

Keith Higgins

Traffic Engineer

**MONTEREY-SALINAS TRANSIT
SOUTH COUNTY
OPERATIONS AND
MAINTENANCE
FACILITY**

KING CITY, CALIFORNIA

TRAFFIC IMPACT ANALYSIS

Draft Report

Prepared for
Denise Duffy and Associates
Monterey, CA

Prepared by
Keith Higgins Traffic Engineer
Gilroy, CA

August 1, 2017

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EXECUTIVE SUMMARY

Introduction:

This report summarizes the potential traffic circulation issues associated with the proposed Monterey Salinas Transit (MST) South County Maintenance and Operations facility in King City, California. Vehicular, pedestrian, bicycle and transit circulation issues were evaluated at the project site and the surrounding street network in King City, along with assessment of site access and on-site circulation. The project site is located on San Antonio Drive at Don Bates Way, in the East Ranch Business Park.

Study Network:

The AM and PM peak periods were analyzed at the following intersections:

1. River Drive – Southbound US 101 Ramps / Broadway Circle
2. Broadway Circle – San Antonio Drive / Broadway Street
3. First Street / Southbound US 101 Ramps
4. First Street / Northbound US 101 Ramps
5. First Street / Lonoak Road
6. First Street / Broadway Street
7. Metz Road / Bitterwater Road
8. Metz Road / San Antonio Drive
9. San Antonio Drive / Bitterwater Road

Traffic operations for the following analysis scenarios were analyzed:

- Existing Conditions
- Existing Plus Project Conditions
- Background Conditions
- Background Plus Project Conditions
- Cumulative Without Project Conditions
- Cumulative Plus Project Conditions

The analysis was performed using the *2000* and *2010 Highway Capacity Manual* methodologies.

Existing Conditions:

All of the study intersections currently operate at or better than their level of service standards.

Existing Plus Project Conditions:

Trip Generation Estimate:

A custom trip generation estimate was prepared for this project, based upon information provided by MST and various assumptions regarding anticipated operations of this facility. This includes the five types of trip generators at the project site:

1. Buses and Shuttles
2. Staff
3. Relief Units
4. Deliveries
5. Visitors

The vast majority of project morning traffic will occur before the AM peak hour. The vast majority of project evening traffic will occur before or after the street PM peak hour. The project is estimated to generate about 263 daily trips, with 4 trips (2 in, 2 out) during the AM peak hour and 4 trips (2 in, 2 out) during the PM peak hour.

Traffic Circulation:

Vehicle Circulation:

All of the study intersections would continue to operate at or better than their respective level of service standards under Existing Plus Project conditions. No project-specific impacts will occur and no mitigations are required. The project is also a unique land use in that it supports the development and operation of a transit system that will reduce overall traffic volumes throughout the study area. Recent studies indicate that MST transit operations currently have about a 0.5% mode share in rural areas. In other words, the introduction of enhanced transit service in King City that will be able to occur due to the South County Operations and Maintenance Facility will reduce traffic on the arterial street system by about 0.5%. This is not directly accounted for in the traffic operations analysis. However, the 0.5% traffic reduction is credited toward the project's contribution to background and cumulative mitigations identified in this analysis.

Pedestrian Circulation:

No significant impacts, as the project would generate little pedestrian traffic. The final design plans will include a sidewalk along its San Antonio Drive and Don Bates Way frontages.

Bicycle Circulation:

No significant impacts, as the project would generate little bicycle traffic.

Transit Circulation:

No significant impacts, as the project would generate little, if any, increase in transit usage.

Railroad Circulation:

No significant impacts, as the project would generate no additional railroad passenger use, all of the at-grade crossings near the project site have existing crossing gates, and buses traveling to/from the site would not have to stop at the at-grade crossings (because they would not have passengers).

TAMC Regional Development Impact Fee:

The project is a local public agency project. It is not subject to the Transportation Agency for Monterey County (TAMC) regional development impact fee.

Background Conditions:

A list of approved but not yet constructed/operational projects was obtained from the City of King. Vehicle trips from these projects were added to the existing volumes to create Background condition traffic volumes.

Traffic Circulation:

All of the study intersections would continue to operate at or better than their respective level of service standards, with the exception of Intersection No. 6 - First Street / Broadway Street. Signalization of this intersection, as summarized on Exhibit ES-1, is the improvement needed at this intersection to accommodate Background traffic conditions.

Background Plus Project Conditions:

Traffic Circulation:

Vehicle Circulation:

The project would contribute to impacts under Background Plus Project conditions at Intersection No. 6 - First Street / Broadway Street.

Signalization of this intersection, as summarized on **Exhibit ES-1**, is the recommended mitigation at this intersection.

Although it's impact will be insignificant and virtually imperceptible, the project would be responsible for a fair-share contribution of 0.41% towards the cost of implementing this improvement, based upon the amount of traffic the project would add to the intersection. The project's payment towards this improvement would constitute its contribution towards the mitigation of Background plus Project conditions.

Pedestrian Circulation:

No significant impacts, as pedestrian traffic is not anticipated to significantly increase over Existing Plus Project conditions.

Bicycle Circulation:

No significant impacts, as bicycle traffic is not anticipated to significantly increase over Existing Plus Project conditions.

Cumulative Without Project Conditions:

Cumulative Without Project volumes are based on forecasts in "First Street Bypass Traffic Impact Analysis," Higgins Associates, June 12, 2009. These forecasts incorporate buildout of the City of King General Plan. These forecasts also incorporate two important modifications to the study area street network:

1. Broadway Street extension (east of First Street)
2. First Street Bypass (Bitterwater Road to Lonoak Road)

Traffic Circulation:

Vehicle Circulation:

Only one of the study intersections (Intersection No. 1- River Drive-Southbound US 101 Ramps) would continue to operate at or better than its level of service standard under Cumulative Plus Project conditions, the following intersections would operate below their respective standards:

2. Broadway Circle – San Antonio Drive / Broadway Street
3. First Street / Southbound US 101 Ramps
4. First Street / Northbound US 101 Ramps
5. First Street / Lonoak Road
6. First Street / Broadway Street
7. Metz Road / Bitterwater Road
8. Metz Road / San Antonio Drive
9. San Antonio Drive / Bitterwater Road

See Exhibit ES-1 for the recommended improvements at these intersections. Implementation of these improvements would reduce the level of cumulative impacts at each intersection to less-than-significant.

Pedestrian Circulation:

There are no planned pedestrian network improvements in the vicinity of the project site.

Bicycle Circulation:

The City of King is planning to add bicycle lanes on First Street from US 101 to Bitterwater Road and on Lonoak Road from First Street to the city limits. There are no additional planned bicycle network improvements in the vicinity of the project site.

Cumulative Plus Project Conditions:

The project trip assignment under Cumulative Plus Project conditions has been revised due to the inclusion of the First Street Bypass into the area street network. Approximately 80% of the project traffic on First Street north of US 101 has been reassigned onto the Bypass, including all of the bus traffic. However, the overall trip distribution for the study project remains the same as under Existing Plus Project and Background Plus Project conditions.

Traffic Circulation:

Vehicle Circulation:

Only one study intersection (Intersection No. 1 - River Drive-Southbound US 101 Ramps) would operate at or better than its level of service standard.

The project would contribute to significant cumulative impacts at the following study intersections:

2. Broadway Circle – San Antonio Drive / Broadway Street
3. First Street / Southbound US 101 Ramps

4. First Street / Northbound US 101 Ramps
5. First Street / Lonoak Road
6. First Street / Broadway Street
7. Metz Road / Bitterwater Road
8. Metz Road / San Antonio Drive
9. San Antonio Drive / Bitterwater Road

See **Exhibit ES-1** for the recommended improvements at these intersections. Implementation of these improvement would reduce the level of Cumulative plus Project impacts at each intersection to less-than-significant.

The project would be responsible for a fair-share contribution towards the cost of implementing these improvements, based upon the amount of traffic the project would add to each individual intersection. This would constitute its fair share of Cumulative plus Project mitigations. A credit is given for the project facilitating enhanced transit service in the King City area.

Pedestrian Circulation:

No significant cumulative impacts, as the project's distance away from residential neighborhoods and commercial areas in the city would be greater than typical walking distances to and from the project site.

Bicycle Circulation:

No significant cumulative impacts, as it is not anticipated that the planned bicycle improvements along First Street would, by itself, increase bicycle travel to and from the project site.

Transit Circulation:

No significant cumulative impacts, as although MST may establish transit service to the immediate project vicinity, it is speculative to identify the potential increase in transit usage and the proximity of potential future bus stops to the project site.

Railroad Circulation:

No significant cumulative impacts. Although the City of King is exploring the possibility of re-establishing an Amtrak station in the city, few, if any, people would use such a station to access the project site, due to the distance between the potential station and the project site and the current Amtrak schedule. In addition, the combination of the existing railroad crossing gates and future signalization of the intersections near the current and future railroad at-grade crossings would adequately control traffic near said crossings and minimize the potential for vehicles to be queued up on the tracks at the time of a passing train.

Site Access and Internal Circulation:

The project site plan is currently in development. The site plan included in this report is schematic and only intended to illustrate the project size and site plan elements. Driveway locations, numbers and locations of parking spaces and locations of pedestrian facilities are currently being determined. A sidewalk will be provided along the project's public street frontages. A site plan review will be conducted when a finalized site plan is available.

Construction Impacts:

The large, flat site and relatively small building will result in low amounts of earthwork and general construction. Low traffic volumes are carried by the nearby street system. Together, the project will have an insignificant construction traffic impact. No mitigation is recommended.

Summary of Project Responsibilities:

The project will not create any significant impacts. The project therefore has no responsibility to implement or contribute to off-site mitigations for project or cumulative impacts.

	N-S Street	E-W Street	Existing Intersection Control	Existing Conditions	Existing Plus Project Conditions	Background Without Project Conditions	Background Plus Project Conditions	Cumulative Without Project Conditions	Cumulative Plus Project Conditions
1	River Drive - Southbound US 101 Ramps	Broadway Circle	All-Way Stop	None Required	None Required	None Required	None Required	None Required	None Required
2	Broadway Circle - San Antonio Drive	Broadway Street	Signal	None Required	None Required	None Required	None Required	1. Add 2nd WB L (or convert T lane to L/T) or 2. Convert to Roundabout	1. Add 2nd WB L (or convert T lane to L/T) or 2. Convert to Roundabout
3	First Street	Southbound US 101 Ramps	One-Way Stop	None Required	None Required	None Required	None Required	a. Signalize Intersection b. Widen & Restripe EB as 1-L, 1-R c. Widen and Restripe NB as 1-T, 1-R	a. Signalize Intersection b. Widen & Restripe EB as 1-L, 1-R c. Widen and Restripe NB as 1-T, 1-R
4	First Street	Northbound US 101 Ramps	One-Way Stop	None Required	None Required	None Required	None Required	a. Add SB R b. Widen and Restripe WB as 1-T, 1-R c. Widen north leg of First St. to 2 lanes in each direction	a. Add SB R b. Widen and Restripe WB as 1-T, 1-R c. Widen north leg of First St. to 2 lanes in each direction
5	First Street	Lonoak Road	Two-Way Stop	None Required	None Required	None Required	None Required	a. Signalize Intersection b. Add NB R, SB L c. Widen and Restripe WB as 1-L, 1-L/T/R d. Add 2nd NB T, 2nd SB T e. Add NB RTO	a. Signalize Intersection b. Add NB R, SB L c. Widen and Restripe WB as 1-L, 1-L/T/R d. Add 2nd NB T, 2nd SB T e. Add NB RTO
6	First Street	Broadway Street	All-Way Stop	None Required	None Required	Signalize Intersection	Signalize Intersection	a. Signalize Intersection b. Add SB L, SB R, NB R c. Restripe and Reconstruct EB & WB Broadway as 1-L, 1-T/R	a. Signalize Intersection b. Add SB L, SB R, NB R c. Restripe and Reconstruct EB & WB Broadway as 1-L, 1-T/R
7	Metz Road	Bitterwater Road	One-Way Stop	None Required	None Required	None Required	None Required	a. Signalize Intersection b. Add EB L, WB R	a. Signalize Intersection b. Add EB L, WB R
8	Metz Road	San Antonio Drive	Two-Way Stop	None Required	None Required	None Required	None Required	a. Signalize Intersection b. Add EB R	a. Signalize Intersection b. Add EB R
9	San Antonio Drive	Bitterwater Road	One-Way Stop	None Required	None Required	None Required	None Required	a. Signalize Intersection b. Add NB R, WB L c. Restripe SB as 1-L/T, 1-R	a. Signalize Intersection b. Add NB R, WB L c. Restripe SB as 1-L/T, 1-R

Note:

1. L, T, R, EB, WB, NB, SB, RTO = Left, Through, Right, Eastbound, Westbound, Southbound, Northbound, Right Turn Overlap signal phase.

INTRODUCTION

This report summarizes the potential traffic circulation issues associated with the proposed MST South County Maintenance and Operations facility in King City, California. Vehicular, pedestrian, bicycle and transit circulation issues were evaluated at the project site and the surrounding street network in King City, along with assessment of site access and on-site circulation. The project site is located on San Antonio Drive at Don Bates Way, inside the East Ranch Business Park. The location of the project site is indicated on **Exhibit 1**.

The conceptual site plan is shown on **Exhibit 2**. The site plan included in this report is schematic and only intended to illustrate the project size and site plan elements. Driveway locations, numbers and locations of parking spaces and locations of internal pedestrian facilities are currently being determined. A site plan review will be conducted when a finalized site plan is available.

Scope of Work

This report addresses the following topics:

- Existing vehicular, pedestrian and bicycle circulation at the project access and the surrounding street network.
- Assessment of potential direct impacts to vehicular, pedestrian, bicycle, transit and rail circulation due to the project, and recommendations to minimize or alleviate those impacts.
- Assessment of potential cumulative traffic impacts.
- Site access and on-site circulation assessment.

Study Network

The AM and PM peak periods were analyzed at the following intersections:

1. River Drive – Southbound US 101 Ramps / Broadway Circle
2. Broadway Circle – San Antonio Drive / Broadway Street
3. First Street / Southbound US 101 Ramps
4. First Street / Northbound US 101 Ramps
5. First Street / Lonoak Road
6. First Street / Broadway Street
7. Metz Road / Bitterwater Road
8. Metz Road / San Antonio Drive
9. San Antonio Drive / Bitterwater Road

Exhibit 3 shows the existing traffic control and lane configurations at the study intersections.

Traffic operations for the following analysis scenarios were analyzed:

- Existing Conditions
- Existing Plus Project Conditions

- Background Conditions
- Background Plus Project Conditions
- Cumulative Without Project Conditions
- Cumulative Plus Project Conditions

Improvements recommended to mitigate impacts under each development scenario are recommended where warranted.

Traffic Operation Evaluation Methodologies

Intersection traffic operations were evaluated based upon the level of service (LOS) concept. LOS is a qualitative description of an intersection's operations, ranging from LOS A to LOS F. Level of Service "A" represents free flow uncongested traffic conditions. Level of Service "F" represents highly congested traffic conditions with unacceptable delay to vehicles at intersections. The intermediate levels of service represent incremental levels of congestion and delay between these two extremes. The analysis was performed using the 2000 and 2010 *Highway Capacity Manual* methodologies. LOS descriptions for each type of existing traffic control at the study intersections (i.e., signal, all-way stop and one-/two-way stop) are included as **Appendix A**.

Level of Service Standards

The study area includes intersections under the jurisdictions of the City of King and Caltrans. The City of King has an overall level of service (LOS) standard of LOS C, which applies to Intersections #2, 5, 6, 7, 8, and 9. The Caltrans' overall level of service standard is generally the transition from LOS C to LOS D (abbreviated as LOS C/D in this document), which applies to Intersections #1, 3, and 4.

Significance Criteria

According to the California Environmental Quality Act (CEQA) guidelines, a project may have a significant effect on the environment if it would cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system. The following significance criteria has been used within this study, based upon the jurisdiction of each study intersection:

City of King

The City of King does not have established, specific impact criteria for transportation-related impacts. Therefore, the following significance criteria have been used in this study:

Signalized Intersection (Intersection #2)

A significant impact at a **signalized study intersection** is defined to occur under either of the following two conditions:

- If an intersection currently operating at LOS A, B, or C degrades to D, E or F;
- or

-
- For intersections already operating at unacceptable levels D, E or F, if the project would cause overall delay to increase by at least 0.1 seconds.

All-Way Stop-Controlled Intersection (Intersection #6)

A significant impact at an **all-way stop-controlled study intersection** is defined to occur under either of the following two conditions:

- If an intersection operating at LOS A, B, or C degrades to D, E or F; or
- For intersections already operating at unacceptable levels D, E or F, if the project would cause overall delay to increase by at least 0.1 seconds.

One- or Two-Way Stop-Controlled Intersection (Intersections #5, 7, 8 and 9)

A significant impact at a **one- or two-way stop-controlled study intersection** is defined to occur under either of the following two conditions:

- If any traffic movement operating at LOS A, B, C, D or E degrades to F; or
- For traffic movements already operating at unacceptable level F if the project would cause overall delay to increase by at least 0.1 seconds.

Caltrans

The following significance criteria have been used within this study at intersections under the jurisdiction of Caltrans:

All-Way Stop-Controlled Intersection (Intersection #1)

A significant impact at an **all-way stop-controlled study intersection** is defined to occur under either of the following two conditions:

- If an intersection operating at LOS A, B, or C degrades to D, E or F; or
- For intersections already operating at unacceptable levels D, E or F if the project would cause overall delay to increase by at least 0.1 seconds.

One- or Two-Way Stop-Controlled Intersection (Intersections #3, 4)

A significant impact at a **one- or two-way stop-controlled study intersection** is defined to occur under either of the following two conditions:

- If any traffic movement operating at LOS A, B, C, D or E degrades to F; or
- For intersections already operating at unacceptable level F if the project would cause overall delay to increase by at least 0.1 seconds.

EXISTING TRAFFIC CONDITIONS

This chapter of the report evaluates Existing traffic conditions and includes a description of the project setting.

Existing Traffic Network

The project site is located at the northwest corner of the San Antonio Drive and Don Bates Way intersection in the East Ranch Business Park in northeastern King City. Regional access to the project site is provided by US 101. Major roadways in the vicinity of the project site include San Antonio Drive, Metz Road, Bitterwater Road, First Street and Broadway Street. Other roadways serving the study area include Lonoak Road, Broadway Circle, and River Drive. A brief description of each roadway can be found below.

US 101 is a four-lane freeway providing statewide and regional circulation functions. In Monterey County, US 101 traverses the Salinas Valley north to Salinas and eventually San Jose and the San Francisco Bay Area, and south into San Luis Obispo County towards Los Angeles. Through King City, US 101 is in an east-west alignment, although its regional alignment is in a north-south orientation. Interchanges within King City are located at Broadway Street, Canal Street, and First Street. The speed limit on US 101 is 65 miles per hour (mph) north of First Street, and 70 mph south of First Street.

Bitterwater Road is a two-lane, east-west arterial street in northeastern King City. Bitterwater Road connects First Street and Metz Road via an at-grade railroad crossing, then continues eastward through the industrial portion of the city. East of King City, Bitterwater Road continues in a northeasterly direction to State Route 25 (SR 25) in San Benito County, and is designated as County Route G13. The speed limit on Bitterwater Road is 25 mph between First Street and a point 50 feet east of Metz Road, 35 mph between a point 50 feet east of Metz Road and Airport Drive, and 45 mph east of Airport Drive, including in Monterey County immediately east of King City.

Broadway Circle is a two-lane local street in southern King City. Broadway Circle is an extension of San Antonio Drive south of Broadway Street, and provides access to the US 101/Broadway Street interchange, as well as to commercial development south of US 101. The speed limit on Broadway Circle is 25 mph.

Broadway Street is a two-lane, east-west arterial street through the center of King City, connecting the eastern and western portions of the city. The central business district of King City is centered around the eastern end of Broadway Street. The speed limit on Broadway Street is 25 mph.

First Street is a two-lane, north-south arterial street in eastern King City, with left turn channelization in the downtown area. First Street extends from Bitterwater Road north of the downtown area to US 101 at its southern terminus. First Street is also designated as County Route G15. The speed limit on First Street is 25 mph north of Division Street, 35 mph between Division Street and Lonoak Road, and 45 mph south of Lonoak Road.

Lonoak Road is a two-lane, east-west roadway on the southeastern edge of King City. This roadway serves the local agricultural fields and homes east of King City, and extends eastward to SR 25 near the Monterey-San Benito County Line. In the vicinity of King City, Lonoak Road is classified as a collector street, and has a posted speed limit of 25 mph. East of King City, there is no posted speed limit; for the purposes of this analysis, it is assumed that the speed limit is 55 mph in this section.

