5	258.5	44.0	19.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	104.7	0.0	16.7	0.0
Total Delay	228.0	23.7	24.8	12.4	45.7	151.2	258.5	60.7	19.7
Queue Length 50th (ft)	~338	152	40	101	25	298	~482	493	82
Queue Length 95th (ft)	#522	230	79	203	#59	350	#697	#592	143
Internal Link Dist (ft)		298		379		236		505	
Turn Bay Length (ft)	100		50		150		215		55
Base Capacity (vph)	235	772	358	864	104	1571	336	1566	695
Starvation Cap Reductn	0	0	0	0	0	555	0	211	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.39	0.41	0.23	0.55	0.59	1.23	1.48	1.02	0.31

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

18: Alabama St & Industrial Park

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	310	185	115	77	68	382	58	1089	98	471	1315	201
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	6.2	6.2		6.2	6.2		6.0	6.2		6.0	6.2	6.2
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	*1.00		1.00	*1.00	1.00
Frt	1.00	0.94		1.00	0.87		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1710	1791		1710	1658		1710	5629		1710	3800	1615
Flt Permitted	0.31	1.00		0.47	1.00		0.13	1.00		0.11	1.00	1.00
Satd. Flow (perm)	560	1791		851	1658		231	5629		194	3800	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	326	195	121	81	72	402	61	1146	103	496	1384	212
RTOR Reduction (vph)	0	19	0	0	166	0	0	10	0	0	0	30
Lane Group Flow (vph)	326	297	0	81	308	0	61	1239	0	496	1384	182
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4			6			2		2
Actuated Green, G (s)	51.8	51.8		51.8	51.8		38.2	33.2		58.2	49.2	49.2
Effective Green, g (s)	49.8	49.8		49.8	49.8		34.2	31.2		56.2	47.2	47.2
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.29	0.26		0.47	0.40	0.40
Clearance Time (s)	4.2	4.2		4.2	4.2		4.0	4.2		4.0	4.2	4.2
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)	236	753		358	697		104	1483		335	1515	644
v/s Ratio Prot		0.17			0.19		0.01	0.22		c0.24	0.36	
v/s Ratio Perm	c0.58			0.10			0.15			c0.47		0.11
v/c Ratio	1.38	0.40		0.23	0.44		0.59	0.84		1.48	0.91	0.28
Uniform Delay, d1	34.3	23.8		22.0	24.4		33.9	41.2		35.7	33.7	24.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	195.8	0.3		0.3	0.4		8.2	4.2		231.7	8.8	0.2
Delay (s)	230.1	24.2		22.3	24.9		42.1	45.4		267.4	42.4	24.4
Level of Service	F	C		C	C		D	D		F	D	C
Approach Delay (s)		128.8			24.5			45.3			93.9	
Approach LOS		F			C			D			F	

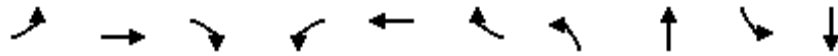
Intersection Summary

HCM Average Control Delay	76.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.39		
Actuated Cycle Length (s)	118.4	Sum of lost time (s)	12.2
Intersection Capacity Utilization	116.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues

19: Alabama St & W Redlands

12/16/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	434	1052	123	136	481	267	139	834	296	1462
v/c Ratio	0.65	0.92	0.21	0.61	0.73	0.51	0.90	0.55	0.61	1.04
Control Delay	49.9	55.4	10.2	67.6	54.6	8.4	109.1	39.1	54.8	73.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	328.1
Total Delay	49.9	55.4	10.2	67.6	54.6	8.4	109.1	39.1	58.6	401.0
Queue Length 50th (ft)	160	401	15	54	181	0	56	180	112	-605
Queue Length 95th (ft)	235	#514	61	91	237	70	#129	241	172	#823
Internal Link Dist (ft)		1247			345			380		164
Turn Bay Length (ft)	240		240	290			115		125	
Base Capacity (vph)	666	1141	577	461	902	609	154	1521	487	1400
Starvation Cap Reductn	0	0	0	0	0	0	0	0	117	581
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	0.65	0.92	0.21	0.30	0.53	0.44	0.90	0.55	0.80	1.79

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.

HCM Signalized Intersection Capacity Analysis

19: Alabama St & W Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↖↗	↖	↖↗	↖↗	↖	↖↗	↖↗↘		↖↗	↖↗	
Volume (vph)	412	999	117	129	457	254	132	683	109	281	1038	351
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Total Lost time (s)	5.0	6.9	4.9	6.9	6.9	4.9	5.0	6.2		5.0	6.2	
Lane Util. Factor	0.97	*1.00	*1.00	0.97	*1.00	*1.00	0.97	*1.00		0.97	*1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3133	3800	1615	3133	3800	1615	3133	5582		3133	3656	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3133	3800	1615	3133	3800	1615	3133	5582		3133	3656	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	434	1052	123	136	481	267	139	719	115	296	1093	369
RTOR Reduction (vph)	0	0	66	0	0	216	0	19	0	0	27	0
Lane Group Flow (vph)	434	1052	57	136	481	51	139	815	0	296	1435	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	28.0	38.7	38.7	10.7	23.3	23.3	8.0	35.0		21.0	48.0	
Effective Green, g (s)	26.0	36.7	38.7	8.7	21.3	23.3	6.0	33.0		19.0	46.0	
Actuated g/C Ratio	0.21	0.30	0.32	0.07	0.17	0.19	0.05	0.27		0.16	0.38	
Clearance Time (s)	3.0	4.9	4.9	4.9	4.9	4.9	3.0	4.2		3.0	4.2	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	666	1139	511	223	661	307	154	1505		486	1374	
v/s Ratio Prot	c0.14	c0.28		0.04	0.13		c0.04	0.15		0.09	c0.39	
v/s Ratio Perm			0.04			0.03						
v/c Ratio	0.65	0.92	0.11	0.61	0.73	0.17	0.90	0.54		0.61	1.04	
Uniform Delay, d1	44.1	41.5	29.7	55.2	47.8	41.4	57.9	38.2		48.2	38.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.9	12.3	0.1	4.7	4.0	0.3	50.4	1.4		5.6	36.6	
Delay (s)	49.0	53.8	29.8	59.9	51.8	41.7	108.3	39.6		53.8	74.8	
Level of Service	D	D	C	E	D	D	F	D		D	E	
Approach Delay (s)		50.6			50.0			49.4			71.3	
Approach LOS		D			D			D			E	

Intersection Summary

HCM Average Control Delay	57.3	HCM Level of Service	E
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	122.4	Sum of lost time (s)	23.1
Intersection Capacity Utilization	98.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queues

20: Tennessee & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	554	1509	48	555	796	779
v/c Ratio	1.03	0.97	0.29	0.74	0.93	1.00
Control Delay	72.4	46.0	20.5	38.0	50.6	66.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	563.1
Total Delay	72.4	46.0	20.5	38.0	50.6	629.3
Queue Length 50th (ft)	~316	457	14	147	240	~244
Queue Length 95th (ft)	#525	#616	31	208	#360	#374
Internal Link Dist (ft)		2241		737	458	48
Turn Bay Length (ft)	145		140			
Base Capacity (vph)	538	1555	165	750	854	779
Starvation Cap Reductn	0	0	0	0	0	438
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.97	0.29	0.74	0.93	2.28