Metz Road is a two-lane, north-south arterial roadway within Monterey County and King City. Metz Road extends northward from King City along the eastern edge of the Salinas Valley to SR 146 just east of Soledad. Metz Road is also designated as County Route G15. South of Airport Drive, the speed limit on Metz Road is 35 mph. North of Airport Drive, there is no posted speed limit; for the purposes of this analysis, it is assumed that the speed limit is 55 mph in this section.

River Drive is a two-lane, east-west local street within southern King City, serving a residential neighborhood (“Forden” Neighborhood) south of US 101. The speed limit on River Drive is 25 mph.

San Antonio Drive is an arterial street within King City. San Antonio Drive forms a loop around the western and northern portions of the city, through residential areas in the north and west and industrial areas to the northeast. San Antonio Drive is four lanes wide between Broadway Street and just north of Bedford Avenue, and is two lanes wide for the remainder of the street. A center median is present on San Antonio Drive between Mildred Avenue and just east of Third Street. The speed limit on San Antonio Drive is 35 mph, except between Willow Street Metz Road, where it is signed at 25 mph.

Existing Pedestrian Network

Sidewalks are present along most developed properties on San Antonio Drive near the project site (i.e., between Metz Road and Bitterwater Drive) – there are continuous sidewalks along the southern and western sides of the street, but only two short and discontinuous sections of sidewalk on the northern and eastern sides. Although there are connecting sidewalks along the eastern side of Metz Road and the northern side of Bitterwater Road, there is no clear pedestrian route across the at-grade railroad crossings at either Bitterwater Road or San Antonio Drive. A connecting sidewalk is present just west (i.e., non-project site) of the railroad crossing on the southern side of

San Antonio Drive, but there is no sidewalk present on either side of Bitterwater Road west of its railroad crossing.

Existing Bicycle Network

There are no existing bicycle facilities near the project site. The nearest facilities are bicycle lanes in both directions of San Antonio Drive between Mildred Avenue and Third Street, over a half-mile west of the project site. However, the shoulders on most roadways in the city are sufficiently wide to allow bicyclists to travel alongside vehicles.

Existing Transit Service

Monterey-Salinas Transit provides indirect fixed-route transit service to the study project site. Routes 23, 82, 83, 84, and 86 all stop in King City, but only at select locations.

- **Route 23** connects the communities of the Salinas Valley to Salinas itself. Service is provided hourly on weekdays and weekends. In King City itself, Route 23 traverses a clockwise loop around the city. Although Route 23 stops in multiple places in King City, the nearest bus stops are located on eastbound San Antonio Drive near Bishop Street and on eastbound Broadway Street near Second Street – both locations are a 20- to 30-minute walk from the project site.
- **Route 82** is an express route that connects Fort Hunter Liggett (located south of King City) to Salinas and Seaside, via King City. This route is only in operation five times on weekdays (three times northbound and two times southbound) and two times on weekends (one time northbound and one time southbound). Although this route also traverses a clockwise loop around King City, it does not stop at as many locations in the city as Route 23. The nearest bus stop for Route 82 to the project site is on First Street at Pearl Street, a 30-minute walk from the project site.
- **Route 84** connects Soledad and Paso Robles (in San Luis Obispo County) via King City. Although the route connects to other destinations on its route more frequently, it only services King City eight times a day on weekdays (four times northbound and four times southbound) and two days on weekends (two times northbound and two times southbound). The nearest bus stop for Route 84 to the project site is also on First Street at Pearl Street.
- **Route 86** connects King City to San Jose via Salinas, Norman Y. Mineta San Jose International Airport, downtown San Jose and Diridon Station. Service for this route is only one round trip on weekdays and two round trips on weekends. In addition, this route also directly connects King City and the intersection of State Routes 68 and 218 in Monterey during one round trip on weekdays and two round trips on weekends. The nearest bus stop for Route 86 to the project site is also on First Street at Pearl Street.

MST also provides dial-a-ride service via its MST On Call South County program. In King City, the service provides rides to and from any destination within the city and in the unincorporated Pine Canyon Road residential area southwest of the city on weekdays between 7:00 AM and 4:00 PM.

Existing Railroad Service

Regionally, the Union Pacific Railroad rail line is the primary north-south rail route along the Pacific coast, connecting to Los Angeles to the south, and Oakland, Sacramento, and Portland to the north. This rail line, which is comprised of two rail tracks (or “dual tracking”) throughout much of the city, is located in the eastern portion of King City. South of the city, it is parallel to and north of Highway 101, then east of First Street. North of the King City central business district, the rail line parallels Metz

Road to the west, which it follows as it exits the city to the north. At-grade rail crossings in the greater King City area include Lonoak Road, Bitterwater Road, San Antonio Drive, and Spreckels Road.

Amtrak, the national passenger rail service company, provides passenger service in the King City area via the Coast Starlight service. The Coast Starlight is composed of one northbound and one southbound passenger train per day. Approximately 8 to 12 freight trains also pass through the King City area each day.

Existing Conditions Traffic Circulation

Vehicle Circulation

Intersection turning movement counts were conducted at the study intersections during the AM (7:00 – 9:00 AM) and PM (4:00 – 6:00) peak hours on Thursday, April 27, 2017. Traffic data was collected for cars, trucks, buses, bicyclists, and pedestrians. From these counts, the AM and PM peak hour volumes were derived. **Appendix B** contains the traffic count data at the study intersections.

Exhibit 3 indicates existing lane configurations at study intersections. **Exhibit 4** depicts the existing peak turning movement volumes for the study intersections.

Existing intersection levels of service are summarized on **Exhibit 5a**. The LOS calculation sheets for Existing conditions can be found in **Appendix C**.

All of the study intersections currently operate at or better than their respective level of service standards. No improvements are recommended for existing conditions, as summarized on **Exhibit 5b**.

Pedestrian Circulation

There is little to no pedestrian traffic at the study intersections, with most pedestrian traffic located near the commercial areas off Broadway Circle and on First Street at Broadway Street.

Bicycle Circulation

There is little to no bicycle traffic at the study intersections, with most bicycle traffic located on Broadway Circle and First Street.

EXISTING PLUS PROJECT CONDITIONS

Project Description

The study project is an approximately 14,000 square foot maintenance and operations facility on a 4.8 acre site for Monterey-Salinas Transit (MST) to support southern Monterey County operations. The project consists of a three-bay maintenance area, an administrative area (including offices, bus driver break area, and dispatch area) and equipment storage area. Up to 40 buses and 45 employees (including bus drivers) would be based out of this facility.

Project Trip Generation

A custom trip generation estimate has been prepared for this project, based upon information provided by MST and various assumptions regarding anticipated operation of the facility.

There would be five types of trip generators at the project site:

1. Buses and Shuttles – The active fleet standard-size buses, shuttles and paratransit vehicles would be stored and maintained at the facility. Spare buses and shuttles would also be stored at the facility but would only be in use as needed (e.g., if an active fleet bus was temporarily unusable).
2. Staff – Staffing at the site includes bus drivers, fleet maintenance staff and operational supervisors. While the bus drivers and operational supervisors would typically be in the field during their working hours, the maintenance staff would spend their work hours on site.
3. Relief Units – These vehicles would allow transportation to offsite locations for transfers of buses between bus drivers beginning and ending their respective shifts without having to return the bus to the facility.
4. Deliveries – There would be two types of deliveries to the site – fuel deliveries (to fuel buses and other vehicles) and non-fuel deliveries (e.g., US Mail and package deliveries).
5. Visitors – Visitors would include employees from other MST facilities and other non-employees visiting the facility.

Appendix D contains a comprehensive list of data and assumptions used in the derivation of the project trip generation estimate. However, the following is a list of key data and assumptions:

1. Maximum Total Staffing: 45 staff (including bus drivers)
2. Maximum Total Buses and Shuttles: 40 (including 5 spare buses)
3. All staff (including bus drivers) are assumed to drive themselves to and from the site.

-
4. Due to their respective schedules, virtually all of the bus drivers, fleet maintenance staff, and buses and shuttles would be traveling to and from the site outside of the AM and PM peak hours.
 5. Fifty (50%) of on-site staff are assumed to travel offsite during their respective lunch hours.
 6. There would be one (1) fuel delivery per week to the site. To be conservative, this fuel delivery was included in the trip generation estimate for the project.
 7. There would be 10 deliveries per day to the site, spread out throughout the day.
 8. There would be 3 visitors to the site per day.

Exhibit 6 summarizes the project trip activity. The project is estimated to generate 263 daily trips, with 4 trips (2 in, 2 out) during the AM peak hour and 4 trips (2 in, 2 out) during the PM peak hour.

The project is also a unique land use in that it supports the development and operation of a transit system that will reduce overall traffic volumes throughout the study area. Recent studies indicate that MST transit operations currently have about a 0.5% mode share. In other words, the introduction of enhanced transit service in King City that will be able to occur due to the South County Operations and Maintenance Facility will reduce traffic on the arterial street system by about 0.5%. This is not accounted for in the traffic operations analysis. However, the 0.5% traffic reduction will be credited toward the project's contribution to mitigations identified in this analysis.

Project Trip Distribution and Assignment

Exhibit 7 depicts the trip distribution for the project. This distribution was derived based upon MST routes in southern Monterey County and major population centers in King City and the greater area. A total of adjacent complementary uses in the greater study area and travel patterns indicated by the existing intersection traffic counts. A total of 18% of the total trips were distributed in King City itself, as it is anticipated that some of the employees will either move to or are currently living in King City.

The trip distribution was combined with the trip generation to derive the project trip assignment, both of which are depicted on **Exhibit 7**. The trip assignment was added to the existing traffic volumes to estimate the Existing Plus Project volumes depicted on **Exhibit 8**.

Existing Plus Project Condition Traffic Circulation

Vehicle Circulation

Existing Plus Project condition intersection levels of service are summarized on **Exhibit 5**. The LOS calculation sheets for Existing Plus Project conditions can be found in **Appendix E**.

All of the study intersections would continue to operate at or better than their respective levels of service standards under Existing Plus Project Conditions. No improvements are required.

There will be no project-specific significant impacts, even without credit for reductions in overall ambient traffic on the King City street system due to the expanded transit service the project will facilitate.

Pedestrian Circulation

The project is anticipated to generate little pedestrian traffic, due to the distance of the project site from the residential neighborhoods of King City and the lack of pedestrian facilities connecting the project site to said neighborhoods. Therefore, the project would not represent a significant impact to pedestrian circulation. The final design plan will include a sidewalk along its San Antonio Drive and Don Bates Way frontages.

Bicycle Circulation

The project is anticipated to generate little bicycle traffic, again due to the distance of the project site from the residential neighborhoods of King City and the lack of bicycle facilities connecting the project site to said neighborhoods. Therefore, the project would not represent a significant impact to bicycle circulation.

Transit Circulation

The project is anticipated to generate little, if any, increase in transit usage by employees or visitors to the project site, due to the distance of the project site from any bus stops and the relative infrequency of transit service to the King City area. Therefore, the project would not represent a significant impact to transit use.

Railroad Circulation

As trains do not currently stop in or near King City, the project would not generate any new railroad passenger use (e.g., Amtrak).

The at-grade rail crossings at both Bitterwater Road and San Antonio Drive have existing crossing gates that are activated when trains approach the respective crossings. Although Intersection 7 – Metz Road / Bitterwater Road – and Intersection 8 – Metz Road / San Antonio Drive – are located immediately adjacent to the at-grade rail crossings, stop signs are currently on Metz Road at both intersections; therefore, project traffic crossing the railroad tracks would not be stopped on the tracks for extended periods behind a stop sign, awaiting gaps in conflicting traffic before clearing the tracks.

The project will have multiple transit buses to and from the project site during normal operations. Although buses carrying passengers must stop at all at-grade rail crossings, all of the buses traveling to and from the project site will be out of service (or

“deadhead”), and thus would not be carrying any passengers. Out of service buses are not required to stop at rail crossings, therefore the number of vehicles stopping at the Bitterwater Road at-grade rail crossing would not increase over current conditions, with the exception of increased transit service on existing or expanded routes.

Accounting for all of this, the study project would not impact railroad passenger service, add additional traffic that would be stopped on the railroad tracks for extensive periods of time or cause significant congestion at the Bitterwater Road at-grade rail crossing.

TAMC Regional Development Impact Fee

The Transportation Agency for Monterey County (TAMC) assesses a regional development impact fee that funds various countywide transportation projects. This project is a local public agency project (i.e., owned and operated by Monterey-Salinas Transit), and is not subject to this fee.

BACKGROUND CONDITIONS

This chapter describes Background Conditions, which includes estimated traffic conditions from approved projects in King City. This scenario does not include trips from the study project.

Background Traffic Volumes

Various approved but yet not constructed/completed projects are located in King City, including near the project site. A list of these projects was obtained from the City of King, which are located throughout King City. **Exhibit 9** summarizes their trip generation. The trips from these projects were distributed through the study intersections and added to the Existing traffic volumes to create the Background conditions traffic volumes depicted in **Exhibit 10**.

Background Condition Traffic Circulation

Background condition intersection levels of service are summarized on **Exhibit 5**. The LOS calculation sheets for Background conditions can be found in **Appendix F**.

Most of the study intersections will continue to operate at or better than their respective levels of service standards under Background Conditions. However, one intersection will operate just below its level of service standard: Intersection No. 6 - First Street / Broadway Street – LOS D near C (PM), although it will remain at an acceptable LOS C during the AM peak hour. The Caltrans peak hour signal warrant will be met at this intersection (see Appendix J).

The Downtown Addition, which is a long-term mixed-use development on the east side of the existing downtown and railroad tracks, is also an approved project, but has an implementation schedule longer than other Background projects. At the direction of the City Planning Department, it is not included until the Cumulative scenario. The Downtown Addition is responsible for paying for this signal, as well as other improvements at this intersection. The Background mitigation at this intersection is therefore anticipated to be fully funded.

BACKGROUND PLUS PROJECT CONDITIONS

This chapter provides a description of the analysis under Background Plus Project traffic conditions, which analyzes Background Conditions plus anticipated traffic from the proposed project.

Background Plus Project Traffic Volumes

The project trip assignment (**Exhibit 7**) was added to the Background Condition volumes (**Exhibit 10**) to create Background Plus Project Condition volumes shown in **Exhibit 11**.

Background Plus Project Conditions Traffic Circulation

Vehicle Circulation

Background Plus Project intersection levels of service are summarized on **Exhibit 5**. The LOS calculation sheets for Background Plus Project traffic conditions can be found in **Appendix G**.

Although most of the study intersections would continue operate at or better than their respective level of service standards under Background Plus Project conditions, : Intersection No. 6 - First Street / Broadway Street – LOS D (PM), acceptable LOS C (AM) would continue to operate below its level of service standard, although there will be virtually no increase in delay or congestion due to the project. The average delay for both the morning and evening peak hours will not change due to traffic from the Project.

Below is a discussion of the significance evaluations and recommended improvements at the study intersection operating under deficient operations under Background Plus Project conditions.

- **Intersection #6 – First Street / Broadway Street:**

A traffic signal will be warranted at this intersection with the traffic associated with Background traffic (see **Appendix J**). As described under the Existing Plus Background scenario, the traffic signal and other longer-term improvements at this intersection will be implemented by the Downtown Addition. The Project has no financial responsibility for mitigations for Background (or Cumulative, which is the scenario that includes the Downtown Addition) mitigations.

Pedestrian Circulation

Pedestrian traffic under Background Plus Project conditions is not anticipated to significantly increase over Existing Plus Project conditions. Therefore, the project

would not represent a significant impact to pedestrian circulation under Background Plus Project conditions. The Project will include a sidewalk along its San Antonio Drive and Don Bates Way frontages.

Bicycle Circulation

Bicycle traffic under Background Plus Project conditions is not anticipated to significantly increase over Existing Plus Project conditions. Therefore, the project would not represent a significant impact to bicycle circulation under Background Plus Project conditions.

CUMULATIVE WITHOUT PROJECT CONDITIONS

This section describes Cumulative conditions without the study project. The Cumulative Without Project traffic condition is defined as buildout of the current City of King General Plan, or traffic conditions a minimum of thirteen years beyond existing conditions (i.e., the Year 2030). This analysis scenario does not include traffic from the study project.

Derivation of Cumulative Without Project Condition Traffic Volumes

The traffic volumes under the Cumulative Without Project condition are based upon traffic forecasts in *First Street Bypass Traffic Impact Analysis*, Higgins Associates, June 12, 2009. These forecasts incorporate buildout of properties governed by the City of King General Plan, including buildout of the East Ranch Business Park, the industrial area along Industrial Way (off Bitterwater Road east of San Antonio Drive), the Downtown Addition mixed-use project (an Approved project) and the Creekbridge residential project north of San Antonio Drive.

Exhibit 12 illustrates the Cumulative Without Project traffic volumes at the study intersections.

Modifications to Study Area Street Network

Both Cumulative Without Project and Cumulative Plus Project scenarios include two important modifications to the study area street network: 1) Broadway Street extension and 2) First Street Bypass. Both of these improvements will be implemented by the Downtown Addition. Each new roadway is briefly discussed below.

The Broadway Street extension extends Broadway Street eastward of First Street, across the Union Pacific Railroad tracks and into the Downtown Addition project.

The First Street Bypass is a truck and vehicle bypass road east of Downtown King City, extending from the San Antonio Drive / Bitterwater Road intersection to Lonoak Road. The portion of the bypass adjacent to the Downtown Addition project would be named “Oak Avenue”.

The alignments for the Broadway Street extension and First Street Bypass are shown in **Exhibit 12**. The alignment of the First Street Bypass south of San Lorenzo Creek is illustrative, as the exact alignment of the roadway not been determined.

Cumulative Without Project Traffic Circulation

Vehicle Circulation

Cumulative Without Project AM and PM intersection levels of service are summarized on **Exhibit 5**. The LOS calculation sheets for Cumulative Without Project traffic conditions can be found in **Appendix H**.

Only one of the study intersections (Intersection 1- River Drive-Southbound US 101 Ramps) would continue operate at or better than its level of service standard under Cumulative Without Project conditions. The following intersections would operate below their respective standards. The intersection numbers follow the numbering system used throughout this report.

2. Broadway Circle – San Antonio Drive / Broadway Street – LOS D (PM)
3. First Street / Southbound US 101 Ramps – Overall LOS F (AM and PM), Side-Street LOS F (AM and PM)
4. First Street / Northbound US 101 Ramps – Side-Street LOS F (PM)
5. First Street / Lonoak Road – Overall LOS F (AM and PM), Side-Street LOS F (AM and PM)
6. First Street / Broadway Street – LOS F (AM and PM)
7. Metz Road / Bitterwater Road – Overall LOS E (AM) and LOS D (PM), Side-Street LOS F (AM and PM)
8. Metz Road / San Antonio Drive – Overall LOS E (AM) and LOS F (PM), Side-Street LOS F (AM and PM)
9. San Antonio Drive / Bitterwater Road – Overall LOS D (AM) and LOS F (PM), Side-Street LOS F (AM and PM)

Below is a discussion of recommended improvements at the study intersection operating under deficient operations under Cumulative conditions.

- **Intersection #2 – Broadway Circle – San Antonio Drive / Broadway Street:**

This intersection will operate at a deficient LOS D during the PM peak hour. The Transportation Agency for Monterey County (TAMC) conducted an Intersection Control Evaluation (ICE) at this intersection and identified two alternative mitigation measures.

The first is to modify the Broadway/San Antonio Drive intersection by adding a second westbound left turn lane on Broadway Street with a second lane in the southbound direction on the south leg of San Antonio Drive. The left turn lane could either be added as a fourth lane on the westbound approach or by converting the existing eastbound through movement to an optional left/through lane. The signal could also be modified to include the existing northbound US 101 Off-Ramp, which would be widened to two lanes. However, according to the TAMC study, this five-legged intersection would continue to operate at

LOS D at General Plan Buildout. If it remains as a four legged signal with the northbound US 101 Off-Ramp controlled by a stop sign, the intersection would operate at LOS C.

The second alternative is to construct a single lane roundabout, which would operate at LOS B. Refer to “Regional Roundabout Study – Utilizing Caltrans’ Intersection Control Evaluation, Section 3: King City,” Kittleson & Associates, 2015.

The implementation of either of the above alternatives would fully mitigate Cumulative impacts.

- **Intersection #3 – First Street / Southbound US 101 Ramps:**

Both overall and side-street operations at this intersection will operate at a deficient LOS F during the AM and PM peak hours. The Caltrans peak hour signal warrant will be met at this intersection (see **Appendix J**). Thus, it is recommended that the following improvement be implemented at this intersection:

1. Signalize intersection.

This improvement would reduce overall delay during the AM and PM peak hour to an acceptable LOS C. Therefore, this improvement would reduce the cumulative impact to less-than-significant.

- **Intersection #4 – First Street / Northbound US 101 Ramps:**

It is recommended that the following improvements be implemented at this intersection:

1. Add a southbound First Street exclusive right turn lane.
2. Add a northbound US 101 Off-Ramp free right turn lane into a second northbound First Street through lane departing from the intersection.

These improvements would reduce side-street delay during the PM peak hour to an acceptable LOS C for the side street movements, therefore more than offsetting the incremental increase in delay caused by Cumulative impacts. Therefore, this improvement would reduce the cumulative impact to less-than-significant.

- **Intersection #5 – First Street / Lonoak Road:**

Both overall and side-street operations at this intersection will operate at a deficient LOS F during the AM and PM peak hours. The Caltrans peak hour signal warrant will be met at this intersection (see **Appendix J**). Thus, it is recommended that the following improvements be implemented at this intersection:

1. Signalize intersection.
2. Add a northbound First Street exclusive right turn lane and a southbound First Street exclusive left turn lane.
3. Widen and restripe westbound Lonoak Road as one exclusive left turn lane and one shared left/through/right lane.
4. Add a second through lane to both northbound and southbound First Street.
5. Add a northbound First Street right turn overlap signal phase.

These improvements would reduce overall and side-street delay during the AM and PM peak hours to an acceptable LOS B. Therefore, this improvement would reduce the cumulative impact to less-than-significant.

- **Intersection #6 – First Street / Broadway Street:**

Broadway Street will be extended eastward from First Street, across the Union Pacific Railroad tracks as a part of the Downtown Addition project. This intersection will operate at a deficient LOS F during the AM and PM peak hours. The Caltrans peak hour signal warrant will be met at this intersection (see **Appendix J**). Thus, it is recommended that the following improvements be implemented at this intersection:

1. Signalize intersection (warranted under Background conditions).
2. Add southbound First Street exclusive left turn and right turn lanes and a northbound exclusive right turn lane.
3. Restripe and reconstruct both eastbound and westbound Broadway Street as one exclusive left lane and one shared through/right lane.

These improvements would reduce overall delay during the AM and PM peak hours to an acceptable LOS C. Therefore, this improvement would reduce the cumulative impact to less-than-significant.

- **Intersection #7 – Metz Road / Bitterwater Road:**

Both overall and side-street operations at this intersection will operate at a deficient overall LOS E (AM) and LOS F (PM) and side-street LOS F (AM and

PM). The Caltrans peak hour signal warrant will be met at this intersection (see **Appendix J**). Thus, it is recommended that the following improvements be implemented at this intersection:

1. Signalize intersection.
2. Add an eastbound Bitterwater exclusive left turn lane and westbound Bitterwater exclusive right turn lane.

These improvements would reduce overall delay during the AM and PM peak hours to an acceptable LOS C. Therefore, this improvement would reduce the cumulative impact to less-than-significant.

- **Intersection #8 – Metz Road/ San Antonio Drive:**

Overall and side-street operations at this intersection will operate at a deficient overall LOS E (AM) and LOS F (PM) and side-street LOS F (AM and PM).

The Caltrans peak hour signal warrant will be met at this intersection (see **Appendix J**). Thus, it is recommended that the following improvements be implemented at this intersection:

1. Signalize intersection.
2. Add an eastbound San Antonio exclusive right turn lane.

These improvements would reduce overall delay during the AM and PM peak hours to an acceptable LOS C. Therefore, this improvement would reduce the level of the project's impact to less-than-significant.

- **Intersection #9 – San Antonio Drive / Bitterwater Road:**

Overall and side-street operations at this intersection would operate at a deficient overall LOS E during the PM peak hour and side-street LOS F during the AM and PM peak hours. The addition of project trips would increase delay by more than 0.1 seconds during the PM peak hour. Per the significance criteria in Section 1.5 of this document, the project would represent a significant impact at this intersection.

The Caltrans peak hour signal warrant will be met at this intersection (see **Appendix J**). Thus, it is recommended that the following improvements be implemented at this intersection:

1. Signalize intersection.

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2. Add northbound Oak Avenue exclusive right turn lane and westbound Bitterwater exclusive left turn lane.
 3. Restripe southbound San Antonio as one shared left-through lane and one exclusive right turn lane.

These improvements would reduce overall delay to an acceptable LOS C under Cumulative Without Project conditions, therefore more than offsetting the incremental increase in delay caused by the project. Therefore, this improvement would reduce the cumulative impact to less-than-significant.

Pedestrian Circulation

There are no planned pedestrian network improvements in the vicinity of the project site.

Bicycle Circulation

The City of King is planning to add bicycle lanes on First Street from US 101 to Bitterwater Road and on Lonoak Road from First Street to the city limits. There are no additional planned bicycle network improvements in the vicinity of the project site.

CUMULATIVE PLUS PROJECT CONDITIONS

This section describes the analysis results under Cumulative Plus Project traffic conditions, which combines both Cumulative Without Project conditions with traffic from the study project.

Derivation of Cumulative Plus Project Condition Traffic Volumes

Cumulative Plus Project traffic volumes represent future project conditions plus the study project traffic.

The project trip assignment under Cumulative Plus Project conditions has been revised due to the inclusion of the First Street Bypass into the area street network. Approximately 80% of the project traffic on First Street north of US 101 has been reassigned onto the Bypass, including all of the bus traffic. **Exhibit 13** indicates the project trip assignment under Cumulative Plus Project conditions. Although the project trip distribution has been revised under Cumulative Plus Project conditions, the overall trip distribution for the study project remains the same as under Existing Plus Project and Background Plus Project conditions.

The revised study project trip assignment (**Exhibit 13**) was added to the Cumulative Without Project condition volumes (**Exhibit 12**) to estimate the Cumulative Plus Project volumes in **Exhibit 14**.

Cumulative Plus Project Traffic Conditions

Vehicle Circulation

Cumulative Plus Project conditions AM and PM intersection levels of service are summarized on **Exhibit 5a**. The LOS calculation sheets for Cumulative Without Project traffic conditions can be found in **Appendix I**.

The same eight study intersections would operate below their respective standards under Cumulative Plus Project conditions as under the Cumulative Without Project conditions. They are as follows:

2. Broadway Circle – San Antonio Drive / Broadway Street – LOS D (PM)
3. First Street / Southbound US 101 Ramps – Overall LOS F (AM and PM), Side-Street LOS F (AM and PM)
4. First Street / Northbound US 101 Ramps – Side-Street LOS F (PM)
5. First Street / Lonoak Road – Overall LOS F (AM and PM), Side-Street LOS F (AM and PM)
6. First Street / Broadway Street – LOS F (AM and PM)
7. Metz Road / Bitterwater Road – Overall LOS E (AM) and LOS D (PM), Side-Street LOS F (AM and PM)

8. Metz Road / San Antonio Drive – Overall LOS E (AM) and LOS F (PM), Side-Street LOS F (AM and PM)
9. San Antonio Drive / Bitterwater Road – Overall LOS D (AM) and LOS F (PM), Side-Street LOS F (AM and PM)

The project will not result in any additional decline in Level of Service. A comparison of the anticipated delay under Cumulative with and without the project indicate that generally the project will represent an imperceptible increase in delay at any study intersection.

The project's incremental increase in delay will generally be offset by the reduction in city-wide traffic that will occur by the increased transit service that will be able to be facilitated by the project. This was discussed in the Project Trip Generation subsection of the Existing Plus Project section of this report. The introduction of enhanced transit service in King City that will be able to occur due to the South County Operations and Maintenance Facility will reduce traffic on the arterial street system by about 0.5%. This is not accounted for in the traffic operations analysis. However, the 0.5% traffic reduction is credited toward the project's contribution to cumulative mitigations identified in this analysis.

Below is a discussion of the significance evaluations of project impacts at the study intersections operating under deficient operations under Cumulative Plus Project conditions. A description of the improvements at each study intersection is provided in the Cumulative Without Project section of this report. **Exhibit 5b** summarizes these improvements. **Exhibit 15** provides a tabular summary of the calculations used to determine the project's financial responsibility for Cumulative Plus Project impacts.

- Intersection #2 – Broadway Circle – San Antonio Drive / Broadway Street:
The project would be responsible for its fair-share contribution toward cumulative mitigations based upon the amount of traffic the project would add to this intersection - 0.19% of the total cost of these improvements. With a credit of 0.50% for reduced cumulative traffic due to increased transit service, the project would have no financial responsibility for Cumulative and Cumulative Plus Project mitigation.
- Intersection #3 – First Street / Southbound US 101 Ramps:
The project would be responsible for its fair-share contribution towards these improvements, based upon the amount of traffic the project would add to this intersection – 0.15% of the total cost of these improvements. With a credit of 0.50% for reduced cumulative traffic due to increased transit service, the project would have no financial responsibility for Cumulative and Cumulative Plus Project mitigation.

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- **Intersection #4 – First Street / Northbound US 101 Ramps:**
The project would be responsible for its fair-share contribution towards these improvements, based upon the amount of traffic the project would add to this intersection – 0.17% of the total cost of these improvements. With a credit of 0.50% for reduced traffic due to increased transit service, the project would have no financial responsibility for Cumulative and Cumulative Plus Project mitigation.
 - **Intersection #5 – First Street / Lonoak Road:**
The project would be responsible for its fair-share contribution towards these improvements, based upon the amount of traffic the project would add to this intersection – 0.19% of the total cost of these improvements. With a credit of 0.50% for reduced cumulative traffic due to increased transit service, the project would have no financial responsibility for Cumulative and Cumulative Plus Project mitigation.
 - **Intersection #6 – First Street / Broadway Street:**
Under Background Plus Project conditions, the project's fair-share contribution towards the signalization of the intersection was already addressed. Cumulative mitigations will be funded and implemented by the Downtown Addition. Therefore, the project would have no financial responsibility for Cumulative and Cumulative Plus Project mitigation.
 - **Intersection #7 – Metz Road / Bitterwater Road:**
The project will not add measurable traffic to this intersection during peak hours, so will have no financial responsibility for Cumulative and Cumulative Plus Project mitigation.
 - **Intersection #8 – Metz Road/ San Antonio Drive:**
The project would be responsible for its fair-share contribution towards these improvements, based upon the amount of traffic the project would add to this intersection – 0.42% of the total cost of the improvements. With a credit of 0.50% for reduced traffic cumulative due to increased transit service, the project would have no financial responsibility for Cumulative and Cumulative Plus Project mitigation.
 - **Intersection #9 – San Antonio Drive / Bitterwater Road:**
The project would be responsible for its fair-share contribution towards these improvements, based upon the amount of traffic the project would add to this intersection – 0.20% of the total cost of the improvements. With a credit of 0.50% for reduced cumulative traffic due to increased transit service, the project would have no financial responsibility for Cumulative and Cumulative Plus Project mitigation.

Pedestrian Circulation

Although the pedestrian circulation network (including sidewalks) is likely to expand throughout the city as vacant parcels develop, the project site's distance away from residential neighborhoods and commercial areas in the city would continue to

discourage increases in pedestrian travel to and from the project site. Therefore, the project would not represent a significant cumulative impact to pedestrian circulation.

Bicycle Circulation

Although the planned bicycle improvements along First Street would improve bicycle access into the downtown area, it is not anticipated that this improvement alone would increase bicycle travel to and from the project site. Thus, the project would not represent a significant cumulative impact to bicycle circulation.

Transit Circulation

As the East Ranch Business Park builds out, there is the potential for MST to establish transit service to the immediate project vicinity. However, it is speculative at this time to identify the potential increase in transit usage that such service would create, not to mention the proximity of potential future bus stops to the project site. Thus, the project would not represent a significant cumulative impact to transit circulation. In fact, the project will be a mitigation for overall traffic impacts by providing extensive transit resources to the King City and South Salinas Valley area.

Railroad Circulation

The City of King is exploring the possibility of re-establishing an Amtrak station in the city, possibly on First Street south of Broadway Street. However, given the distance between the potential station and the project site and the current Amtrak schedule, few, if any, people would use such a station to access the project site. In addition, the combination of the existing railroad crossing gates and future signalization of the intersections near the current and future railroad at-grade crossings would adequately control traffic near said crossings and minimize the potential for vehicles to be queued up on the tracks at the time of a passing train. Therefore, the project would not represent a significant cumulative impact to railroad circulation.

SITE ACCESS AND INTERNAL CIRCULATION

The project site plan is currently in development. The site plan included in this report is schematic and only intended to illustrate the project size and site plan elements. Driveway locations, numbers and locations of parking spaces and locations of pedestrian facilities are currently being determined. A site plan review will be conducted when a finalized site plan is available.

CONSTRUCTION IMPACTS

The project site is essentially level. It is expected that earthwork will be minimal and that cut and fill will be balanced, resulting in no net import or export of earth. The earthwork operation will take only several weeks and will not involve a hauling operation. In addition, the site is large enough to provide on-site stockpiling of earthwork materials. Therefore, earthwork operations will have an insignificant traffic impact.

Construction will also require delivery of miscellaneous concrete, steel, lumber, asphalt concrete, portland cement concrete and landscaping materials after completion of the site grading and earthwork operation and during construction of paved areas, underground utilities, building and landscaping. It is assumed that construction will take about 12 months, or 240 work days. The project is the equivalent square footage of about six 2,300 square foot houses. The site is large enough to provide a construction materials staging and stockpile area to store materials efficiently on the site and minimize deliveries. In addition to an extensive amount of street frontage, on-site construction parking greater than typical for construction projects of this type will be able to be provided, minimizing shuttling of construction workers to and from the site. The project will generate construction traffic volumes similar to several single-family homes, which is not significant.

All streets and intersections currently operate well within acceptable congestion levels. San Antonio Drive currently carries about 60 vehicles per hour during the morning and evening peak hours. This is one vehicle per minute, which is a very low volume. No traffic conflicts will occur for construction traffic entering or leaving the site. The project is located in an industrial area with no land uses such as schools that are sensitive to construction traffic. The project will have minimal construction impacts. Project construction impacts are therefore determined to be insignificant. No mitigation is recommended.

SUMMARY OF PROJECT RESPONSIBILITIES

The project will not create any significant impacts. The project therefore has no responsibility to implement or contribute to off-site mitigations for project or cumulative impacts.

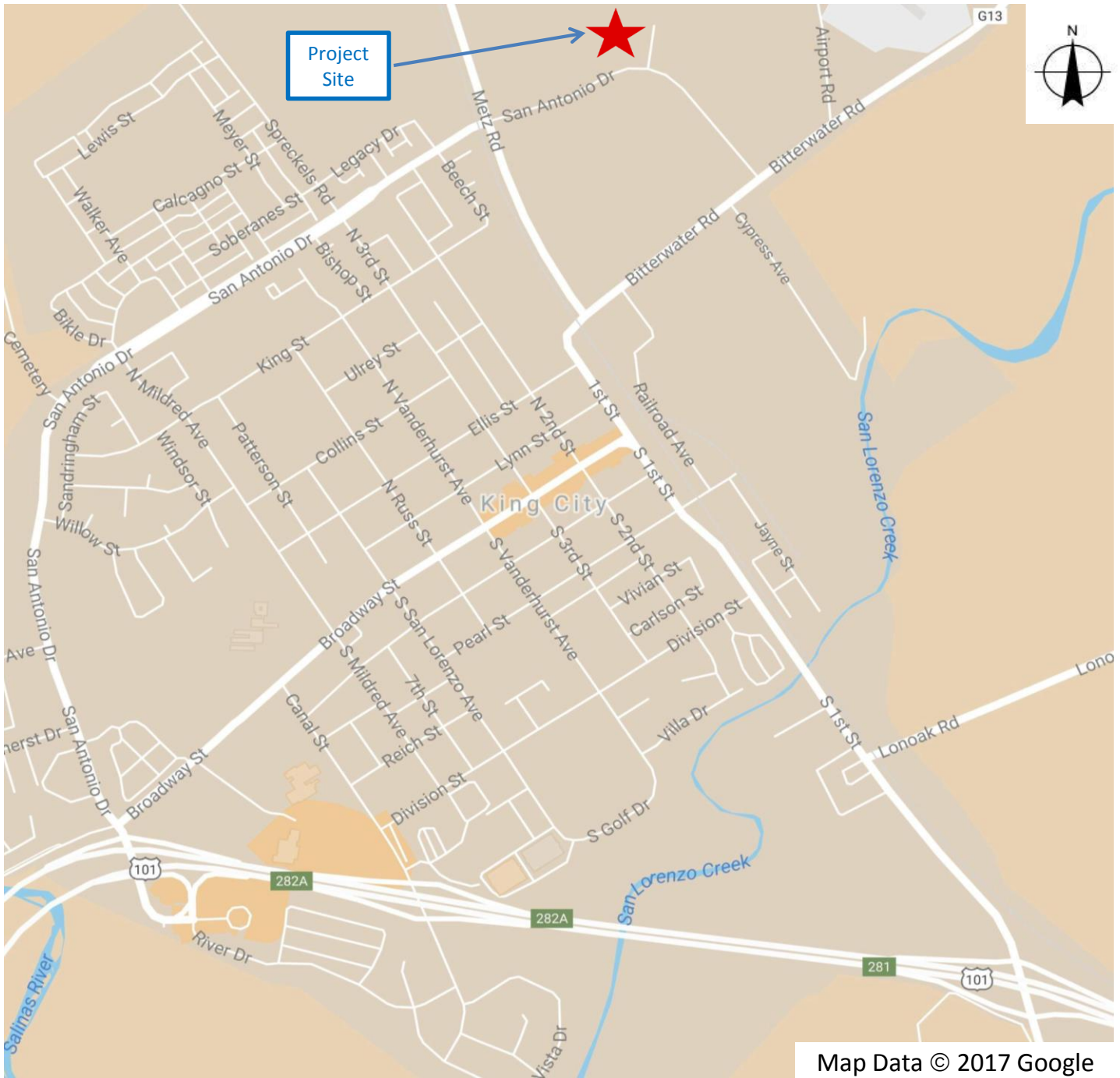
10. REFERENCES

List of References

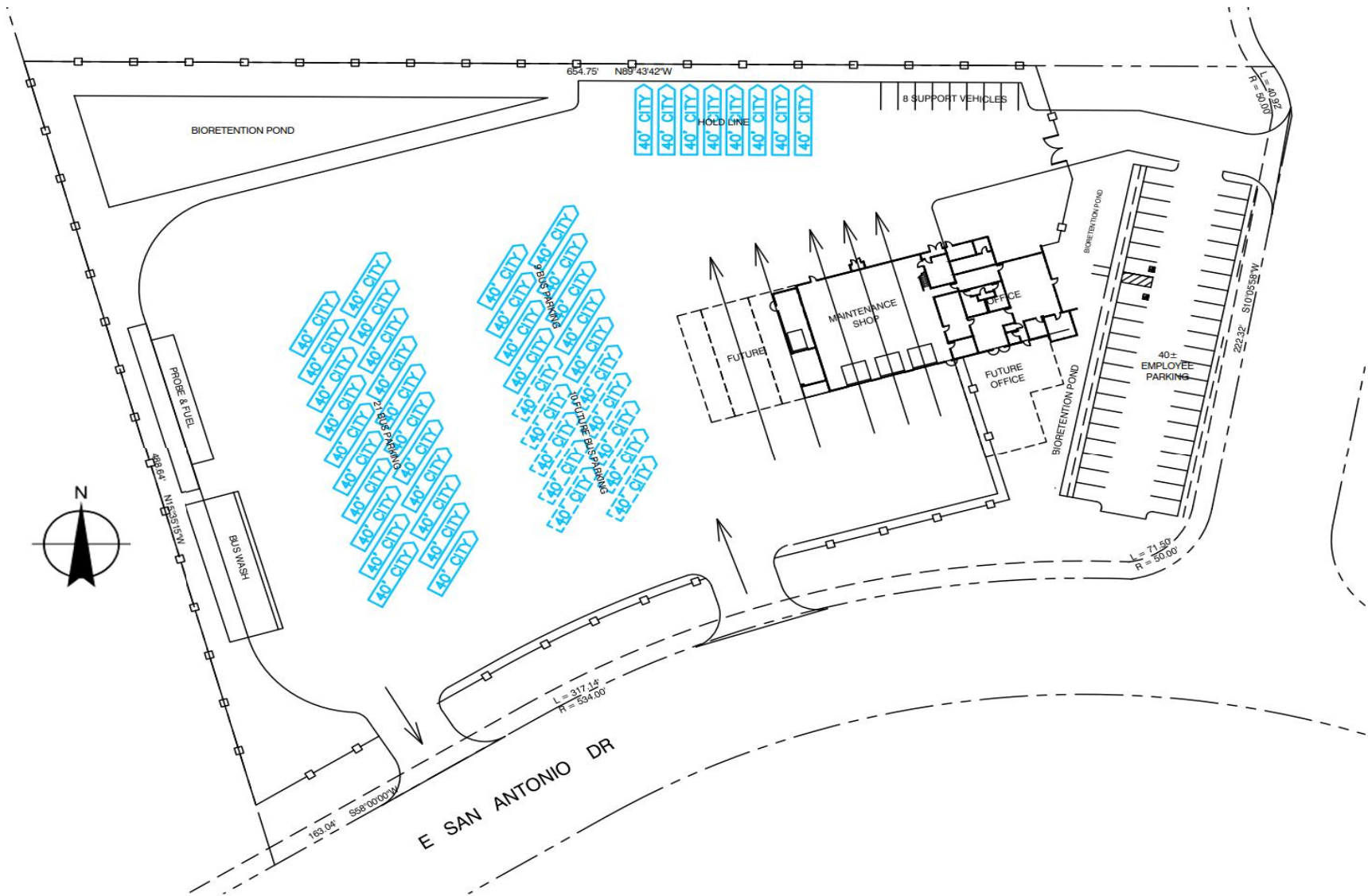
1. *2000 Highway Capacity Manual*, Transportation Research Board, 2000.
2. *2010 Highway Capacity Manual*, Transportation Research Board, 2010.
3. Monterey-Salinas Transit web site, <http://www.mst.org>. Accessed May 10, 2017.
4. *Regional Fee Implementation Guidelines*, Transportation Agency for Monterey County, Updated October 28, 2009.
5. *Trip Generation Manual*, 9th Edition, Institute of Transportation Engineers, 2012.
6. *First Street Bypass Traffic Impact Analysis*, Higgins Associates, June 12, 2009.