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

20: Tennessee & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	526	1277	157	46	315	212	76	627	53	118	591	31
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.9		5.5	6.9			6.9			6.9	
Lane Util. Factor	1.00	*1.00		1.00	0.95			*1.00			*1.00	
Frt	1.00	0.98		1.00	0.94			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1710	3738		1710	3392			3741			3746	
Flt Permitted	0.19	1.00		0.20	1.00			0.66			0.60	
Satd. Flow (perm)	347	3738		364	3392			2470			2257	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	554	1344	165	48	332	223	80	660	56	124	622	33
RTOR Reduction (vph)	0	10	0	0	75	0	0	6	0	0	3	0
Lane Group Flow (vph)	554	1499	0	48	480	0	0	790	0	0	776	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	53.8	43.3		28.8	21.8			36.3			36.3	
Effective Green, g (s)	51.8	41.3		24.8	19.8			34.3			34.3	
Actuated g/C Ratio	0.52	0.41		0.25	0.20			0.34			0.34	
Clearance Time (s)	4.0	4.9		3.5	4.9			4.9			4.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	535	1545		158	672			848			775	
v/s Ratio Prot	c0.27	0.40		0.02	0.14							
v/s Ratio Perm	c0.27			0.06				0.32			c0.34	
v/c Ratio	1.04	0.97		0.30	0.71			0.93			1.00	
Uniform Delay, d1	25.8	28.7		30.0	37.4			31.7			32.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	48.4	16.3		1.1	3.6			16.7			32.6	
Delay (s)	74.2	45.0		31.1	41.0			48.3			65.4	
Level of Service	E	D		C	D			D			E	
Approach Delay (s)		52.8			40.2			48.3			65.4	
Approach LOS		D			D			D			E	

Intersection Summary

HCM Average Control Delay	52.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	99.9	Sum of lost time (s)	12.9
Intersection Capacity Utilization	110.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

21: Texas & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	3	11	59	57	42	51	20	580	30	18	318	14
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	3	12	62	60	44	54	21	611	32	19	335	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								193				
pX, platoon unblocked	0.99	0.99		0.99	0.99	0.99				0.99		
vC, conflicting volume	803	1064	175	942	1056	321	349			642		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	772	1037	175	913	1029	284	349			609		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	95	93	70	80	92	98			98		
cM capacity (veh/h)	220	221	845	198	224	709	1221			966		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	77	158	326	337	186	182
Volume Left	3	60	21	0	19	0
Volume Right	62	54	0	32	0	15
cSH	548	274	1221	1700	966	1700
Volume to Capacity	0.14	0.58	0.02	0.20	0.02	0.11
Queue Length 95th (ft)	12	83	1	0	2	0
Control Delay (s)	12.6	34.6	0.7	0.0	1.1	0.0
Lane LOS	B	D	A		A	
Approach Delay (s)	12.6	34.6	0.3		0.5	
Approach LOS	B	D				

Intersection Summary		
Average Delay		5.4
Intersection Capacity Utilization	56.7%	ICU Level of Service
Analysis Period (min)		15
		B

HCM Unsignalized Intersection Capacity Analysis

22: Texas & Oriental

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↕			↕	
Volume (veh/h)	42	11	32	65	4	37	1	680	15	8	439	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	44	12	34	68	4	39	1	716	16	8	462	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)											212	
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99		0.99					
vC, conflicting volume	880	1213	231	1013	1205	366	462			732		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	864	1199	210	998	1191	366	443			732		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	81	94	96	62	98	94	100			99		
cM capacity (veh/h)	228	184	796	180	186	637	1120			882		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	89	112	359	374	239	231
Volume Left	44	68	1	0	8	0
Volume Right	34	39	0	16	0	0
cSH	299	241	1120	1700	882	1700
Volume to Capacity	0.30	0.46	0.00	0.22	0.01	0.14
Queue Length 95th (ft)	31	57	0	0	1	0
Control Delay (s)	22.1	32.2	0.0	0.0	0.4	0.0
Lane LOS	C	D	A		A	
Approach Delay (s)	22.1	32.2	0.0		0.2	
Approach LOS	C	D				

Intersection Summary		
Average Delay		4.0
Intersection Capacity Utilization	35.0%	ICU Level of Service
Analysis Period (min)		15
		A

Queues

23: Eureka & EB I-10 off/Pearl

12/16/2013



Lane Group	EBT	EBR	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	1222	727	113	49	151	281	98
v/c Ratio	0.89	0.54	1.15	0.04	0.49	0.66	0.36
Control Delay	23.6	2.6	161.0	1.3	55.8	24.3	52.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.6	2.6	161.0	1.3	55.8	24.3	52.9
Queue Length 50th (ft)	704	25	~112	0	117	64	74
Queue Length 95th (ft)	1027	60	#155	10	188	165	132
Internal Link Dist (ft)	447				545		418
Turn Bay Length (ft)				75			
Base Capacity (vph)	1373	1345	98	1205	307	425	272
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.54	1.15	0.04	0.49	0.66	0.36




















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.

HCM Signalized Intersection Capacity Analysis

23: Eureka & EB I-10 off/Pearl

12/16/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	252	909	691	107	0	47	0	143	267	24	69	0
Ideal Flow (vphpl)	1900	1900	1900	1800	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0	6.0		6.0		7.0	7.0		7.0	
Lane Util. Factor		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.99	1.00	0.95		1.00		1.00	1.00		0.99	
Satd. Flow (prot)		1880	1615	1710		1615		1900	1615		1876	
Flt Permitted		0.99	1.00	0.07		1.00		1.00	1.00		0.89	
Satd. Flow (perm)		1880	1615	133		1615		1900	1615		1683	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	265	957	727	113	0	49	0	151	281	25	73	0
RTOR Reduction (vph)	0	0	165	0	0	13	0	0	164	0	0	0
Lane Group Flow (vph)	0	1222	562	113	0	36	0	151	117	0	98	0
Turn Type	Perm	NA	Perm	custom		custom		NA	Perm	Perm	NA	
Protected Phases		8						2				6
Permitted Phases	8		8	3		3			2	6		
Actuated Green, G (s)		97.0	97.0	98.0		98.0		23.0	23.0		23.0	
Effective Green, g (s)		95.0	95.0	96.0		96.0		21.0	21.0		21.0	
Actuated g/C Ratio		0.73	0.73	0.74		0.74		0.16	0.16		0.16	
Clearance Time (s)		5.0	5.0	4.0		4.0		5.0	5.0		5.0	
Vehicle Extension (s)		2.0	2.0	2.0		2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)		1374	1180	98		1193		307	261		272	
v/s Ratio Prot								c0.08				
v/s Ratio Perm		0.65	0.35	c0.85		0.02			0.07		0.06	
v/c Ratio		0.89	0.48	1.15		0.03		0.49	0.45		0.36	
Uniform Delay, d1		13.5	7.2	17.0		4.5		49.6	49.3		48.5	
Progression Factor		1.00	1.00	1.00		1.00		1.00	1.00		1.00	
Incremental Delay, d2		7.2	0.1	138.0		0.0		5.5	5.5		3.7	
Delay (s)		20.7	7.3	155.0		4.6		55.2	54.7		52.2	
Level of Service		C	A	F		A		E	D		D	
Approach Delay (s)		15.7			109.5			54.9			52.2	
Approach LOS		B			F			D			D	
Intersection Summary												
HCM Average Control Delay			29.2									C
HCM Volume to Capacity ratio			1.03									
Actuated Cycle Length (s)			130.0								13.0	
Intersection Capacity Utilization			101.4%									G
Analysis Period (min)			15									
c Critical Lane Group												