List of Contacts

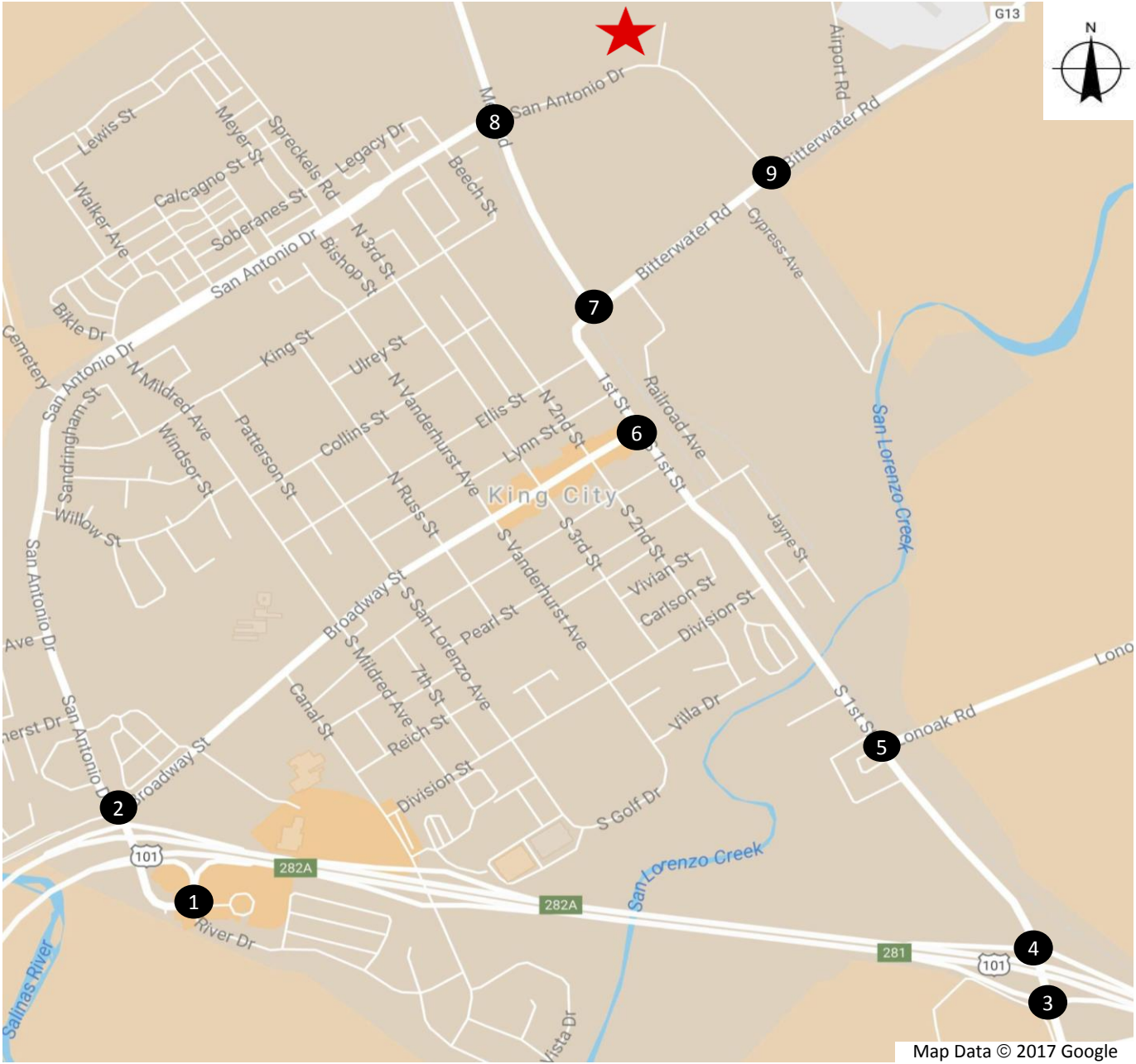
1. Erin Harwayne, Denise Duffy and Associates, Monterey, California.
2. Maricruz Aguilar, City of King Community Development Department, King City, California.
3. Mike Zeller, Transportation Agency for Monterey County, Salinas, California.
4. Lisa Rheinheimer, Monterey-Salinas Transit Director of Planning & Marketing
5. Hunter Harvath, Monterey-Salinas Transit Assistant General Manager



Map Data © 2017 Google



Source: Paul Davis Partnership, 2017.



 Stop Sign

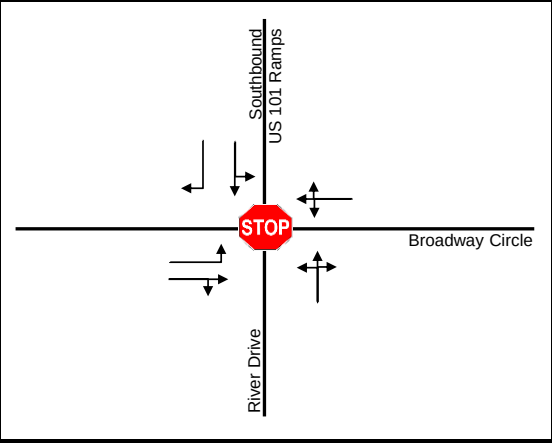
 Traffic Signal

 Project Location

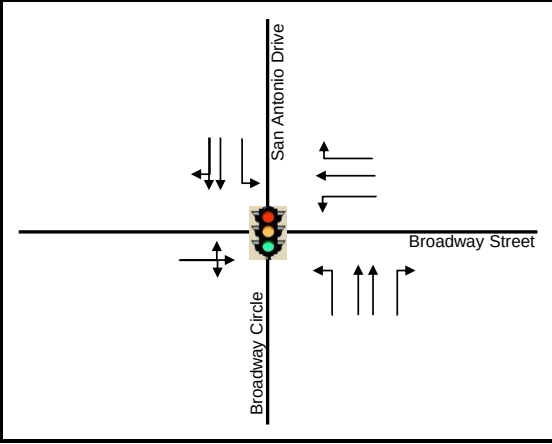
 Study Intersection #

 Lane Configuration

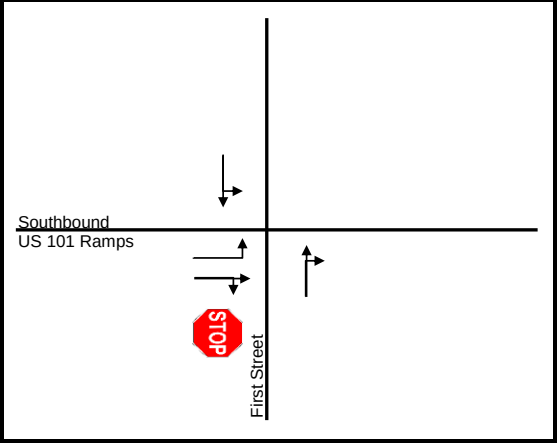
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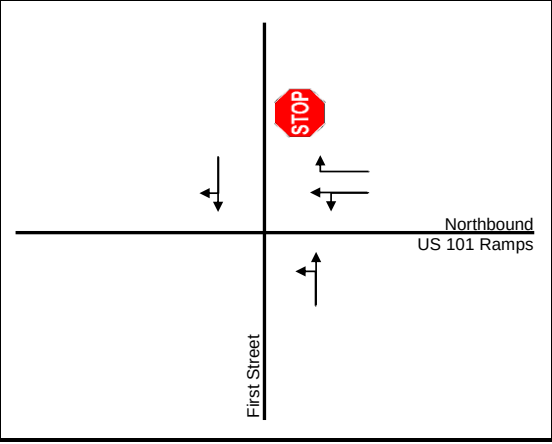
2. Broadway Circle - San Antonio Drive / Broadway Street



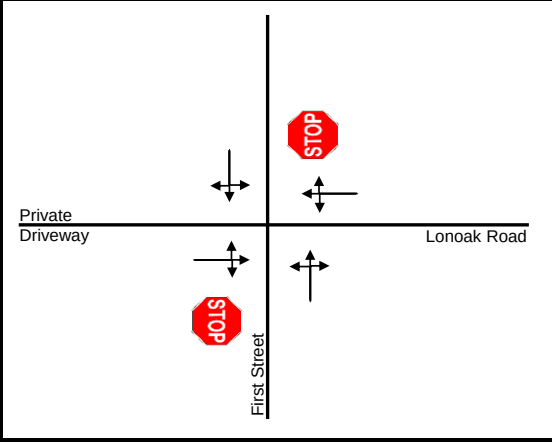
3. First Street / Southbound US 101 Ramps



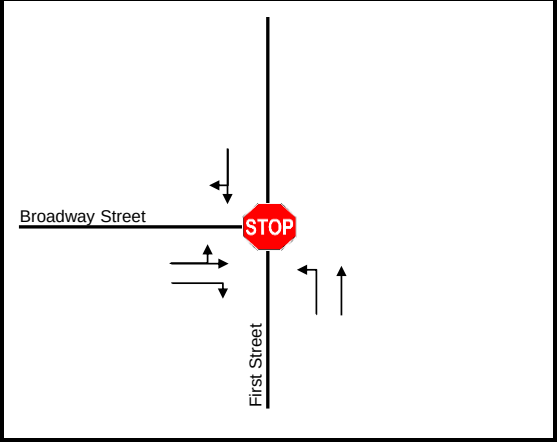
4. First Street / Northbound US 101 Ramps



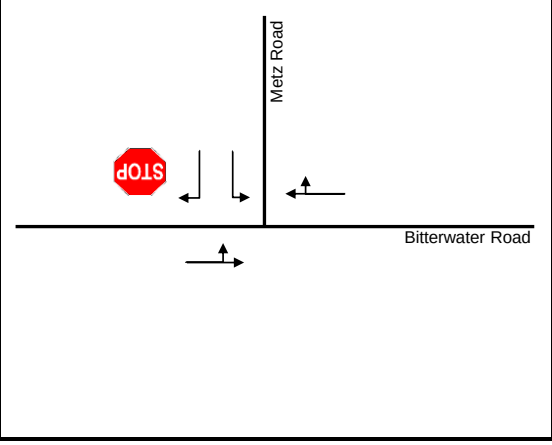
5. First Street / Lonoak Road



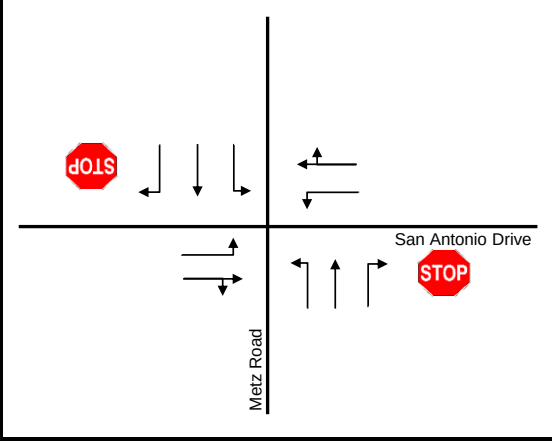
6. First Street / Broadway Street



7. Metz Road / Bitterwater Road



8. Metz Road / San Antonio Drive



9. San Antonio Drive / Bitterwater Road

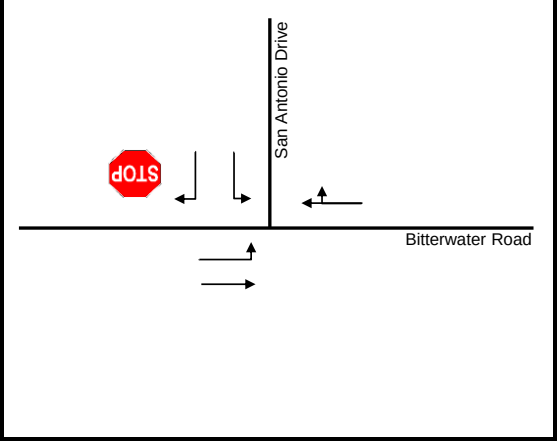
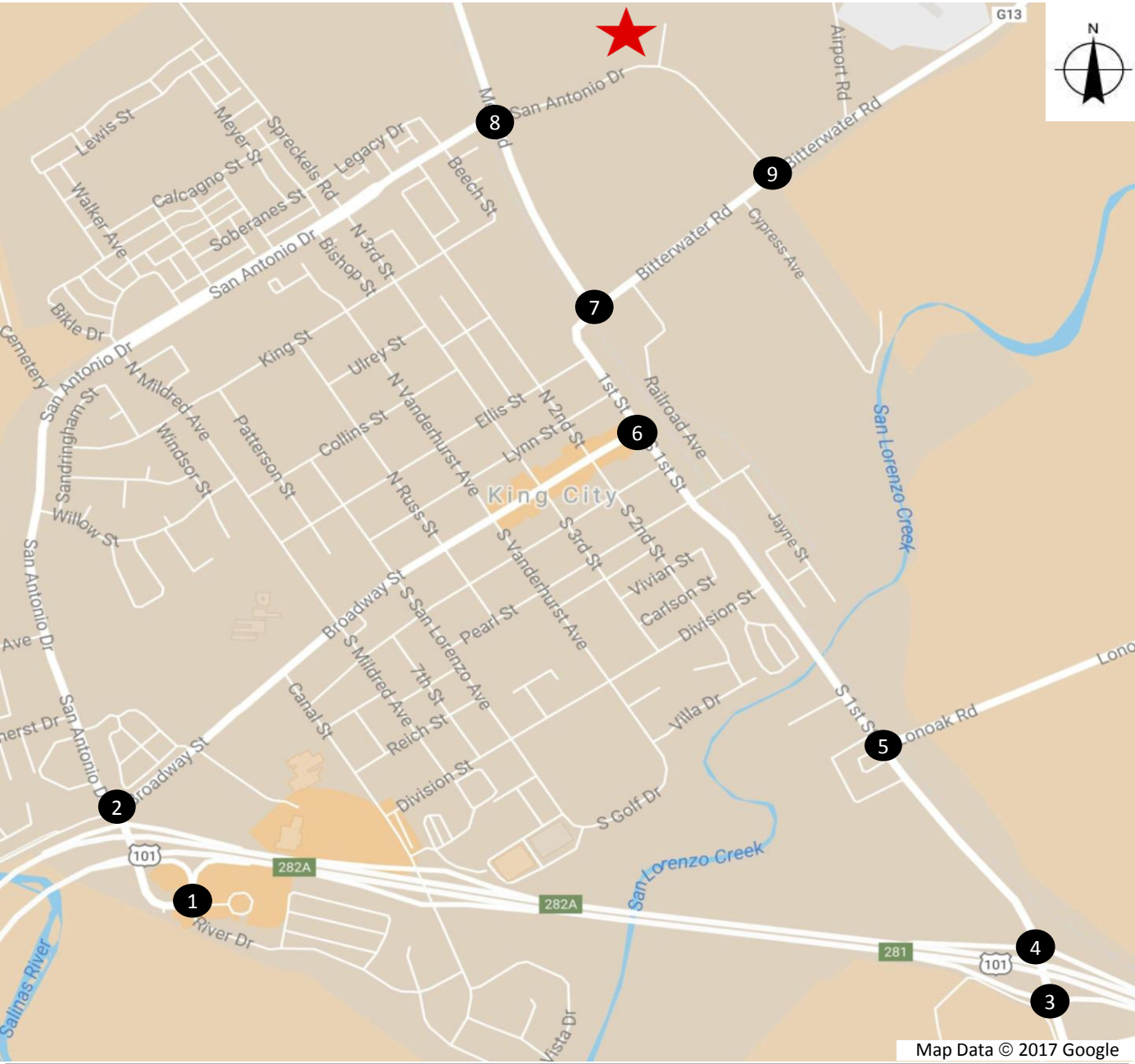


Exhibit 3
Existing Intersection Traffic Controls
and Lane Configurations



LEGEND

XX (YY) = AM (PM)

Stop Sign

Study Intersection #

Traffic Signal

Traffic Movement

Project Location

1. River Drive - Southbound US 101 Ramps / Broadway Circle

2. Broadway Circle - San Antonio Drive / Broadway Street

3. First Street / Southbound US 101 Ramps

4. First Street / Northbound US 101 Ramps

5. First Street / Lonoak Road

6. First Street / Broadway Street

7. Metz Road / Bitterwater Road

8. Metz Road / San Antonio Drive

9. San Antonio Drive / Bitterwater Road

Exhibit 4
Existing Conditions
AM & PM Peak Hour Volumes

Volume Exhibits1 - revised project description no Background.xlsx - Existing

N-S Street		E-W Street	Existing Intersection Control	LOS Std.	Peak Hour	Existing Conditions		Existing Plus Project Conditions		Background Conditions		Background Plus Project Conditions		Cumulative Without Project Conditions		Cumulative Plus Project Conditions	
						Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
1	River Drive - Southbound US 101 Ramps	Broadway Circle	All-Way Stop	C/D	Wky AM	8.1	A	8.1	A	8.5	A	8.5	A	16.9	C	17.0	C
					Wky PM	8.0	A	8.0	A	8.4	A	8.4	A	9.4	A	9.4	A
2	Broadway Circle - San Antonio Drive	Broadway Street	Signal	C	Wky AM	18.6	B	18.6	B	18.1	B	18.1	B	29.9	C	29.9	C
					Wky PM	21.7	C	21.7	C	21.4	C	21.4	C	41.5	D	41.5	D
			With Improvement	Wky AM									25.0	C	25.0	C	
				Wky PM									25.0	C	25.0	C	
3	First Street	Southbound US 101 Ramps	One-Way Stop	C/D (E)	Wky AM	9.7 (13.8)	A (B)	9.7 (13.8)	B (B)	15.1 (21.6)	B (C)	15.2 (21.8)	B (C)	247.1 (421.3)	F (F)	250.0 (426.8)	F (F)
					Wky PM	6.8 (11.8)	A (B)	6.8 (11.7)	A (B)	8.9 (15.3)	A (C)	8.9 (15.4)	A (C)	926.8 (1970.5)	F (F)	936.8 (1993.5)	F (F)
			With Improvement	Wky AM									20.9	B	20.9	B	
				Wky PM									33.9	C	33.2	C	
4	First Street	Northbound US 101 Ramps	One-Way Stop	C/D (E)	Wky AM	2.3 (11.2)	A (B)	2.3 (11.3)	A (B)	2.8 (12.9)	A (B)	2.8 (12.9)	A (B)	10.3 (38.3)	B (E)	10.4 (39.1)	B (E)
					Wky PM	3.4 (10.8)	A (B)	3.3 (10.9)	A (B)	3.3 (11.7)	A (B)	3.3 (11.7)	A (B)	14.1 (70.5)	B (F)	14.3 (71.2)	B (F)
			With Improvement	Wky AM									0.9 (20.2)	A (C)	0.9 (20.2)	A (C)	
				Wky PM									0.9 (30.1)	A (D)	0.9 (30.1)	A (D)	
5	First Street	Lonoak Road	Two-Way Stop	C (E/E)	Wky AM	2.3 (0.0/17.3)	A (A/C)	2.3 (0.0/17.4)	A (A/C)	2.2 (0.0/24.0)	A (A/C)	2.3 (0.0/24.1)	A (A/C)	110.6 (28.5/637.7)	F (D/F)	111.6 (28.5/641.8)	F (D/F)
					Wky PM	3.0 (9.9/15.9)	A (A/C)	3.0 (10.0/16.0)	A (B/C)	3.0 (11.1/20.9)	A (B/C)	3.0 (11.1/20.9)	A (B/C)	867.6 (60.8/3213.4)	F (F/F)	870.0 (60.8/3219.7)	F (F/F)
			With Improvement	Wky AM									11.5	B	11.5	B	
				Wky PM									16.3	B	16.3	B	
6	First Street	Broadway Street	All-Way Stop	C	Wky AM	12.5	B	12.5	B	22.2	C	22.4	C	108.3	F	108.3	F
					Wky PM	13.5	B	13.6	B	28.4	D	28.7	D	333.1	F	333.1	F
			With Improvement	Wky AM				8.2	A	8.2	A	23.5	C	23.5	C		
				Wky PM				10.2	B	10.2	B	31.1	C	31.1	C		
7	Metz Road	Bitterwater Road	One-Way Stop	C (E)	Wky AM	5.0 (9.7)	A (A)	5.0 (9.7)	A (A)	5.9 (10.3)	A (B)	5.9 (10.3)	A (A)	46.6 (136.6)	E (F)	46.6 (136.6)	E (F)
					Wky PM	5.4 (11.9)	A (B)	5.4 (11.9)	A (B)	7.9 (15.5)	A (C)	7.7 (15.2)	A (C)	32.4 (146.3)	D (F)	32.4 (146.3)	D (F)
			With Improvement	Wky AM									12.1	B	12.1	B	
				Wky PM									25.2	C	25.2	C	
8	Metz Road	San Antonio Drive	Two-Way Stop	C (E/E)	Wky AM	6.9 (11.5/10.9)	A (B/B)	6.9 (12.7/11.7)	A (B/B)	14.0 (28.9/18.0)	B (D/C)	14.2 (29.7/18.5)	B (D/C)	42.3 (133.5/74.5)	E (F/F)	45.9 (144.3/84.7)	E (F/F)
					Wky PM	7.1 (11.0/10.3)	A (B/B)	7.1 (11.1/10.3)	A (B/B)	10.6 (20.9/12.7)	B (C/B)	11.5 (24.1/12.8)	B (C/B)	343.9 (1308.3/30.6)	F (F/D)	424.7 (1624.3/32.1)	F (F/D)
			With Improvement	Wky AM									18.9	B	19.2	B	
				Wky PM									24.1	C	24.3	C	
9	San Antonio Drive	Bitterwater Road	One-Way Stop	C (E)	Wky AM	2.8 (9.1)	A (A)	2.8 (9.1)	A (A)	3.3 (9.6)	A (A)	3.3 (9.6)	A (B)	31.7 (84.0/75.8)	D (F/F)	32.5 (85.6/78.4)	E (F/F)
					Wky PM	2.0 (10.1)	A (B)	2.0 (10.1)	A (B)	2.2 (10.5)	A (B)	2.2 (10.5)	A (B)	63.1 (*494.3)	F (F/F)	1.7 (* / *)	A (F/F)
			With Improvement	Wky AM									15.5	B	15.5	B	
				Wky PM									26.6	C	27.0	C	

Notes:

- LOS Std. = Level of Service Standard.
- XX (YY) = Overall (Side Street).
- Analysis performed using 2000 and 2010 Highway Capacity Manual methodologies.
- Overall level of service standard for the City of King is LOS C. Overall level of service standard for Caltrans is the transition between LOS C and LOS D (LOS C/D).
- * = Delay exceeds ability for 2000/2010 HCM to quantify.
- Worst approach level of service standard is generally LOS E. Level of service "F" is the level of service at which improvements would normally be required.
- Above delays and levels of service are summarized from calculations in **Appendices C and E through I**.
- Items in **bold** represent significant impacts.

	N-S Street	E-W Street	Existing Intersection Control	Existing Conditions	Existing Plus Project Conditions	Background Without Project Conditions	Background Plus Project Conditions	Cumulative Without Project Conditions	Cumulative Plus Project Conditions
1	River Drive - Southbound US 101 Ramps	Broadway Circle	All-Way Stop	None Required	None Required	None Required	None Required	None Required	None Required
2	Broadway Circle - San Antonio Drive	Broadway Street	Signal	None Required	None Required	None Required	None Required	1. Add 2nd WB L (or convert T lane to L/T) or 2. Convert to Roundabout	1. Add 2nd WB L (or convert T lane to L/T) or 2. Convert to Roundabout
3	First Street	Southbound US 101 Ramps	One-Way Stop	None Required	None Required	None Required	None Required	a. Signalize Intersection b. Widen & Restripe EB as 1-L, 1-R c. Widen and Restripe NB as 1-T, 1-R	a. Signalize Intersection b. Widen & Restripe EB as 1-L, 1-R c. Widen and Restripe NB as 1-T, 1-R
4	First Street	Northbound US 101 Ramps	One-Way Stop	None Required	None Required	None Required	None Required	a. Add SB R b. Widen and Restripe WB as 1-T, 1-R c. Widen north leg of First St. to 2 lanes in each direction	a. Add SB R b. Widen and Restripe WB as 1-T, 1-R c. Widen north leg of First St. to 2 lanes in each direction
5	First Street	Lonoak Road	Two-Way Stop	None Required	None Required	None Required	None Required	a. Signalize Intersection b. Add NB R, SB L c. Widen and Restripe WB as 1-L, 1-L/T/R d. Add 2nd NB T, 2nd SB T e. Add NB RTO	a. Signalize Intersection b. Add NB R, SB L c. Widen and Restripe WB as 1-L, 1-L/T/R d. Add 2nd NB T, 2nd SB T e. Add NB RTO
6	First Street	Broadway Street	All-Way Stop	None Required	None Required	Signalize Intersection	Signalize Intersection	a. Signalize Intersection b. Add SB L, SB R, NB R c. Restripe and Reconstruct EB & WB Broadway as 1-L, 1-T/R	a. Signalize Intersection b. Add SB L, SB R, NB R c. Restripe and Reconstruct EB & WB Broadway as 1-L, 1-T/R
7	Metz Road	Bitterwater Road	One-Way Stop	None Required	None Required	None Required	None Required	a. Signalize Intersection b. Add EB L, WB R	a. Signalize Intersection b. Add EB L, WB R
8	Metz Road	San Antonio Drive	Two-Way Stop	None Required	None Required	None Required	None Required	a. Signalize Intersection b. Add EB R	a. Signalize Intersection b. Add EB R
9	San Antonio Drive	Bitterwater Road	One-Way Stop	None Required	None Required	None Required	None Required	a. Signalize Intersection b. Add NB R, WB L c. Restripe SB as 1-L/T, 1-R	a. Signalize Intersection b. Add NB R, WB L c. Restripe SB as 1-L/T, 1-R

Note:

1. L, T, R, EB, WB, NB, SB, RTO = Left, Through, Right, Eastbound, Westbound, Southbound, Northbound, Right Turn Overlap signal phase.

Daily Trips	<u>AM Peak Hour</u>			<u>PM Peak Hour</u>		
	Total	In	Out	Total	In	Out
263	2	1	1	2	1	1

Note:

1. See **Appendix D** for detailed trip generation derivation and list of data and assumptions.

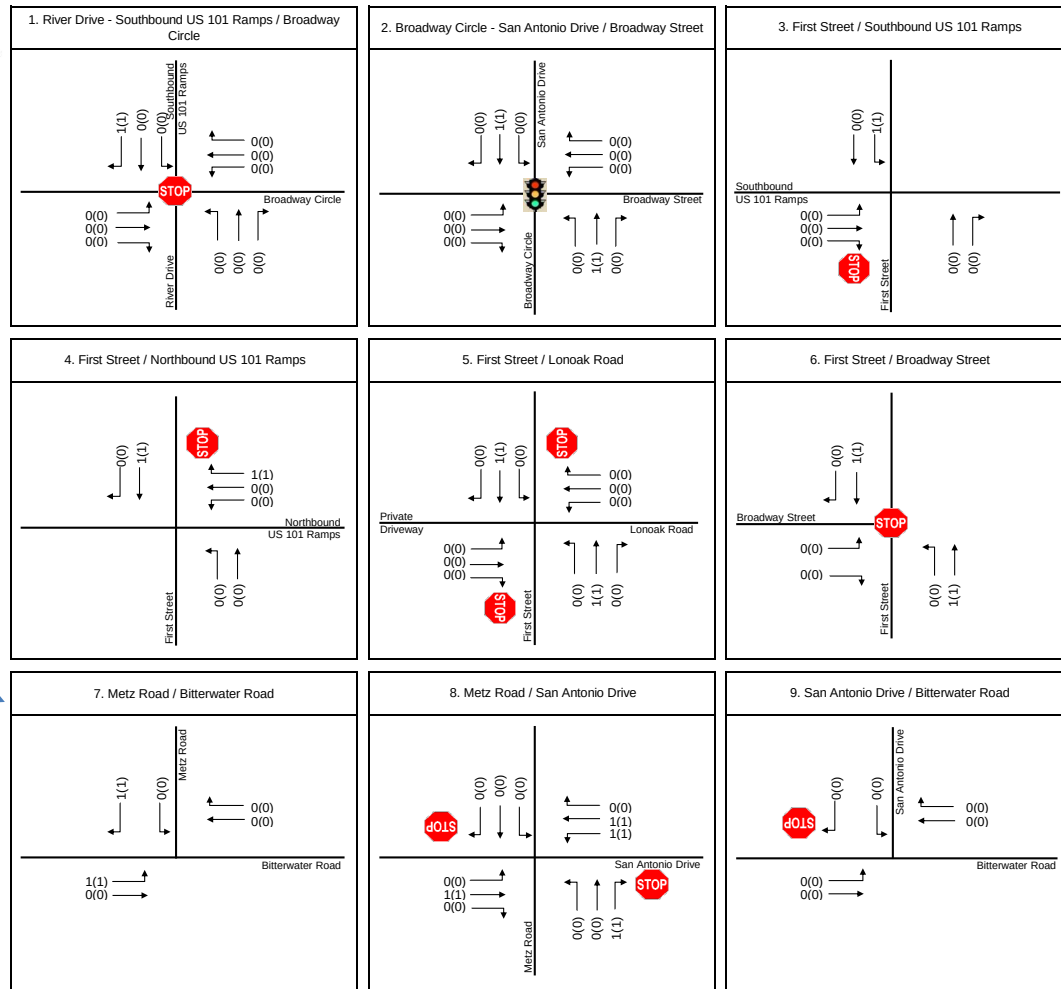
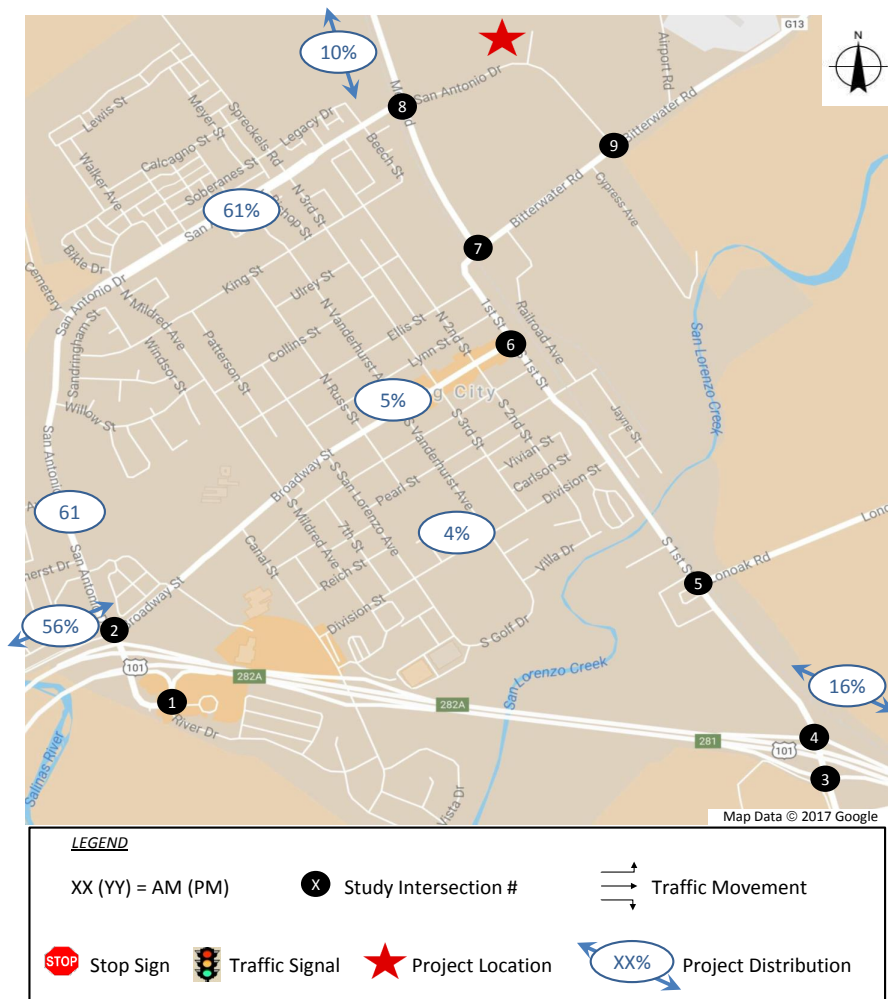
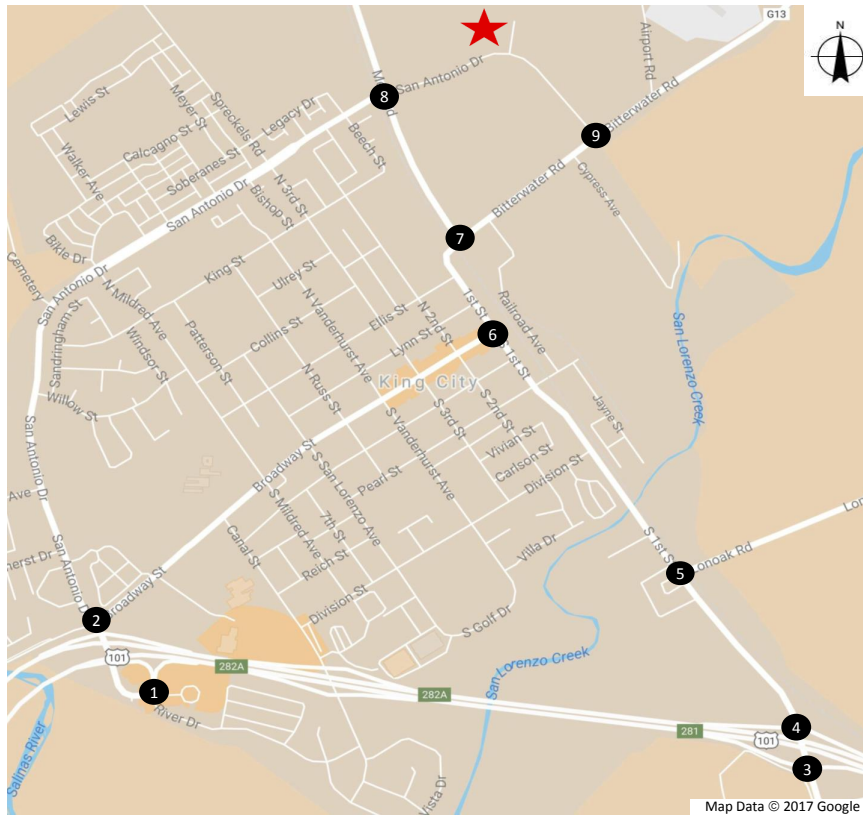


Exhibit 7

Project Trip Distribution and Assignment

AM & PM Peak Hour Volumes



LEGEND		
XX (YY) = AM (PM)	Study Intersection #	Traffic Movement
Stop Sign	Traffic Signal	Project Location

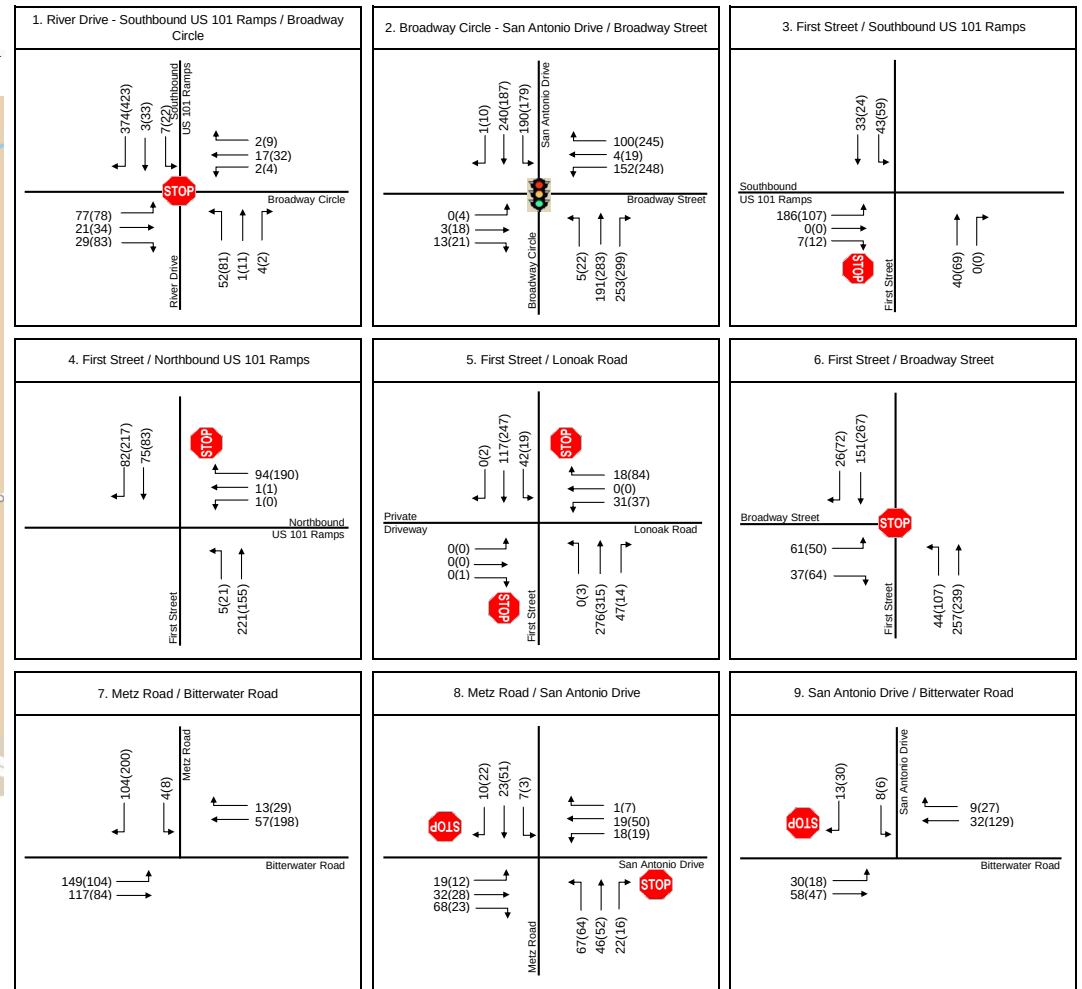


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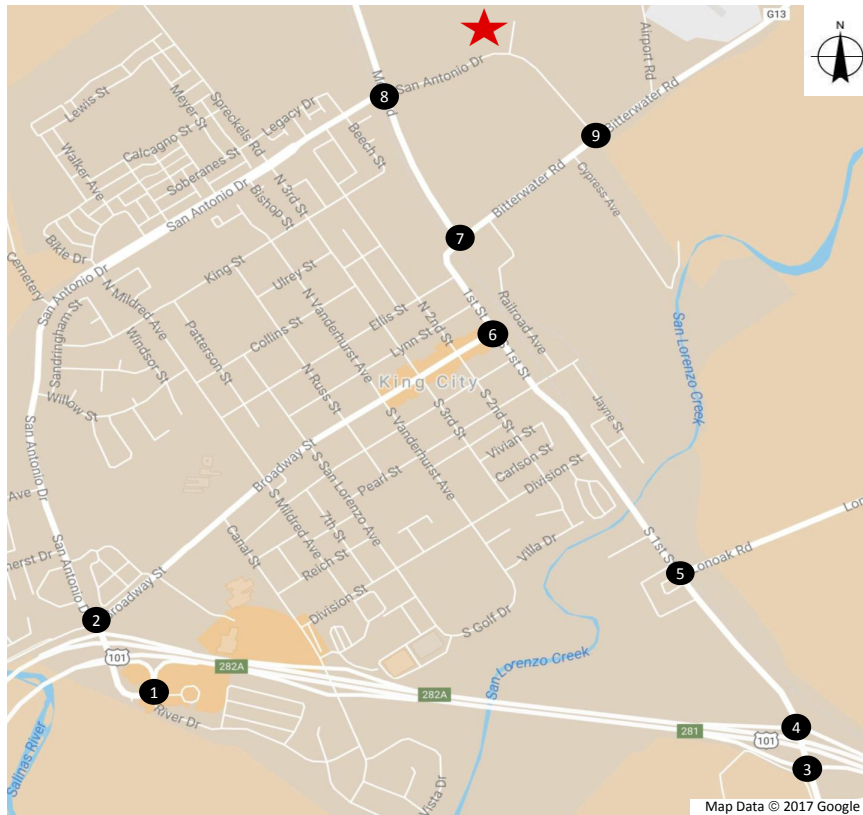
Existing Plus Project Conditions