Queues

24: Eureka & Stuart

12/16/2013



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	102	90	19	479	46	606
v/c Ratio	0.55	0.56	0.03	0.19	0.07	0.23
Control Delay	36.5	41.8	3.6	2.9	3.7	3.6
Queue Delay	0.0	0.0	0.0	0.7	0.0	0.0
Total Delay	36.5	41.8	3.6	3.6	3.7	3.6
Queue Length 50th (ft)	36	37	2	22	5	35
Queue Length 95th (ft)	78	77	8	44	16	65
Internal Link Dist (ft)	380	399		136		545
Turn Bay Length (ft)			20		20	
Base Capacity (vph)	542	500	563	2579	634	2649
Starvation Cap Reductn	0	0	0	1700	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.18	0.03	0.54	0.07	0.23

Intersection Summary

HCM Signalized Intersection Capacity Analysis

24: Eureka & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (vph)	29	46	22	50	28	8	18	347	108	44	542	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		1.00			1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.97			0.99		1.00	0.96		1.00	0.99	
Flt Protected		0.99			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1800			1812		1710	3459		1704	3579	
Flt Permitted		0.90			0.83		0.42	1.00		0.48	1.00	
Satd. Flow (perm)		1649			1547		761	3459		858	3579	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	31	48	23	53	29	8	19	365	114	46	571	35
RTOR Reduction (vph)	0	19	0	0	6	0	0	22	0	0	3	0
Lane Group Flow (vph)	0	83	0	0	84	0	19	457	0	46	603	0
Confl. Peds. (#/hr)	9		6	6		9			3	3		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.5			9.5		57.5	57.5		57.5	57.5	
Effective Green, g (s)		7.5			7.5		55.5	55.5		55.5	55.5	
Actuated g/C Ratio		0.10			0.10		0.74	0.74		0.74	0.74	
Clearance Time (s)		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	
Lane Grp Cap (vph)		165			155		563	2560		635	2648	
v/s Ratio Prot								0.13			c0.17	
v/s Ratio Perm		0.05			c0.05		0.02			0.05		
v/c Ratio		0.50			0.54		0.03	0.18		0.07	0.23	
Uniform Delay, d1		32.0			32.1		2.6	2.9		2.7	3.0	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.4			3.8		0.1	0.2		0.2	0.2	
Delay (s)		34.4			35.9		2.7	3.1		2.9	3.2	
Level of Service		C			D		A	A		A	A	
Approach Delay (s)		34.4			35.9			3.1			3.2	
Approach LOS		C			D			A			A	

Intersection Summary

HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

25: Eureka & Oriental

12/16/2013



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	42	36	8	475	37	638
v/c Ratio	0.19	0.15	0.02	0.26	0.08	0.35
Control Delay	11.9	9.8	4.6	5.2	5.2	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.7
Total Delay	11.9	9.8	4.6	5.2	5.2	6.5
Queue Length 50th (ft)	4	2	1	21	3	31
Queue Length 95th (ft)	20	17	4	37	11	52
Internal Link Dist (ft)	432	448		184		93
Turn Bay Length (ft)			25		40	
Base Capacity (vph)	331	362	412	2005	481	2010
Starvation Cap Reductn	0	0	0	0	0	963
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.10	0.02	0.24	0.08	0.61

Intersection Summary

HCM Signalized Intersection Capacity Analysis

25: Eureka & Oriental

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Volume (vph)	21	1	18	7	4	24	8	426	26	35	584	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)		6.2			6.2		6.2	6.2		6.2	6.2	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frbp, ped/bikes		0.99			0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			0.91		1.00	0.99		1.00	0.99	
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1711			1670		1709	3574		1705	3588	
Flt Permitted		0.82			0.92		0.41	1.00		0.48	1.00	
Satd. Flow (perm)		1434			1554		737	3574		862	3588	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	22	1	19	7	4	25	8	448	27	37	615	23
RTOR Reduction (vph)	0	16	0	0	21	0	0	11	0	0	6	0
Lane Group Flow (vph)	0	26	0	0	15	0	8	464	0	37	632	0
Confl. Peds. (#/hr)	8		2	2		8	1		6	6		1
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			5			7				3
Permitted Phases	1			5			7			3		
Actuated Green, G (s)		7.1			7.1		20.0	20.0		20.0	20.0	
Effective Green, g (s)		5.1			5.1		18.0	18.0		18.0	18.0	
Actuated g/C Ratio		0.14			0.14		0.51	0.51		0.51	0.51	
Clearance Time (s)		4.2			4.2		4.2	4.2		4.2	4.2	
Vehicle Extension (s)		2.5			2.5		2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		206			223		374	1812		437	1819	
v/s Ratio Prot								0.13				c0.18
v/s Ratio Perm		c0.02			0.01		0.01			0.04		
v/c Ratio		0.12			0.07		0.02	0.26		0.08	0.35	
Uniform Delay, d1		13.3			13.1		4.4	5.0		4.5	5.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.1		0.0	0.1		0.1	0.1	
Delay (s)		13.5			13.2		4.4	5.0		4.6	5.3	
Level of Service		B			B		A	A		A	A	
Approach Delay (s)		13.5			13.2			5.0			5.3	
Approach LOS		B			B			A			A	

Intersection Summary

HCM Average Control Delay	5.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	35.5	Sum of lost time (s)	12.4
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

26: Eureka & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	94	1007	55	497	378	616
v/c Ratio	0.24	0.85	0.30	0.41	0.40	0.74
Control Delay	11.1	26.6	14.7	16.4	14.8	23.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.1	26.6	14.7	16.4	14.8	23.0
Queue Length 50th (ft)	18	172	10	71	46	96
Queue Length 95th (ft)	40	#276	26	110	77	147
Internal Link Dist (ft)		660		354	209	138
Turn Bay Length (ft)	35		40			
Base Capacity (vph)	384	1296	185	1214	1127	1003
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.78	0.30	0.41	0.34	0.61

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

26: Eureka & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	89	889	67	52	410	62	33	262	64	141	401	44
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.6		5.7	6.6			6.2			6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.97			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1709	3567		1710	3533			3486			3520	
Flt Permitted	0.46	1.00		0.21	1.00			0.86			0.77	
Satd. Flow (perm)	819	3567		385	3533			3011			2726	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	94	936	71	55	432	65	35	276	67	148	422	46
RTOR Reduction (vph)	0	9	0	0	19	0	0	32	0	0	11	0
Lane Group Flow (vph)	94	998	0	55	478	0	0	346	0	0	605	0
Confl. Peds. (#/hr)	2		7	7		2	4		9	9		4
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			4	
Permitted Phases	6			2			4			4		
Actuated Green, G (s)	25.4	21.3		24.5	20.7			18.9			18.9	
Effective Green, g (s)	21.4	19.3		20.5	18.7			16.9			16.9	
Actuated g/C Ratio	0.38	0.34		0.36	0.33			0.30			0.30	
Clearance Time (s)	4.0	4.6		3.7	4.6			4.2			4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	343	1218		182	1169			901			815	
v/s Ratio Prot	c0.01	c0.28		0.01	0.14							
v/s Ratio Perm	0.09			0.10				0.11			c0.22	
v/c Ratio	0.27	0.82		0.30	0.41			0.38			0.74	
Uniform Delay, d1	11.5	17.0		12.5	14.6			15.7			17.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.4	4.4		0.9	0.2			0.3			3.7	
Delay (s)	12.0	21.4		13.5	14.9			16.0			21.5	
Level of Service	B	C		B	B			B			C	
Approach Delay (s)		20.6			14.7			16.0			21.5	
Approach LOS		C			B			B			C	

Intersection Summary

HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	56.5	Sum of lost time (s)	12.2
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Queues
27: Orange & Colton

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	249	894	180	283	129	143	895	103	601
v/c Ratio	0.42	0.86	1.45	0.26	0.14	0.89	0.86	1.14	0.58
Control Delay	12.9	24.7	265.1	9.8	5.9	78.4	35.7	172.1	26.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.9	24.7	265.1	9.8	5.9	78.4	35.7	172.1	26.5
Queue Length 50th (ft)	66	336	~125	67	18	68	209	~61	131
Queue Length 95th (ft)	121	#606	#188	109	42	#177	#314	#157	184
Internal Link Dist (ft)		502		260			472		133
Turn Bay Length (ft)	50		65		65	50		75	
Base Capacity (vph)	586	1041	124	1069	928	161	1038	90	1034
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.86	1.45	0.26	0.14	0.89	0.86	1.14	0.58

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.

HCM Signalized Intersection Capacity Analysis

27: Orange & Colton

12/16/2013



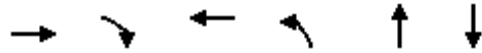
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↗	↖	↕		↖	↗	
Volume (vph)	237	606	243	171	269	123	136	647	203	98	521	50
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	1818		1710	1900	1615	1710	3481		1710	3562	
Flt Permitted	0.58	1.00		0.12	1.00	1.00	0.31	1.00		0.17	1.00	
Satd. Flow (perm)	1043	1818		219	1900	1615	560	3481		313	3562	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	249	638	256	180	283	129	143	681	214	103	548	53
RTOR Reduction (vph)	0	18	0	0	0	20	0	38	0	0	9	0
Lane Group Flow (vph)	249	876	0	180	283	109	143	857	0	103	592	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	47.0	47.0		47.0	47.0	47.0	25.0	25.0		25.0	25.0	
Effective Green, g (s)	45.0	45.0		45.0	45.0	45.0	23.0	23.0		23.0	23.0	
Actuated g/C Ratio	0.56	0.56		0.56	0.56	0.56	0.29	0.29		0.29	0.29	
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	3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	587	1023		123	1069	908	161	1001		90	1024	
v/s Ratio Prot		0.48			0.15			0.25			0.17	
v/s Ratio Perm	0.24			c0.82		0.07	0.26			c0.33		
v/c Ratio	0.42	0.86		1.46	0.26	0.12	0.89	0.86		1.14	0.58	
Uniform Delay, d1	10.1	14.8		17.5	9.0	8.2	27.3	26.9		28.5	24.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	7.2		247.5	0.1	0.1	40.7	7.5		139.1	0.9	
Delay (s)	10.6	21.9		265.0	9.1	8.3	67.9	34.4		167.6	25.2	
Level of Service	B	C		F	A	A	E	C		F	C	
Approach Delay (s)		19.5			86.7			39.0			46.0	
Approach LOS		B			F			D			D	

Intersection Summary

HCM Average Control Delay	42.1	HCM Level of Service	D
HCM Volume to Capacity ratio	1.35		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	106.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues
28: Pearl & Orange

12/16/2013



Lane Group	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	1515	515	395	24	1158	724
v/c Ratio	2.19	0.58	1.93	0.15	0.90	0.88
Control Delay	558.2	16.9	455.3	25.9	42.3	44.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	558.2	16.9	455.3	25.9	42.3	44.9
Queue Length 50th (ft)	~1559	188	~263	11	345	215
Queue Length 95th (ft)	#1817	288	#450	31	#468	#321
Internal Link Dist (ft)	445		279		526	472
Turn Bay Length (ft)		20		75		
Base Capacity (vph)	693	894	205	164	1283	822
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	2.19	0.58	1.93	0.15	0.90	0.88

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.

HCM Signalized Intersection Capacity Analysis

28: Pearl & Orange

12/16/2013



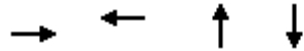
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕		↖	↕			↕	↖
Volume (vph)	586	853	489	55	49	271	23	1016	85	41	634	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1800	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0			6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	*1.00			*1.00	
Frt		1.00	0.85		0.90		1.00	0.99			1.00	
Flt Protected		0.98	1.00		0.99		0.95	1.00			1.00	
Satd. Flow (prot)		1862	1615		1702		1710	3756			3778	
Flt Permitted		0.68	1.00		0.21		0.27	1.00			0.64	
Satd. Flow (perm)		1284	1615		366		483	3756			2412	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	617	898	515	58	52	285	24	1069	89	43	667	14
RTOR Reduction (vph)	0	0	22	0	7	0	0	7	0	0	1	0
Lane Group Flow (vph)	0	1515	493	0	388	0	24	1151	0	0	723	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2				2
Permitted Phases	4		4	4			2			2		
Actuated Green, G (s)		56.0	56.0		56.0		36.0	36.0			36.0	
Effective Green, g (s)		54.0	54.0		54.0		34.0	34.0			34.0	
Actuated g/C Ratio		0.54	0.54		0.54		0.34	0.34			0.34	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.5	3.5			3.5	
Lane Grp Cap (vph)		693	872		198		164	1277			820	
v/s Ratio Prot								c0.31				
v/s Ratio Perm		c1.18	0.31		1.06		0.05				0.30	
v/c Ratio		2.19	0.57		1.96		0.15	0.90			0.88	
Uniform Delay, d1		23.0	15.2		23.0		22.9	31.4			31.1	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		538.5	0.8		449.9		0.5	9.2			11.2	
Delay (s)		561.5	16.1		472.9		23.4	40.6			42.3	
Level of Service		F	B		F		C	D			D	
Approach Delay (s)		423.1			472.9			40.3			42.3	
Approach LOS		F			F			D			D	

Intersection Summary

HCM Average Control Delay	259.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.69		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	163.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues
29: Orange & Stuart

12/16/2013



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	347	309	1085	1570
v/c Ratio	0.97	1.08	0.51	1.04
Control Delay	87.4	120.7	12.9	57.9
Queue Delay	0.0	0.0	56.4	30.3
Total Delay	87.4	120.7	69.3	88.2
Queue Length 50th (ft)	283	~282	230	~713
Queue Length 95th (ft)	#483	#471	282	#849
Internal Link Dist (ft)	305	198	150	526
Turn Bay Length (ft)				
Base Capacity (vph)	357	285	2109	1510
Starvation Cap Reductn	0	0	1136	101
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.97	1.08	1.12	1.11

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.