AM & PM Peak Hour Volumes

Project	Size	Daily Trips	AM Peak Hour			PM Peak Hour		
			Total	In	Out	Total	In	Out
1. 512 Metz Rd Warehouse	48,875 sq. ft.	174	15	12	3	16	4	12
2. 325 Airport Dr Warehouse	8,000 sq. ft.	28	2	2	0	3	1	2
3. O'Reilly Auto Parts ²	7,453 sq. ft.	461	16	8	8	45	22	23
4. N. First St Farmworker Housing ³	214 Employees	44	2	1	1	8	4	4
5. Always Towing & Recovery ⁴	2,400 sq. ft.	48	4	3	1	5	2	3
6. Boutique Unlimited Cannabis Cultivation ⁵	35,964 sq. ft.	251	33	29	4	35	4	31
7. 190 San Antonio Cannabis Manufacturing ⁶	27,840 sq. ft.	106	20	16	4	20	7	13
8. San Antonio / Metz Nursery and Cultivation ⁵	271,000 sq. ft.	1,889	249	219	30	263	32	231
9. Kasey's Fitness Health Club	4,961 sq. ft.	163	7	4	3	18	10	8
10. Nino Homes (formerly Arboleda/Mills Ranch)								
Single Family Homes (remainder) ^{7,8}	348 Units	3,313	261	65	196	348	219	129
Apartments ⁷	40 Units	266	20	4	16	25	16	9
Day Care Center ⁷	4,250 sq. ft.	315	52	28	24	52	24	28
Total Approved Projects:		7,058	681	391	290	838	345	493

Notes:

1. Trip generation based on rates from *Trip Generation Manual*, 9th Edition, Institute of Transportation Engineers (ITE), 2012, unless otherwise noted.
2. ITE does not provide in/out directional distribution for weekday AM peak hour; trip generation estimate assumes 50% in, 50% out.
3. ITE does not provide rates for farmworker housing. Trips rates from *Casa Boronda Agricultural Employee Housing Project Traffic Impact Analysis* (Mott MacDonald, May 25, 2017) were used.
4. ITE does not provide rates for towing services. Trip rates for Auto Repair Center were used from *Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region*, San Diego Association of Governments, April 2002.
5. ITE does not provide rates for cannabis cultivation. ITE rates for General Light Industrial were used.
6. ITE does not provide rates for cannabis manufacturing. ITE rates for Manufacturing were used.
7. Buildout definition of Arboleda project from *Mills Ranch Specific Plan Traffic Analysis Report*, Higgins Associates, November 1, 2014.
8. "Remainder" refers to remaining homes unbuilt out of total originally proposed.



LEGEND		
XX (YY) = AM (PM)	Study Intersection #	Traffic Movement
Stop Sign	Traffic Signal	Project Location

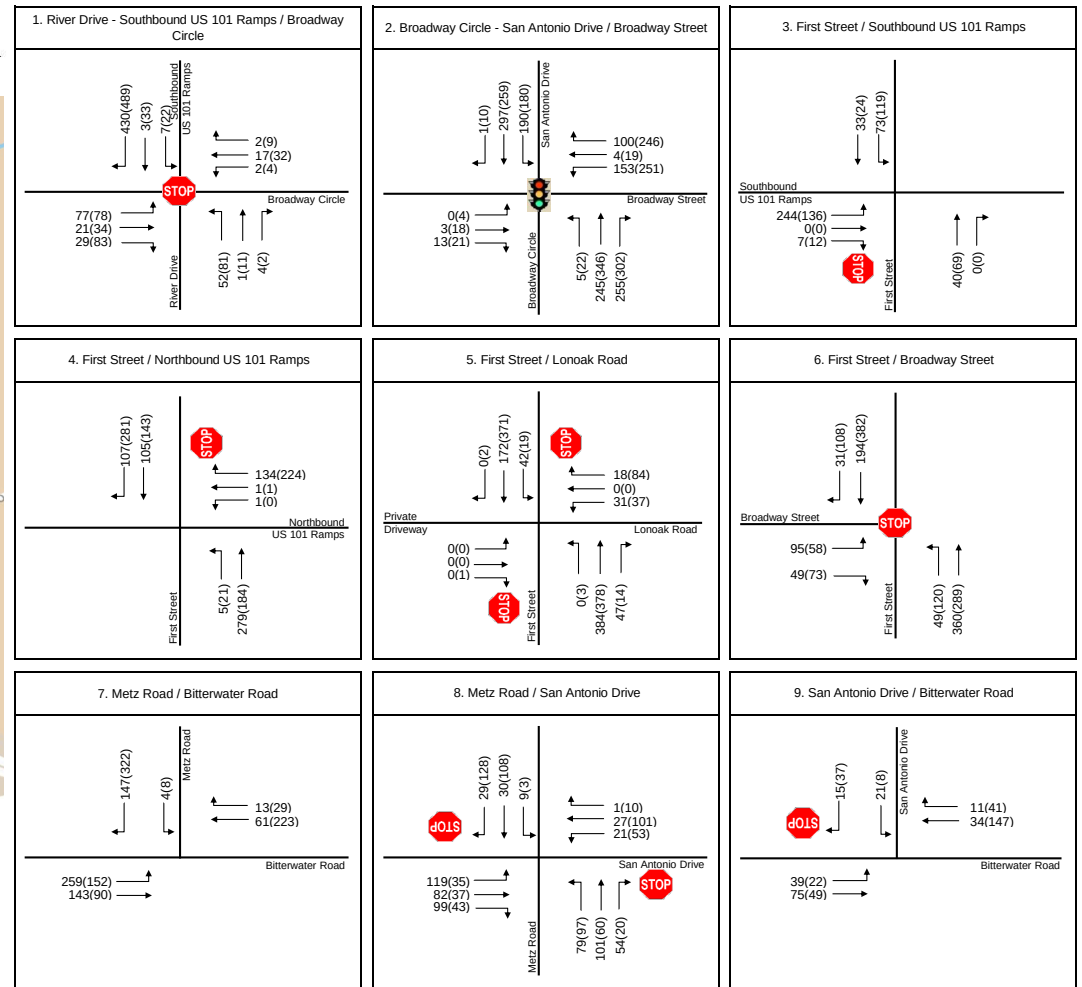
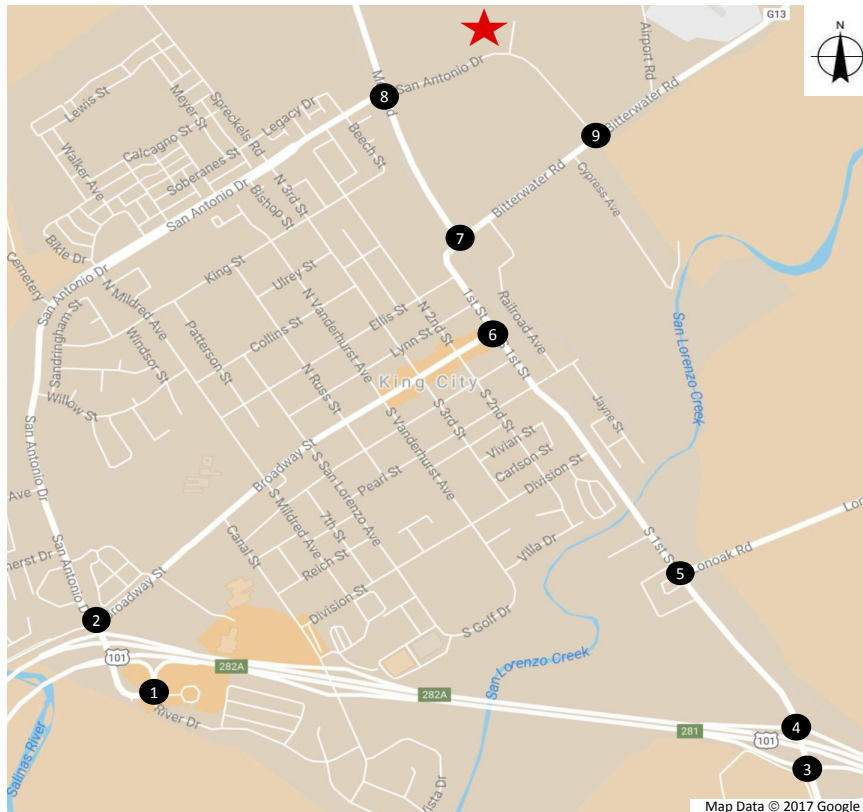


Exhibit 10

Background Conditions

AM & PM Peak Hour Volumes



LEGEND		
XX (YY) = AM (PM)	X Study Intersection #	Traffic Movement
Stop Sign	Traffic Signal	Project Location

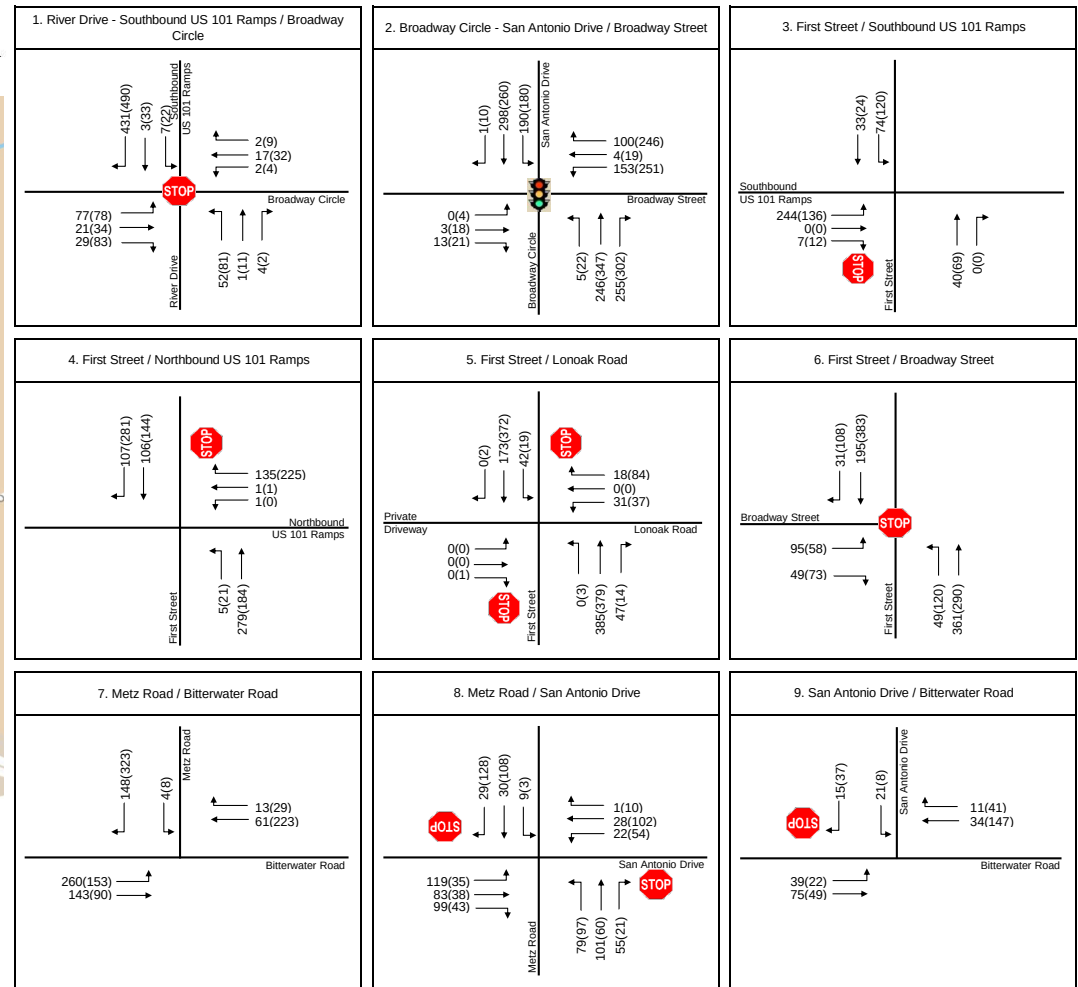


Exhibit 11

Background Plus Project Conditions

AM & PM Peak Hour Volumes

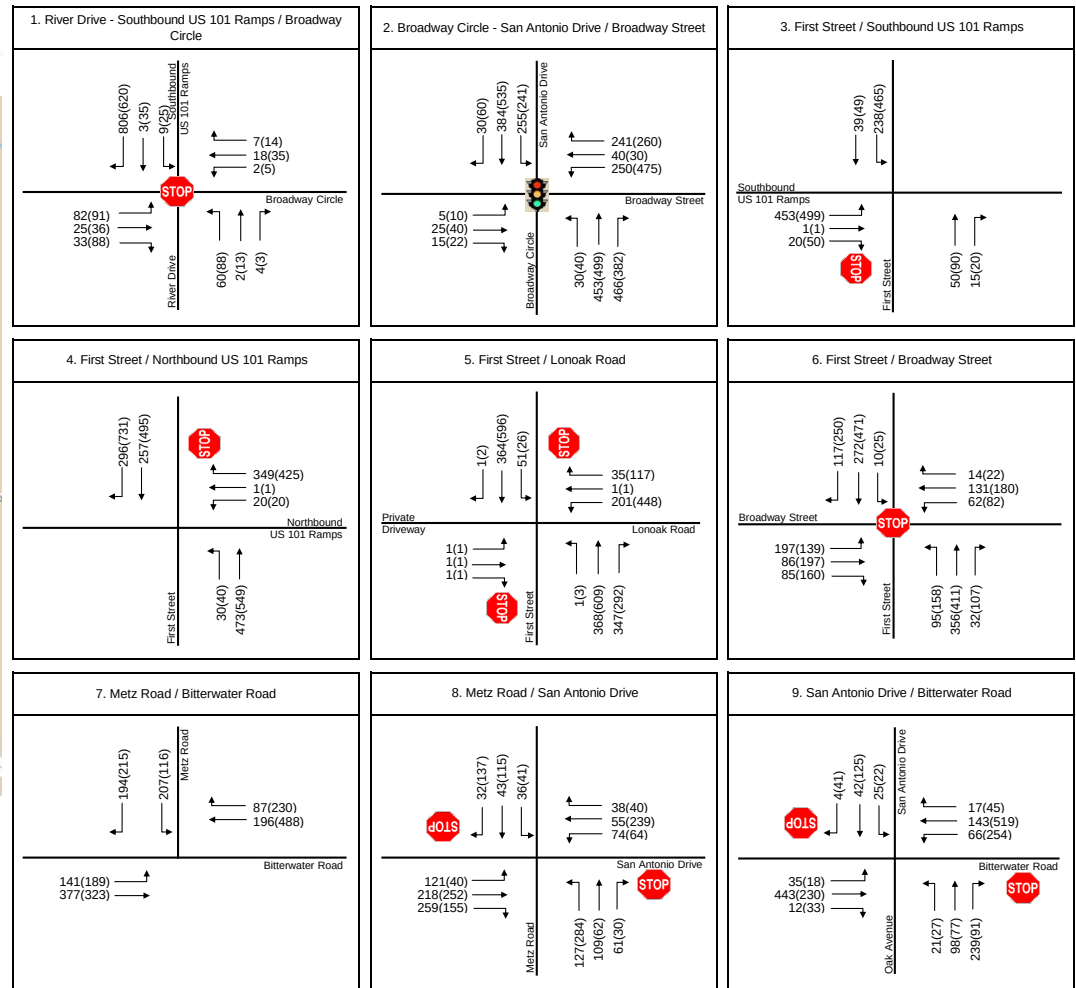
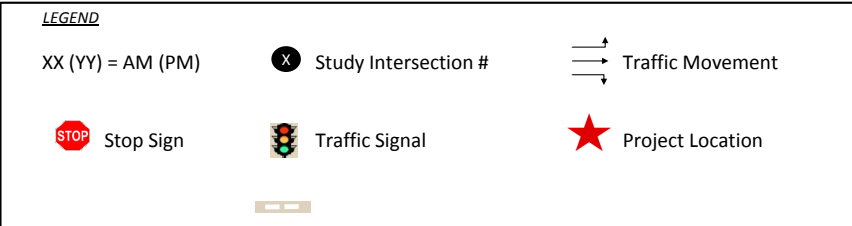
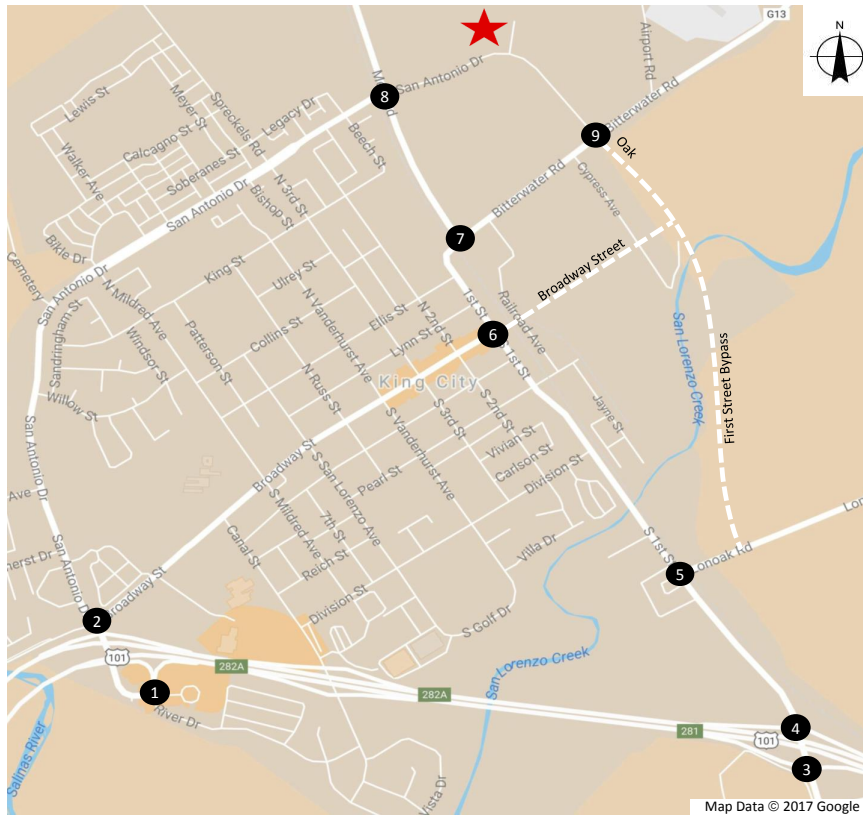