HCM Signalized Intersection Capacity Analysis

29: Orange & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	123	132	75	153	56	85	9	855	167	132	1334	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.2			6.2			6.2			6.2	
Lane Util. Factor		1.00			1.00			0.95			*1.00	
Frpb, ped/bikes		0.98			0.98			0.99			1.00	
Flpb, ped/bikes		0.99			0.99			1.00			1.00	
Frt		0.97			0.96			0.98			1.00	
Flt Protected		0.98			0.97			1.00			1.00	
Satd. Flow (prot)		1764			1726			3469			3766	
Flt Permitted		0.75			0.59			0.94			0.62	
Satd. Flow (perm)		1344			1053			3250			2343	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	129	139	79	161	59	89	9	900	176	139	1404	27
RTOR Reduction (vph)	0	8	0	0	11	0	0	12	0	0	1	0
Lane Group Flow (vph)	0	339	0	0	298	0	0	1073	0	0	1569	0
Confl. Peds. (#/hr)	33		35	35		33	12		21	21		12
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		35.8			35.8			85.8			85.8	
Effective Green, g (s)		33.8			33.8			83.8			83.8	
Actuated g/C Ratio		0.26			0.26			0.64			0.64	
Clearance Time (s)		4.2			4.2			4.2			4.2	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		349			274			2095			1510	
v/s Ratio Prot												
v/s Ratio Perm		0.25			c0.28			0.33			c0.67	
v/c Ratio		0.97			1.09			0.51			1.04	
Uniform Delay, d1		47.6			48.1			12.3			23.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		40.2			79.6			0.2			34.0	
Delay (s)		87.9			127.7			12.5			57.1	
Level of Service		F			F			B			E	
Approach Delay (s)		87.9			127.7			12.5			57.1	
Approach LOS		F			F			B			E	

Intersection Summary

HCM Average Control Delay	52.3	HCM Level of Service	D
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	112.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

30: Orange & Oriental

12/16/2013

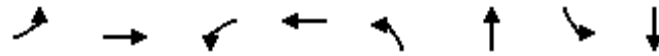


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	56	27	12	965	1564	72
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	59	28	13	1016	1646	76
Pedestrians	16			24	1	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	1			2	0	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				464	165	
pX, platoon unblocked	0.89	0.95	0.95			
vC, conflicting volume	2234	901	1738			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1915	802	1679			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	91	97			
cM capacity (veh/h)	52	306	364			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	87	351	677	1098	625	
Volume Left	59	13	0	0	0	
Volume Right	28	0	0	0	76	
cSH	71	364	1700	1700	1700	
Volume to Capacity	1.23	0.03	0.40	0.65	0.37	
Queue Length 95th (ft)	171	3	0	0	0	
Control Delay (s)	284.0	1.2	0.0	0.0	0.0	
Lane LOS	F	A				
Approach Delay (s)	284.0	0.4		0.0		
Approach LOS	F					
Intersection Summary						
Average Delay			8.9			
Intersection Capacity Utilization			62.1%	ICU Level of Service	B	
Analysis Period (min)			15			

Queues

31: Orange & Redlands

12/16/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	222	739	61	669	76	573	371	1194
v/c Ratio	0.82	0.57	0.50	0.82	0.74	0.72	0.95	0.74
Control Delay	44.2	19.3	40.3	25.9	67.3	30.3	54.5	18.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.2	19.3	40.3	25.9	67.3	30.3	54.5	18.4
Queue Length 50th (ft)	71	133	25	94	31	120	107	210
Queue Length 95th (ft)	#173	185	62	154	#100	176	#279	295
Internal Link Dist (ft)		387		273		223		384
Turn Bay Length (ft)	60		60		75		60	
Base Capacity (vph)	271	1482	160	987	125	957	389	1770
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.50	0.38	0.68	0.61	0.60	0.95	0.67

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

31: Orange & Redlands

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙	↕		↙	↕		↙	↕		↙	↕	
Volume (vph)	211	605	97	58	353	282	72	495	49	352	909	225
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	5.5	6.2		6.2	6.2		6.2	6.2		5.5	6.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.93		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1709	3520		1698	3325		1702	3549		1707	3477	
Flt Permitted	0.22	1.00		0.37	1.00		0.26	1.00		0.22	1.00	
Satd. Flow (perm)	391	3520		663	3325		468	3549		404	3477	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	222	637	102	61	372	297	76	521	52	371	957	237
RTOR Reduction (vph)	0	17	0	0	201	0	0	10	0	0	29	0
Lane Group Flow (vph)	222	722	0	61	468	0	76	563	0	371	1165	0
Confl. Peds. (#/hr)	16		15	15		16	26		23	23		26
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	27.0	27.0		14.9	14.9		17.3	17.3		33.5	33.5	
Effective Green, g (s)	25.0	25.0		12.9	12.9		15.3	15.3		31.5	31.5	
Actuated g/C Ratio	0.36	0.36		0.19	0.19		0.22	0.22		0.46	0.46	
Clearance Time (s)	3.5	4.2		4.2	4.2		4.2	4.2		3.5	4.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	268	1277		124	623		104	788		387	1590	
v/s Ratio Prot	c0.08	0.21			0.14			0.16		c0.15	0.34	
v/s Ratio Perm	c0.22			0.09			0.16			c0.29		
v/c Ratio	0.83	0.57		0.49	0.75		0.73	0.71		0.96	0.73	
Uniform Delay, d1	17.5	17.6		25.1	26.5		24.9	24.8		14.4	15.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	18.6	0.6		3.1	5.1		23.0	3.1		34.7	1.8	
Delay (s)	36.1	18.2		28.1	31.6		47.9	27.9		49.0	17.0	
Level of Service	D	B		C	C		D	C		D	B	
Approach Delay (s)		22.3			31.3			30.2			24.6	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	26.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	68.9	Sum of lost time (s)	11.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

32: 6th St & WB I-10 Ramp

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↖	↗			↑			↘	↙
Volume (veh/h)	0	0	0	346	18	292	0	361	0	0	806	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	364	19	307	0	380	0	0	848	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage veh								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1545	1228	848	1228	1228	380	848			380		
vC1, stage 1 conf vol	848	848		380	380							
vC2, stage 2 conf vol	697	380		848	848							
vCu, unblocked vol	1545	1228	848	1228	1228	380	848			380		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	0	95	54	100			100		
cM capacity (veh/h)	192	347	364	329	347	671	798			1190		

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	364	326	380	848
Volume Left	364	0	0	0
Volume Right	0	307	0	0
cSH	329	637	1700	1700
Volume to Capacity	1.11	0.51	0.22	0.50
Queue Length 95th (ft)	353	73	0	0
Control Delay (s)	117.8	16.4	0.0	0.0
Lane LOS	F	C		
Approach Delay (s)	69.9		0.0	0.0
Approach LOS	F			

Intersection Summary			
Average Delay		25.2	
Intersection Capacity Utilization	69.3%		ICU Level of Service C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis

33: 6th St & EB I-10 Ramp

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔				↔	↔		↔	↔	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	183	295	252	0	0	0	212	188	134	462	485	212
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	193	311	265	0	0	0	223	198	141	486	511	223

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	503	265	223	339	486	734
Volume Left (vph)	193	0	223	0	486	0
Volume Right (vph)	0	265	0	141	0	223
Hadj (s)	0.19	-0.70	0.50	-0.29	0.50	-0.21
Departure Headway (s)	8.4	7.5	8.9	8.1	8.3	7.6
Degree Utilization, x	1.17	0.55	0.55	0.77	1.13	1.56
Capacity (veh/h)	434	464	391	435	438	475
Control Delay (s)	126.0	18.2	21.2	31.9	110.0	280.0
Approach Delay (s)	88.8		27.7		212.2	
Approach LOS	F		D		F	

Intersection Summary

Delay	134.4
HCM Level of Service	F
Intersection Capacity Utilization	86.5%
ICU Level of Service	E
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

34: 6th St & Stuart

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Volume (veh/h)	16	12	33	15	8	46	66	511	22	39	352	38
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	17	13	35	16	8	48	69	538	23	41	371	40
Pedestrians		2			2			4			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (ft)								231				
pX, platoon unblocked	0.97	0.97		0.97	0.97	0.97				0.97		
vC, conflicting volume	1206	1177	211	1003	1185	553	413			563		
vC1, stage 1 conf vol	475	475		690	690							
vC2, stage 2 conf vol	731	702		312	495							
vCu, unblocked vol	1198	1168	211	990	1177	528	413			538		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	96	96	95	98	90	94			96		
cM capacity (veh/h)	254	332	796	337	339	485	1155			1012		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	64	73	69	561	41	247	164
Volume Left	17	16	69	0	41	0	0
Volume Right	35	48	0	23	0	0	40
cSH	434	424	1155	1700	1012	1700	1700
Volume to Capacity	0.15	0.17	0.06	0.33	0.04	0.15	0.10
Queue Length 95th (ft)	13	15	5	0	3	0	0
Control Delay (s)	14.7	15.3	8.3	0.0	8.7	0.0	0.0
Lane LOS	B	C	A		A		
Approach Delay (s)	14.7	15.3	0.9		0.8		
Approach LOS	B	C					

Intersection Summary

Average Delay	2.5
Intersection Capacity Utilization	47.9%
ICU Level of Service	A
Analysis Period (min)	15

Queues

35: Redlands Blvd & Citrus Ave

12/16/2013



Lane Group	EBT	WBT	SET	SER	NWT
Lane Group Flow (vph)	757	371	745	122	470
v/c Ratio	0.81	0.70	0.82	0.19	0.56
Control Delay	30.4	30.6	32.4	7.8	22.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	30.4	30.6	32.4	7.8	22.6
Queue Length 50th (ft)	148	64	158	8	84
Queue Length 95th (ft)	230	111	#306	47	154
Internal Link Dist (ft)	399	463	375		430
Turn Bay Length (ft)				100	
Base Capacity (vph)	1145	920	909	635	835
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.66	0.40	0.82	0.19	0.56

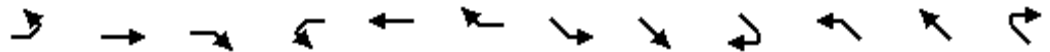
Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

35: Redlands Blvd & Citrus Ave

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕↕			↕↕			↕↕	↕		↕↕	
Volume (vph)	151	348	220	48	188	116	178	530	116	81	304	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.2			6.2	6.2		6.2	
Lane Util. Factor		0.95			0.95			0.95	1.00		0.95	
Frt		0.95			0.95			1.00	0.85		0.98	
Flt Protected		0.99			0.99			0.99	1.00		0.99	
Satd. Flow (prot)		3408			3409			3565	1615		3503	
Flt Permitted		0.99			0.99			0.71	1.00		0.65	
Satd. Flow (perm)		3408			3409			2557	1615		2309	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	159	366	232	51	198	122	187	558	122	85	320	65
RTOR Reduction (vph)	0	60	0	0	78	0	0	0	60	0	14	0
Lane Group Flow (vph)	0	697	0	0	293	0	0	745	62	0	456	0
Turn Type	Split	NA		Split	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	4	4		1	1			2			2	
Permitted Phases							2		2	2		
Actuated Green, G (s)		20.6			11.6			27.9	27.9		27.9	
Effective Green, g (s)		18.6			9.6			25.9	25.9		25.9	
Actuated g/C Ratio		0.26			0.13			0.36	0.36		0.36	
Clearance Time (s)		4.0			4.2			4.2	4.2		4.2	
Vehicle Extension (s)		3.0			3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		874			451			913	577		825	
v/s Ratio Prot		c0.20			c0.09							
v/s Ratio Perm								c0.29	0.04		0.20	
v/c Ratio		0.80			0.65			0.82	0.11		0.55	
Uniform Delay, d1		25.2			29.9			21.1	15.6		18.7	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		5.1			3.2			5.7	0.1		0.8	
Delay (s)		30.3			33.1			26.8	15.7		19.5	
Level of Service		C			C			C	B		B	
Approach Delay (s)		30.3			33.1			25.3			19.5	
Approach LOS		C			C			C			B	

Intersection Summary

HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	72.5	Sum of lost time (s)	18.4
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

36: Stuart & Church

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	53	24	12	312	356	24
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	56	25	13	328	375	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)	203					
pX, platoon unblocked	0.99					
vC, conflicting volume	577	200	400			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	565	200	400			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	88	97	99			
cM capacity (veh/h)	453	814	1170			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	81	122	219	250	150	
Volume Left	56	13	0	0	0	
Volume Right	25	0	0	0	25	
cSH	525	1170	1700	1700	1700	
Volume to Capacity	0.15	0.01	0.13	0.15	0.09	
Queue Length 95th (ft)	14	1	0	0	0	
Control Delay (s)	13.1	0.9	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	13.1	0.3		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			28.5%	ICU Level of Service	A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

37: Universtiy & WB I-10 Ramp/E Central

12/16/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↔			↔	
Volume (veh/h)	0	0	0	2	21	15	416	815	57	11	205	483
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	0	2	22	16	438	858	60	12	216	508
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)											563	
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99		0.99					
vC, conflicting volume	1825	2287	362	1895	2511	459	724			918		
vC1, stage 1 conf vol	493	493		1764	1764							
vC2, stage 2 conf vol	1332	1794		131	747							
vCu, unblocked vol	1809	2277	327	1880	2504	459	694			918		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	95	0	97	51			98		
cM capacity (veh/h)	44	56	666	45	14	555	899			752		

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	40	867	489	119	616
Volume Left	2	438	0	12	0
Volume Right	16	0	60	0	508
cSH	25	899	1700	752	1700
Volume to Capacity	1.60	0.49	0.29	0.02	0.36
Queue Length 95th (ft)	123	68	0	1	0
Control Delay (s)	635.8	10.5	0.0	1.1	0.0
Lane LOS	F	B		A	
Approach Delay (s)	635.8	6.7		0.2	
Approach LOS	F				