Exhibit 12

Cumulative Without Project Conditions

AM & PM Peak Hour Volumes

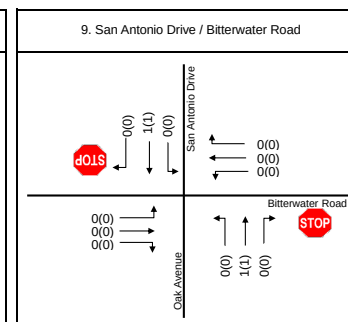
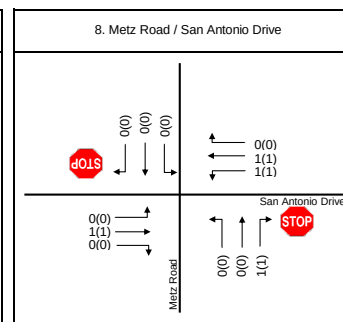
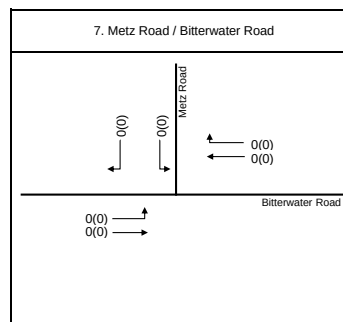
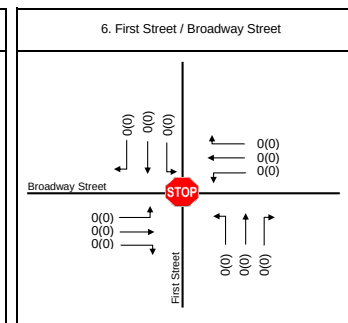
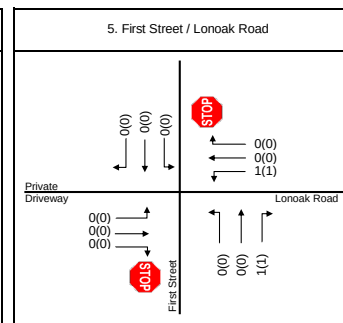
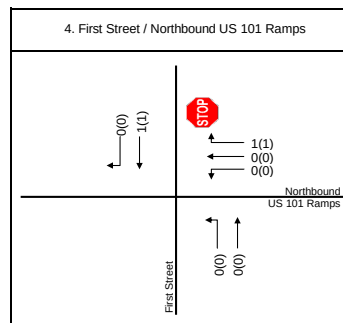
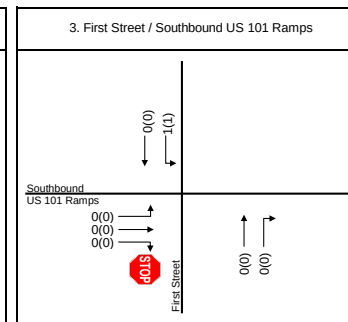
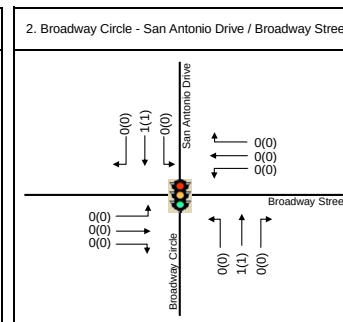
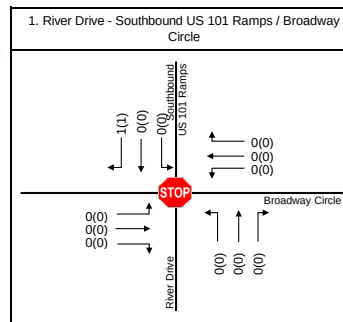
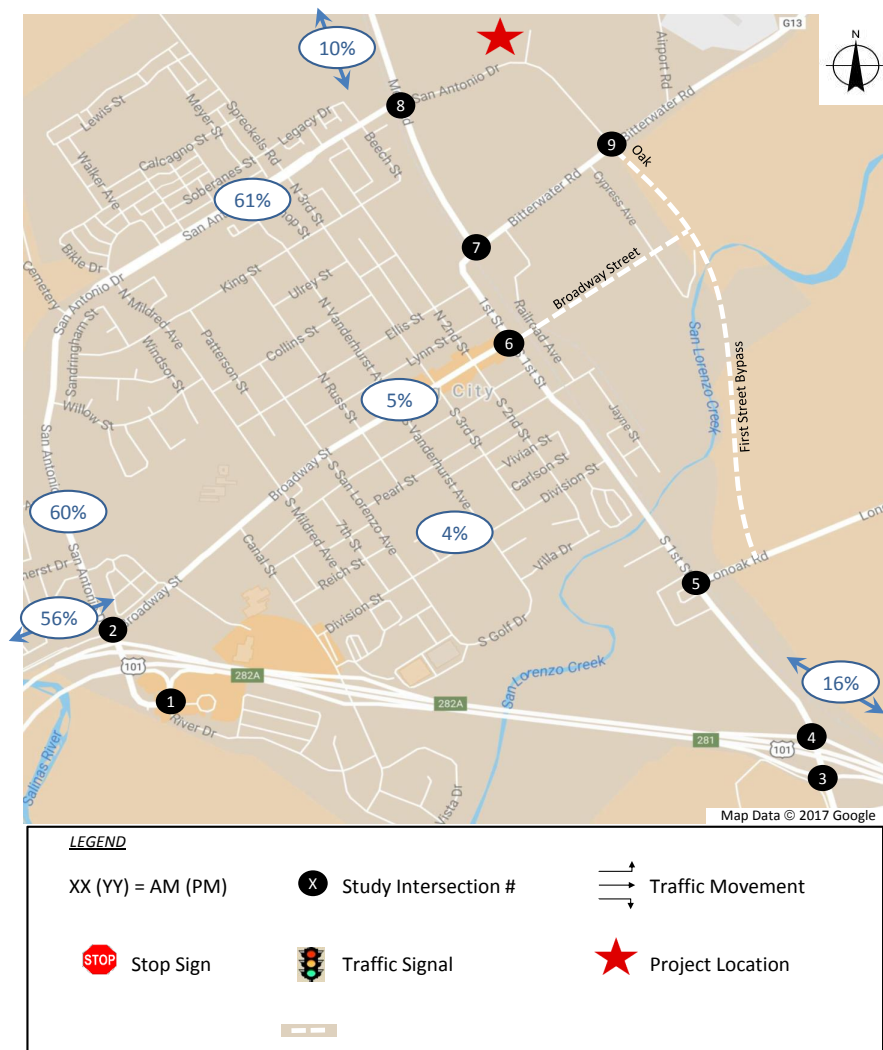


Exhibit 13

Project Trip Distribution and Assignment (Cumulative Plus Project Conditions) AM & PM Peak Hour Volumes

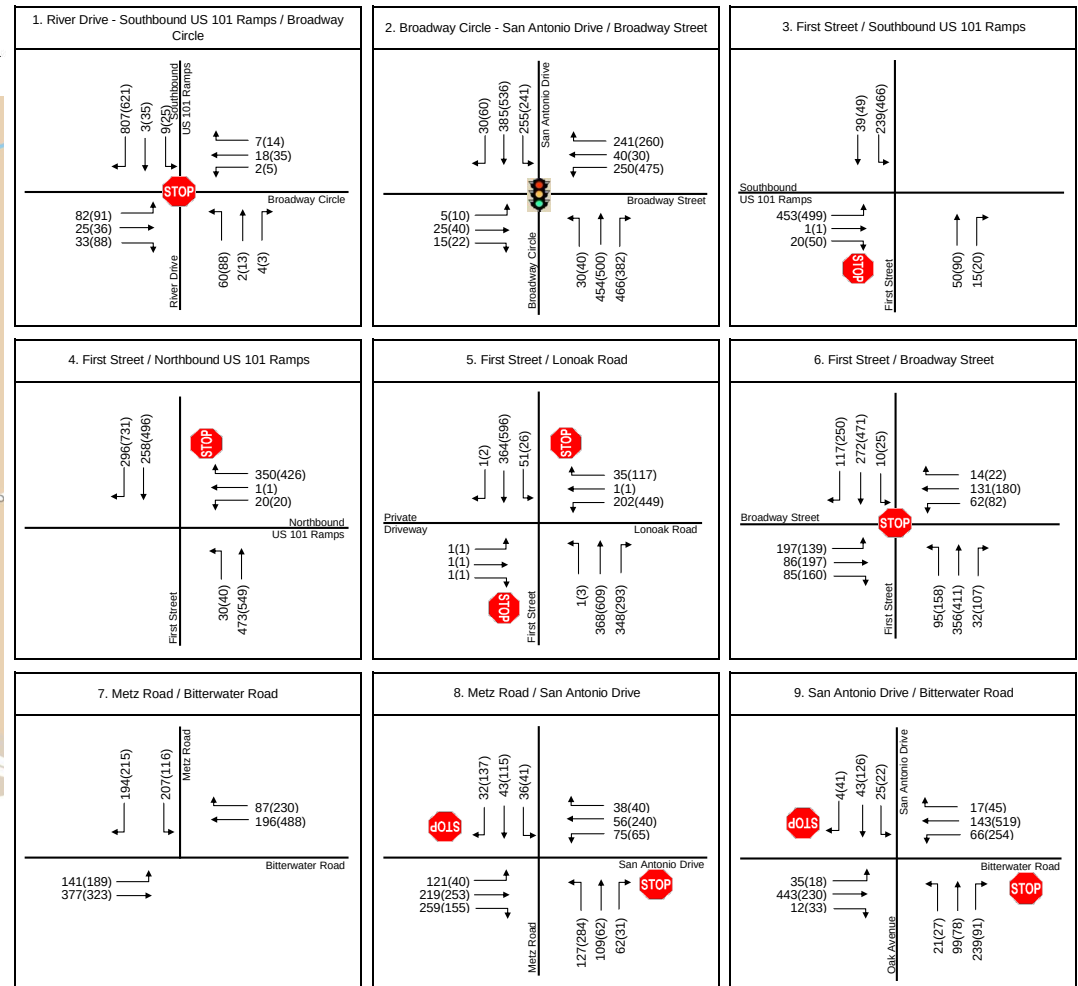
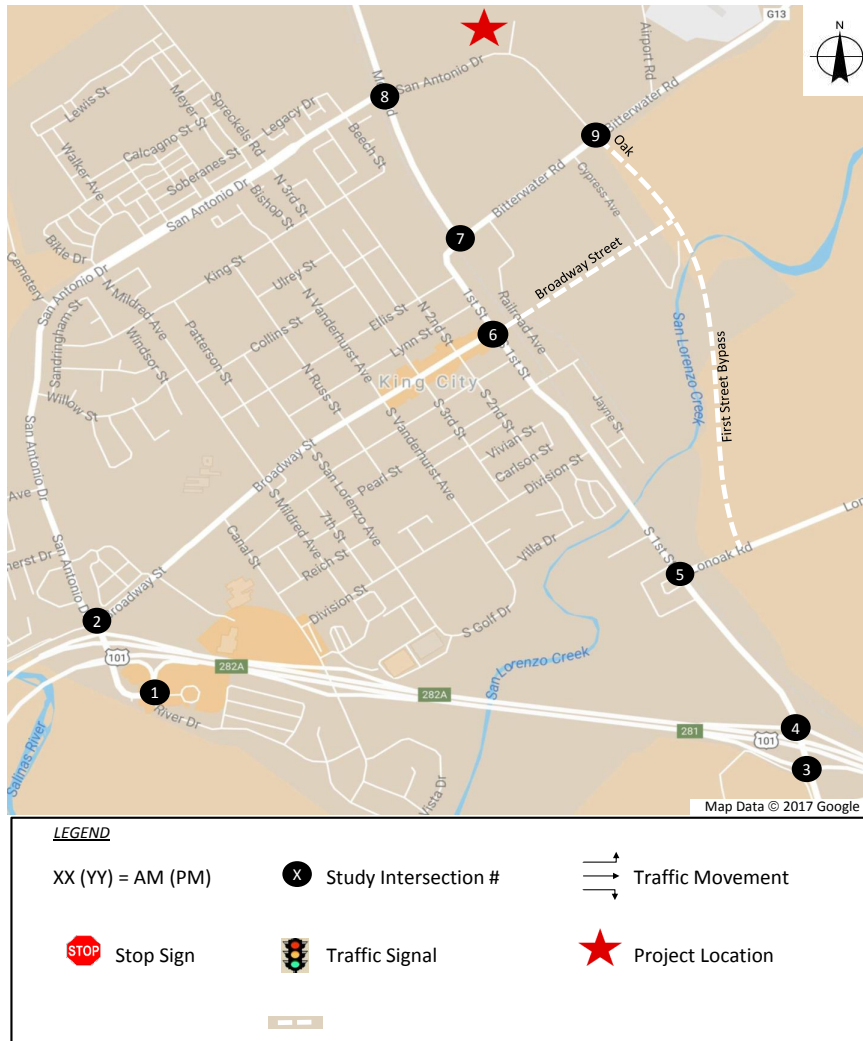


Exhibit 14

Cumulative Plus Project Conditions

AM & PM Peak Hour Volumes

						Gross Trip Contribution	Credit for Transit-Related Trip Reduction	Net Trip Contribution	Recommended Contribution (No Contribution to Mitigation)
Intersection Warranting Mitigation	Peak Hour	Growth (w/o Project)	Project Trips	Total	%	Based on Project Trip Assignment	(0.50% Mode Shift)	With Credit for Trip Reduction due to Mode Shift to Transit	is Justified if Net Contribution is Less than 0.00%
2. Broadway/San Antonio	AM	1,044	2	1046	0.19%				
	PM	1,061	2	1063	0.19%				
	Average				0.19%	0.19%	-0.50%	-0.31%	0.00%
3. First/SB US 101	AM	508	1	509	0.20%				
	PM	904	1	905	0.11%				
	Average				0.15%	0.15%	-0.50%	-0.35%	0.00%
4. First/NB US 101	AM	949	2	951	0.21%				
	PM	1,596	2	1598	0.13%				
	Average				0.17%	0.17%	-0.50%	-0.33%	0.00%
5. First/Lonoak	AM	843	2	845	0.24%				
	PM	1,377	2	1379	0.15%				
	Average				0.19%	0.19%	-0.50%	-0.31%	0.00%
6. First/Broadway	AM	1,017	0	1017	0.00%				
	PM	1,511	0	1511	0.00%				
	Average				0.00%	0.00%	-0.50%	-0.50%	0.00%
7. Metz/Bitterwater	AM	890	0	890	0.00%				
	PM	1,204	0	1204	0.00%				
	Average				0.00%	0.00%	-0.50%	-0.50%	0.00%
8. Metz/San Antonio	AM	930	4	934	0.43%				
	PM	990	4	994	0.40%				
	Average				0.42%	0.42%	-0.50%	-0.08%	0.00%
9. San Antonio/Bitterwater	AM	879	2	881	0.23%				
	PM	1,111	2	1113	0.18%				
	Average				0.20%	0.20%	-0.50%	-0.30%	0.00%
* Intersections 6 through 9 under Cumulative with Project conditions, use traffic remaining on First Street after traffic is diverted to the First Street Bypass									

Exhibit 15
Project Fair-Share
Contribution
to Intersection Mitigation

Appendix A

Level of Service Descriptions

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APPENDIX A1

LEVEL OF SERVICE (LOS) DESCRIPTION SIGNALIZED INTERSECTIONS

The capacity of an urban street is related primarily to the signal timing and the geometric characteristics of the facility as well as to the composition of traffic on the facility. Geometrics are a fixed characteristic of a facility. Thus, while traffic composition may vary somewhat over time, the capacity of a facility is generally a stable value that can be significantly improved only by initiating geometric improvements. A traffic signal essentially allocates time among conflicting traffic movements that seek to use the same space. The way in which time is allocated significantly affects the operation and the capacity of the intersection and its approaches.

The methodology for signalized intersection is designed to consider individual intersection approaches and individual lane groups within approaches. A lane group consists of one or more lanes on an intersection approach. The outputs from application of the method described in the HCM 2010 are reported on the basis of each lane. For a given lane group at a signalized intersection, three indications are displayed: green, yellow and red. The red indication may include a short period during which all indications are red, referred to as an all-red interval and the yellow indication forms the change and clearance interval between two green phases.

The methodology for analyzing the capacity and level of service must consider a wide variety of prevailing conditions, including the amount and distribution of traffic movements, traffic composition, geometric characteristics, and details of intersection signalization. The methodology addresses the capacity, LOS, and other performance measures for lane groups and the intersection approaches and the LOS for the intersection as a whole.

Capacity is evaluated in terms of the ratio of demand flow rate to capacity (v/c ratio), whereas LOS is evaluated on the basis of control delay per vehicle (in seconds per vehicle). The methodology does not take into account the potential impact of downstream congestion on intersection operation, nor does the methodology detect and adjust for the impacts of turn-pocket overflows on through traffic and intersection operation.

LEVEL OF SERVICE (LOS) CRITERIA FOR SIGNALIZED INTERSECTIONS

(Reference 2010 Highway Capacity Manual)

Level of Service	Control Delay (seconds / vehicle)
A	<10
B	>10 - 20
C	>20 - 35
D	>35 - 55
E	>55 - 80
F	>80

APPENDIX A2

LEVEL OF SERVICE (LOS) DESCRIPTION UNSIGNALIZED INTERSECTIONS WITH ALL-WAY STOP CONTROL (AWSC)

AWSC intersections require every vehicle to stop at the intersection before proceeding. Since each driver must stop, the judgement as to whether to proceed into the intersection is a function of traffic conditions on the other approaches. While giving priority to the driver on the right is a recognized rule in some areas, it is not a good descriptor of actual intersection operations. What happens is the development of a consensus of right-of-way that alternates between the drivers on the intersection approaches, a consensus that depends primarily on the intersection geometry and the arrival patterns at the stop line.

If no traffic is present on the other approaches, a driver can proceed immediately after the stop is made. If there is traffic on one or more of the other approaches, a driver proceeds only after determining that there are no vehicles currently in the intersection and that it is the driver's turn to proceed. Since no traffic signal controls the stream movement or allocates the right-of-way to each conflicting stream, the rate of departure is controlled by the interaction between the traffic streams themselves.

For AWSC intersections, the average control delay (in seconds per vehicle) is used as the primary measure of performance. Control delay is the increased time of travel for a vehicle approaching and passing through an AWSC intersection, compared with a free-flow vehicle if it were not required to slow down or stop at the intersection.

The criteria for AWSC intersections have different threshold values than do those for signalized intersections, primarily because drivers expect different levels of performance from different kinds of traffic control devices (i.e., traffic signals, two way stop or all way stop, etc.). The expectation is that a signalized intersection is designed to carry higher traffic volumes than an AWSC intersection and a higher level of control delay is acceptable at a signalized intersection for the same LOS.

For AWSC analysis using the HCM 2000 and 2010 methods, the LOS shown reflects the weighted average of the delay on each of the approaches.

LEVEL OF SERVICE (LOS) CRITERIA FOR AWSC INTERSECTIONS (Reference 2000 and 2010 Highway Capacity Manuals)

Level of Service	Control Delay (seconds / vehicle)
A	0 - 10
B	>10 - 15
C	>15 - 25
D	>25 - 35
E	>35 - 50
F	>50

APPENDIX A3

LEVEL OF SERVICE (LOS) DESCRIPTION UNSIGNALIZED INTERSECTIONS WITH TWO-WAY STOP CONTROL (TWSC)

TWSC intersections are widely used and stop signs are used to control vehicle movements at such intersections. At TWSC intersections, the stop-controlled approaches are referred to as the minor street approaches; they can be either public streets or private driveways. The intersection approaches that are not controlled by stop signs are referred to as the major street approaches. A three-leg intersection is considered to be a standard type of TWSC intersection if the single minor street approach (i.e. the stem of the T configuration) is controlled by a stop sign. Three-leg intersections where two of the three approaches are controlled by stop signs are a special form of unsignalized intersection control.

At TWSC intersections, drivers on the controlled approaches are required to select gaps in the major street flow through which to execute crossing or turning maneuvers on the basis of judgment. In the presence of a queue, each driver on the controlled approach must use some time to move into the front-of-queue position and prepare to evaluate gaps in the major street flow. Capacity analysis at TWSC intersections depends on a clear description and understanding of the interaction of drivers on the minor or stop-controlled approach with drivers on the major street. Both gap acceptance and empirical models have been developed to describe this interaction.

Thus, the capacity of the controlled legs is based on three factors:

- the distribution of gaps in the major street traffic stream;
- driver judgment in selecting gaps through which to execute the desired maneuvers; and
- the follow-up time required by each driver in a queue.

The delay experienced by a motorist is made up of a number of factors that relate to control, geometrics, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions, in the absence of incident, control, traffic or geometric delay. Average control delay for any particular minor movement is a function of the capacity of the approach and the degree of saturation and referred to as level of service.