Intersection Summary	
Average Delay	16.3
Intersection Capacity Utilization	71.3%
ICU Level of Service	C
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

38: Universtiy & EB I-10 Ramp

12/16/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	628	809	0	623	264	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	661	852	0	656	278	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	12					
Median type				TWLTL	TWLTL	
Median storage veh				2	2	
Upstream signal (ft)	1022					
pX, platoon unblocked						
vC, conflicting volume	606	139	278			
vC1, stage 1 conf vol	278					
vC2, stage 2 conf vol	328					
vCu, unblocked vol	606	139	278			
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 %	0	4	100			
cM capacity (veh/h)	614	890	1297			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	1513	328	328	139	139	
Volume Left	661	0	0	0	0	
Volume Right	852	0	0	0	0	
cSH	1240	1700	1700	1700	1700	
Volume to Capacity	1.22	0.19	0.19	0.08	0.08	
Queue Length 95th (ft)	1157	0	0	0	0	
Control Delay (s)	120.8	0.0	0.0	0.0	0.0	
Lane LOS	F					
Approach Delay (s)	120.8	0.0	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay	74.7					
Intersection Capacity Utilization	64.1%			ICU Level of Service	C	
Analysis Period (min)	15					

Queues

39: Tippecanoe & Harriman PI

12/16/2013



Lane Group	EBL	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	216	939	358	419	389	289	1163	780	2432
v/c Ratio	0.96	1.00	0.93	0.91	0.88	0.92	0.43	0.64	0.96
Control Delay	107.7	60.5	87.1	66.8	60.4	66.2	5.0	1.8	21.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	107.7	60.5	87.1	66.8	60.4	66.2	5.0	1.8	21.7
Queue Length 50th (ft)	184	325	156	323	281	123	108	39	234
Queue Length 95th (ft)	#345	#491	#250	#530	#475	m103	m87	m13	m215
Internal Link Dist (ft)				720			382		770
Turn Bay Length (ft)	280		300		300	225		500	
Base Capacity (vph)	224	941	386	458	441	313	2713	1217	2542
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	1.00	0.93	0.91	0.88	0.92	0.43	0.64	0.96

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.

HCM Signalized Intersection Capacity Analysis

39: Tippecanoe & Harriman PI

12/16/2013



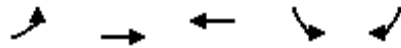
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	205	0	892	340	162	605	275	1105	741	0	2116	195
Ideal Flow (vphpl)	1800	1900	1800	1700	1900	1900	1700	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00		0.88	0.97	0.95	0.95	0.97	0.91	1.00		0.86	
Frt	1.00		0.85	1.00	0.91	0.85	1.00	1.00	0.85		0.99	
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (prot)	1710		2693	3133	1645	1534	3133	5187	1615		6453	
Flt Permitted	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (perm)	1710		2693	3133	1645	1534	3133	5187	1615		6453	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	216	0	939	358	171	637	289	1163	780	0	2227	205
RTOR Reduction (vph)	0	0	236	0	40	51	0	0	372	0	12	0
Lane Group Flow (vph)	216	0	703	358	379	338	289	1163	408	0	2420	0
Turn Type	Prot		custom	Prot	NA	Perm	Prot	NA	Perm		NA	
Protected Phases	7			3	8		5	2				6
Permitted Phases			4			8			2			
Actuated Green, G (s)	17.0		34.0	16.0	33.0	33.0	13.0	68.0	68.0		51.0	
Effective Green, g (s)	17.0		34.0	16.0	33.0	33.0	13.0	68.0	68.0		51.0	
Actuated g/C Ratio	0.13		0.26	0.12	0.25	0.25	0.10	0.52	0.52		0.39	
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)	224		704	386	418	389	313	2713	845		2532	
v/s Ratio Prot	c0.13			0.11	0.23		c0.09	0.22			c0.38	
v/s Ratio Perm			c0.26			0.22			0.25			
v/c Ratio	0.96		1.00	0.93	0.91	0.87	0.92	0.43	0.48		0.96	
Uniform Delay, d1	56.2		48.0	56.4	47.0	46.4	58.0	19.1	19.8		38.4	
Progression Factor	1.00		1.00	1.00	1.00	1.00	1.05	0.26	1.27		0.52	
Incremental Delay, d2	49.7		33.2	28.0	22.7	18.1	4.8	0.0	0.2		1.3	
Delay (s)	105.9		81.2	84.4	69.7	64.5	65.9	5.0	25.4		21.2	
Level of Service	F		F	F	E	E	E	A	C		C	
Approach Delay (s)		85.8			72.5			20.0			21.2	
Approach LOS		F			E			C			C	

Intersection Summary

HCM Average Control Delay	40.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: Mill St

11/25/2013



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	85	940	1277	225	106
v/c Ratio	0.41	0.42	0.57	0.50	0.49
Control Delay	13.3	6.0	7.3	21.2	23.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.3	6.0	7.3	21.2	23.2
Queue Length 50th (ft)	11	61	94	27	21
Queue Length 95th (ft)	49	110	169	53	62
Internal Link Dist (ft)		574	521	21	
Turn Bay Length (ft)	100				
Base Capacity (vph)	208	2237	2227	1403	625
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.41	0.42	0.57	0.16	0.17

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Mill St

11/25/2013



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↶↶	↶↶		↶↶	↶
Volume (vph)	81	893	1163	50	128	186
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0		6.0	6.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frt	1.00	1.00	0.99		0.94	0.85
Flt Protected	0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)	1710	3610	3588		3364	1470
Flt Permitted	0.19	1.00	1.00		0.97	1.00
Satd. Flow (perm)	335	3610	3588		3364	1470
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	85	940	1224	53	135	196
RTOR Reduction (vph)	0	0	3	0	30	30
Lane Group Flow (vph)	85	940	1274	0	195	76
Turn Type	Perm	NA	NA		NA	Perm
Protected Phases		2	2		4	
Permitted Phases	2					4
Actuated Green, G (s)	33.7	33.7	33.7		8.4	8.4
Effective Green, g (s)	31.7	31.7	31.7		6.4	6.4
Actuated g/C Ratio	0.62	0.62	0.62		0.13	0.13
Clearance Time (s)	5.0	5.0	5.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	208	2239	2226		421	184
v/s Ratio Prot		0.26	c0.36		c0.06	
v/s Ratio Perm	0.25					0.05
v/c Ratio	0.41	0.42	0.57		0.46	0.41
Uniform Delay, d1	4.9	5.0	5.7		20.8	20.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.3	0.1	0.4		0.8	1.5
Delay (s)	6.2	5.1	6.1		21.6	22.1
Level of Service	A	A	A		C	C
Approach Delay (s)		5.2	6.1		21.7	
Approach LOS		A	A		C	

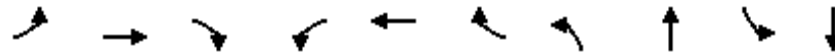
Intersection Summary

HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	51.1	Sum of lost time (s)	13.0
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: E Mill & Waterman

11/25/2013



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	321	520	373	332	731	240	385	1595	143	1510
v/c Ratio	1.06	0.85	0.71	0.98	1.07	0.60	1.10	0.81	0.71	1.00
Control Delay	95.4	54.5	16.8	70.3	92.9	26.7	104.9	32.2	37.6	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	95.4	54.5	16.8	70.3	92.9	26.7	104.9	32.2	37.6	57.1
Queue Length 50th (ft)	~170	171	39	157	~272	74	~228	317	47	324
Queue Length 95th (ft)	#344	#255	141	#333	#389	156	#413	376	#116	#433
Internal Link Dist (ft)		1246			710			465		954
Turn Bay Length (ft)	100		350	250		75	450		125	
Base Capacity (vph)	303	614	527	340	686	397	350	1975	214	1517
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	1.06	0.85	0.71	0.98	1.07	0.60	1.10	0.81	0.67	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.

HCM Signalized Intersection Capacity Analysis

3: E Mill & Waterman

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑	↗	↘	↑↑↑		↘	↑↑↑	
Volume (vph)	305	494	354	315	694	228	366	1388	127	136	1135	299
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0		5.0	7.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	*0.95		1.00	*0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3610	1615	1710	3610	1615	1710	5347		1710	5246	
Flt Permitted	0.24	1.00	1.00	0.22	1.00	1.00	0.12	1.00		0.14	1.00	
Satd. Flow (perm)	424	3610	1615	397	3610	1615	218	5347		257	5246	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	321	520	373	332	731	240	385	1461	134	143	1195	315
RTOR Reduction (vph)	0	0	252	0	0	90	0	11	0	0	48	0
Lane Group Flow (vph)	321	520	121	332	731	150	385	1584	0	143	1462	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	34.0	19.0	19.0	38.0	21.0	21.0	51.0	38.7		39.3	30.0	
Effective Green, g (s)	30.0	17.0	17.0	34.0	19.0	19.0	49.0	36.7		35.3	28.0	
Actuated g/C Ratio	0.30	0.17	0.17	0.34	0.19	0.19	0.49	0.37		0.35	0.28	
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0		3.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	294	614	275	332	686	307	346	1962		197	1469	
v/s Ratio Prot	0.14	0.14		c0.15	c0.20		c0.18	0.30		0.05	0.28	
v/s Ratio Perm	0.19		0.07	0.19		0.09	c0.37			0.20		
v/c Ratio	1.09	0.85	0.44	1.00	1.07	0.49	1.11	0.81		0.73	1.00	
Uniform Delay, d1	31.7	40.2	37.2	28.5	40.5	36.2	29.2	28.5		24.0	35.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	79.3	10.5	1.1	49.4	53.2	1.2	82.4	3.7		12.5	22.3	
Delay (s)	111.0	50.7	38.3	77.9	93.7	37.4	111.6	32.2		36.5	58.2	
Level of Service	F	D	D	E	F	D	F	C		D	E	
Approach Delay (s)		62.9			79.3			47.6			56.3	
Approach LOS		E			E			D			E	

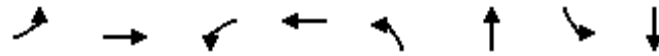
Intersection Summary

HCM Average Control Delay	59.7	HCM Level of Service	E
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	107.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Waterman & E Orange Show

11/25/2013



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	395	1212	324	1233	456	1626	174	1684
v/c Ratio	1.73	1.10	1.72	1.22	1.80	1.11	1.41	1.43
Control Delay	373.1	98.7	371.8	147.2	399.1	95.0	252.4	230.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	35.1	0.0	0.0
Total Delay	373.1	98.7	371.8	147.2	399.1	130.1	252.4	230.4
Queue Length 50th (ft)	~446	~559	~355	~634	~531	~777	~144	~952
Queue Length 95th (ft)	#650	#692	#547	#768	#746	#912	#299	#1086
Internal Link Dist (ft)		622		1515		578		524
Turn Bay Length (ft)	210		210		225		250	
Base Capacity (vph)	228	1104	188	1013	254	1471	123	1181
Starvation Cap Reductn	0	0	0	0	0	100	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	1.73	1.10	1.72	1.22	1.80	1.19	1.41	1.43

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.

HCM Signalized Intersection Capacity Analysis

4: Waterman & E Orange Show

11/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Volume (vph)	375	793	358	308	1016	156	433	1336	209	165	1212	388
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Total Lost time (s)	6.0	7.0		6.0	7.0		6.0	7.0		6.0	7.0	
Lane Util. Factor	1.00	*1.00		1.00	*1.00		1.00	*1.00		1.00	*1.00	
Frt	1.00	0.95		1.00	0.98		1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3623		1710	3724		1710	3723		1710	3662	
Flt Permitted	0.11	1.00		0.11	1.00		0.09	1.00		0.10	1.00	
Satd. Flow (perm)	189	3623		206	3724		153	3723		176	3662	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	395	835	377	324	1069	164	456	1406	220	174	1276	408
RTOR Reduction (vph)	0	45	0	0	10	0	0	10	0	0	26	0
Lane Group Flow (vph)	395	1167	0	324	1223	0	456	1616	0	174	1658	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	55.0	40.0		49.0	37.0		64.0	53.0		50.0	43.0	
Effective Green, g (s)	51.0	38.0		45.0	35.0		62.0	51.0		46.0	41.0	
Actuated g/C Ratio	0.39	0.29		0.35	0.27		0.48	0.39		0.35	0.32	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	226	1059		187	1003		253	1461		121	1155	
v/s Ratio Prot	c0.17	0.32		0.13	0.33		c0.21	0.43		0.06	0.45	
v/s Ratio Perm	c0.51			0.47			c0.65			0.45		
v/c Ratio	1.75	1.10		1.73	1.22		1.80	1.11		1.44	1.44	
Uniform Delay, d1	37.0	46.0		36.3	47.5		40.5	39.5		40.4	44.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	354.2	59.8		351.1	107.7		376.4	58.2		237.6	201.0	
Delay (s)	391.2	105.8		387.3	155.2		416.9	97.7		278.1	245.5	
Level of Service	F	F		F	F		F	F		F	F	
Approach Delay (s)		176.0			203.5			167.6			248.5	
Approach LOS		F			F			F			F	

Intersection Summary

HCM Average Control Delay	198.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.74		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	147.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

5: S Waterman & W Dumas

11/25/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	9	5	29	1968	1874	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	9	5	31	2072	1973	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						87
pX, platoon unblocked	0.93	0.93	0.93			
vC, conflicting volume	3072	988	1977			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3077	843	1903			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	98	90			
cM capacity (veh/h)	8	290	296			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	15	31	1036	1036	1315	662
Volume Left	9	31	0	0	0	0
Volume Right	5	0	0	0	0	4
cSH	12	296	1700	1700	1700	1700
Volume to Capacity	1.19	0.10	0.61	0.61	0.77	0.39
Queue Length 95th (ft)	63	9	0	0	0	0
Control Delay (s)	732.6	18.6	0.0	0.0	0.0	0.0
Lane LOS	F	C				
Approach Delay (s)	732.6	0.3			0.0	
Approach LOS	F					
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			64.4%	ICU Level of Service	C	
Analysis Period (min)			15			