LEVEL OF SERVICE (LOS) CRITERIA FOR TWSC INTERSECTIONS

(Reference 2010 Highway Capacity Manual)

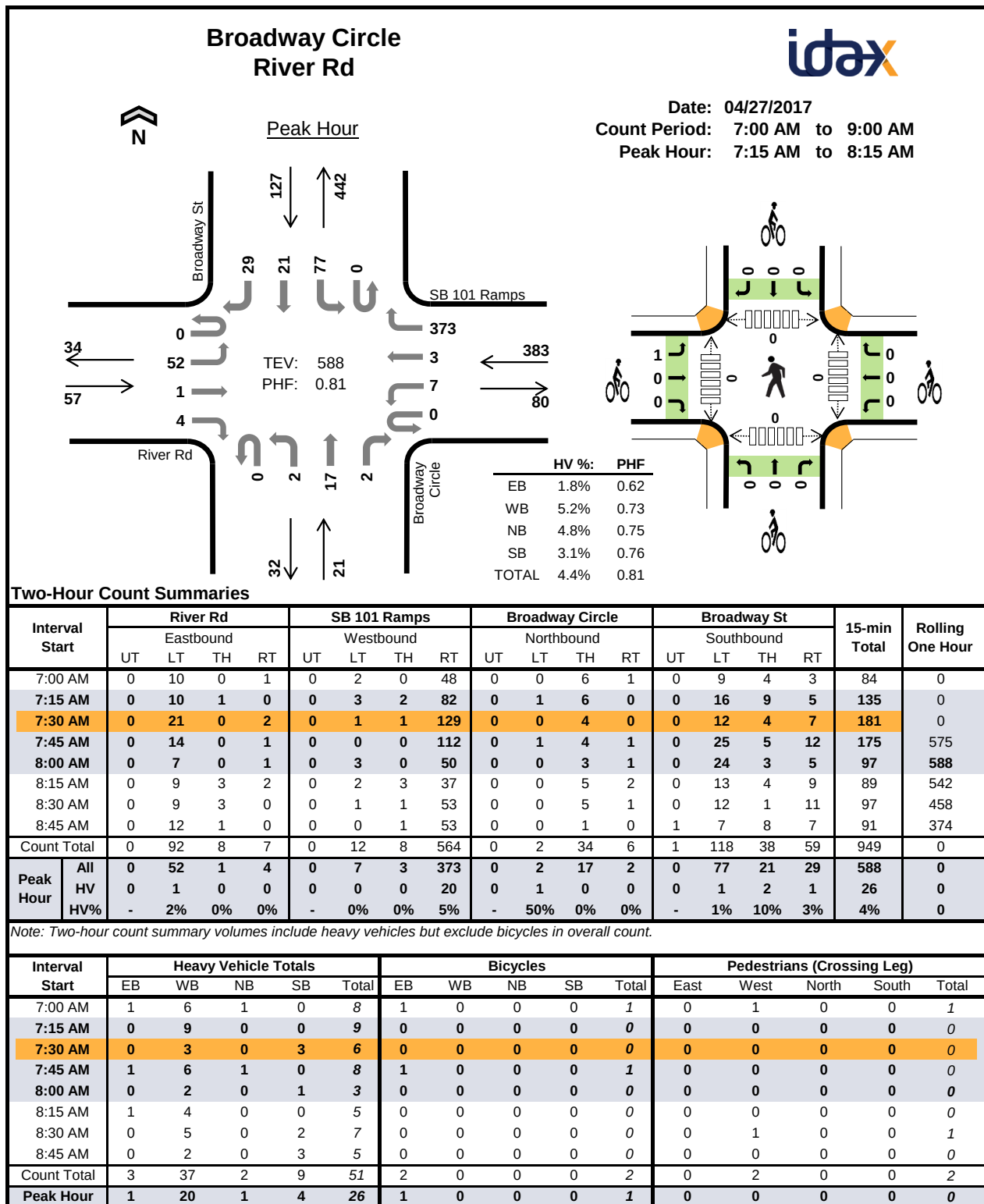
Level of Service	Control Delay (seconds / vehicle)
A	0 - 10
B	>10 - 15
C	>15 - 25
D	>25 - 35
E	>35 - 50
F	>50

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Appendix B

Intersection
Traffic Volume
Counts

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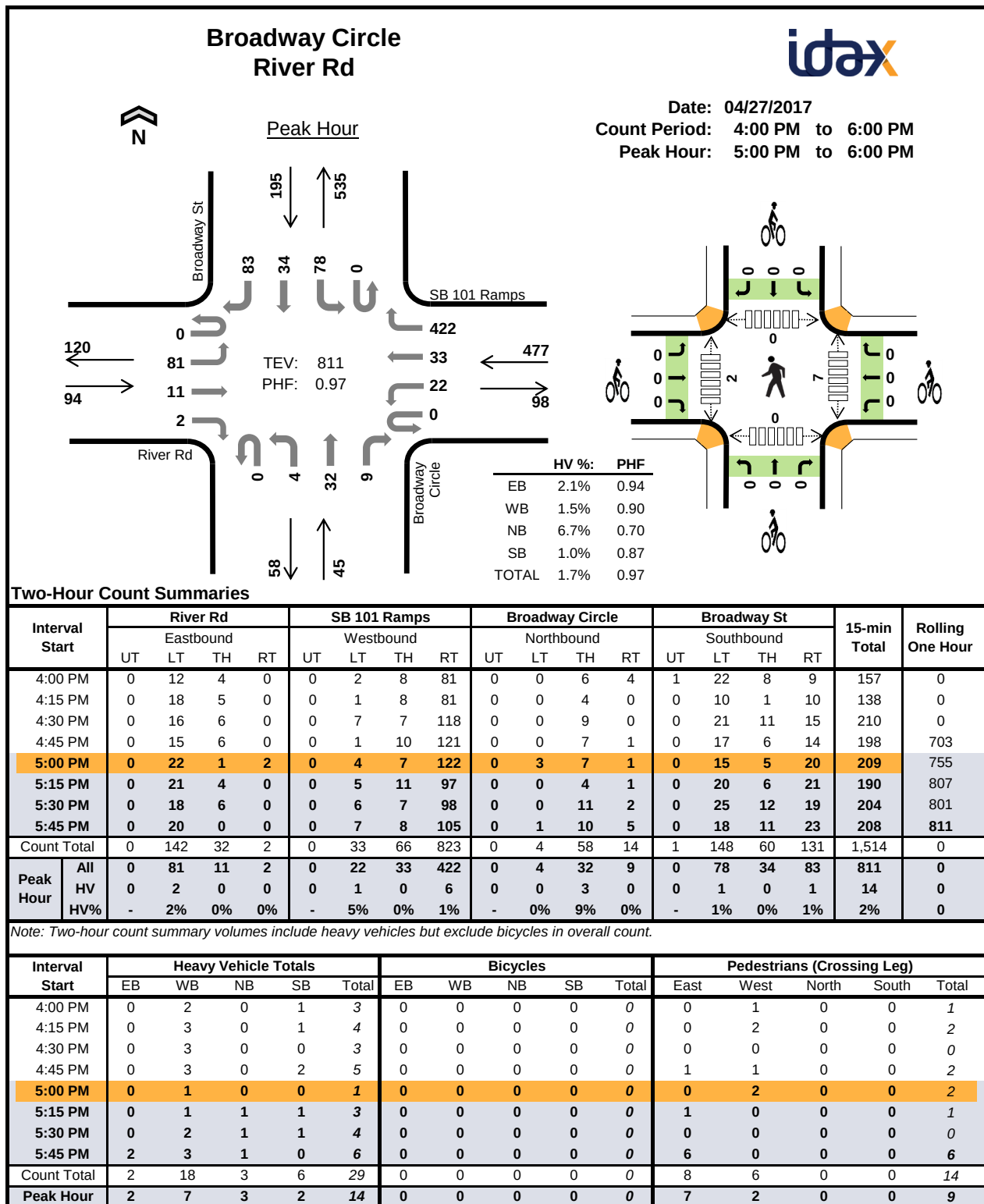
Two-Hour Count Summaries - Heavy Vehicles

Interval Start	River Rd				SB 101 Ramps				Broadway Circle				Broadway St				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	1	0	0	0	0	0	6	0	0	1	0	0	0	0	0	8	0
7:15 AM	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	9	0
7:30 AM	0	0	0	0	0	0	0	3	0	0	0	0	0	0	2	1	6	0
7:45 AM	0	1	0	0	0	0	0	6	0	1	0	0	0	0	0	0	8	31
8:00 AM	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	3	26
8:15 AM	0	1	0	0	0	0	0	4	0	0	0	0	0	0	0	0	5	22
8:30 AM	0	0	0	0	0	0	0	5	0	0	0	0	0	2	0	0	7	23
8:45 AM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	3	0	5	20
Count Total	0	3	0	0	0	0	0	37	0	1	1	0	0	3	5	1	51	0
Peak Hour	0	1	0	0	0	0	0	20	0	1	0	0	0	1	2	1	26	0

Two-Hour Count Summaries - Bikes

Interval Start	River Rd			SB 101 Ramps			Broadway Circle			Broadway St			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	1	0	0	0	0	0	0	0	0	0	0	0	1	0
7:15 AM	0	0	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	0	0
7:45 AM	1	0	0	0	0	0	0	0	0	0	0	0	1	2
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:30 AM	0	0	0	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	0	0
Count Total	2	0	0	0	0	0	0	0	0	0	0	0	2	0
Peak Hour	1	0	0	0	0	0	0	0	0	0	0	0	1	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



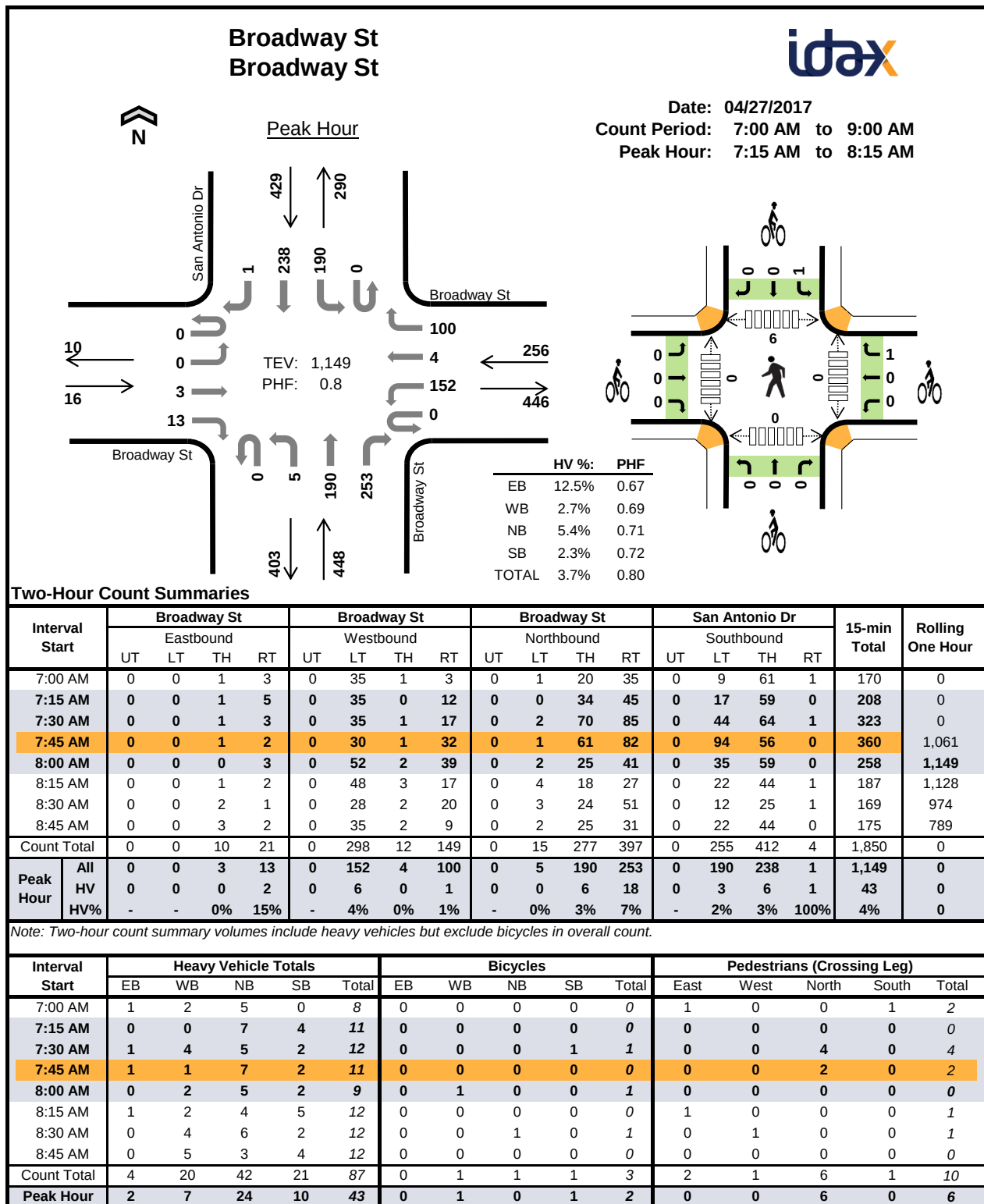
Two-Hour Count Summaries - Heavy Vehicles

Interval Start	River Rd				SB 101 Ramps				Broadway Circle				Broadway St				15-min Total	Rolling One Hour	
	Eastbound				Westbound				Northbound				Southbound						
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
4:00 PM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	3	0
4:15 PM	0	0	0	0	0	0	0	3	0	0	0	0	0	0	1	0	0	4	0
4:30 PM	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	0
4:45 PM	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	2	0	5	15
5:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	13
5:15 PM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	3	12
5:30 PM	0	0	0	0	0	0	0	2	0	0	0	1	0	0	1	0	0	4	13
5:45 PM	0	2	0	0	0	0	1	0	2	0	0	1	0	0	0	0	0	6	14
Count Total	0	2	0	0	0	1	0	17	0	0	3	0	0	2	2	2	2	29	0
Peak Hour	0	2	0	0	0	1	0	6	0	0	3	0	0	1	0	1	1	14	0

Two-Hour Count Summaries - Bikes

Interval Start	River Rd			SB 101 Ramps			Broadway Circle			Broadway St			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	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	0	0
4:30 PM	0	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	0
5:00 PM	0	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	0
5:30 PM	0	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	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



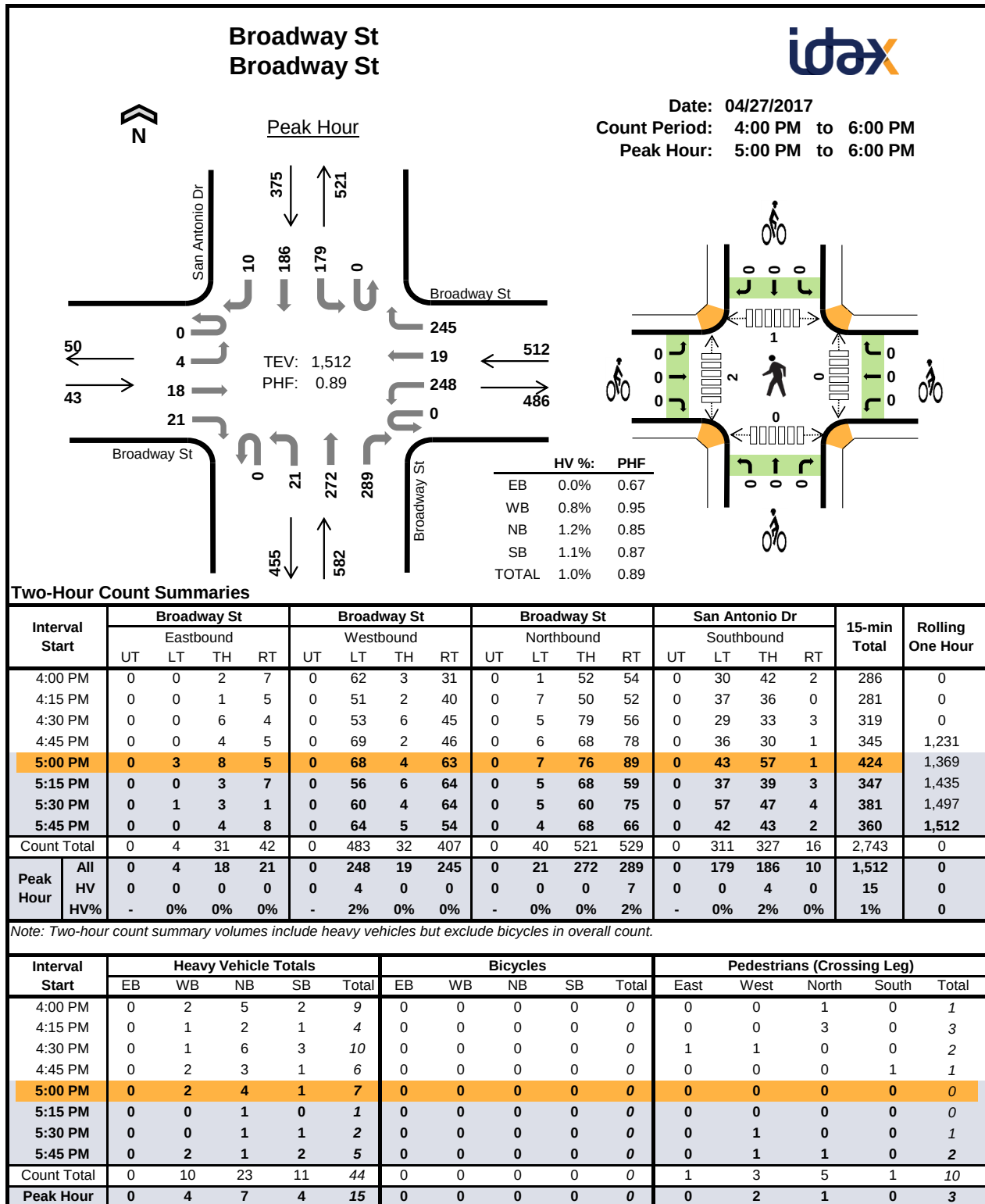
Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Broadway St				Broadway St				Broadway St				San Antonio Dr				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	1	0	2	0	0	0	0	3	2	0	0	0	0	8	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	2	5	0	1	3	0	11	0
7:30 AM	0	0	0	1	0	3	0	1	0	0	0	5	0	1	0	1	12	0
7:45 AM	0	0	0	1	0	1	0	0	0	0	2	5	0	1	1	0	11	42
8:00 AM	0	0	0	0	0	2	0	0	0	0	2	3	0	0	2	0	9	43
8:15 AM	0	0	0	1	0	2	0	0	0	1	1	2	0	1	4	0	12	44
8:30 AM	0	0	0	0	0	4	0	0	0	0	2	4	0	1	1	0	12	44
8:45 AM	0	0	0	0	0	4	0	1	0	0	1	2	0	0	4	0	12	45
Count Total	0	0	0	4	0	18	0	2	0	1	13	28	0	5	15	1	87	0
Peak Hour	0	0	0	2	0	6	0	1	0	0	6	18	0	3	6	1	43	0

Two-Hour Count Summaries - Bikes

Interval Start	Broadway St			Broadway St			Broadway St			San Antonio Dr			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	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	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	1	2
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:30 AM	0	0	0	0	0	0	0	0	1	0	0	0	1	2
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Count Total	0	0	0	0	0	1	0	0	1	1	0	0	3	0
Peak Hour	0	0	0	0	0	1	0	0	0	1	0	0	2	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



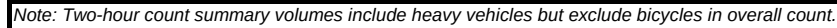
Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Broadway St				Broadway St				Broadway St				San Antonio Dr				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	2	0	0	0	0	3	2	0	1	1	0	9	0
4:15 PM	0	0	0	0	0	1	0	0	0	0	0	2	0	0	1	0	4	0
4:30 PM	0	0	0	0	0	0	0	1	0	1	2	3	0	3	0	0	10	0
4:45 PM	0	0	0	0	0	2	0	0	0	0	2	1	0	0	1	0	6	29
5:00 PM	0	0	0	0	0	2	0	0	0	0	0	4	0	0	1	0	7	27
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	24
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2	16
5:45 PM	0	0	0	0	0	2	0	0	0	0	0	1	0	0	2	0	5	15
Count Total	0	0	0	0	0	9	0	1	0	1	7	15	0	4	7	0	44	0
Peak Hour	0	0	0	0	0	4	0	0	0	0	0	7	0	0	4	0	15	0

Two-Hour Count Summaries - Bikes

Interval Start	Broadway St			Broadway St			Broadway St			San Antonio Dr			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	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	0	0
4:30 PM	0	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	0
5:00 PM	0	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	0
5:30 PM	0	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	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Two-Hour Count Summaries - Heavy Vehicles

Interval Start	SB 101 Off-Ramp				SB 101 On-Ramp				Mesa Verde Rd				S 1st St				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	4	0	0	0	0	0	0	0	0	2	0	0	2	1	0	9	0
7:15 AM	0	2	0	0	0	0	0	0	0	0	1	0	0	5	4	0	12	0
7:30 AM	0	4	0	0	0	0	0	0	0	0	2	0	0	1	3	0	10	0
7:45 AM	0	10	0	0	0	0	0	0	0	0	1	0	0	0	0	0	11	42
8:00 AM	0	4	0	0	0	0	0	0	0	0	2	0	0	3	1	0	10	43
8:15 AM	0	4	0	0	0	0	0	0	0	0	0	0	0	1	3	0	8	39
8:30 AM	0	1	0	0	0	0	0	0	0	0	2	0	0	1	4	0	8	37
8:45 AM	0	8	0	0	0	0	0	0	0	0	1	0	0	4	3	0	16	42
Count Total	0	37	0	0	0	0	0	0	0	0	11	0	0	17	19	0	84	0
Peak Hour	0	20	0	0	0	0	0	0	0	0	6	0	0	9	8	0	43	0

Two-Hour Count Summaries - Bikes

Interval Start	SB 101 Off-Ramp			SB 101 On-Ramp			Mesa Verde Rd			S 1st St			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	2	0	0	2	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:30 AM	0	0	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	0	0
Count Total	0	0	0	0	0	0	0	0	0	2	0	0	2	0
Peak Hour	0	0	0	0	0	0	0	0	0	2	0	0	2	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

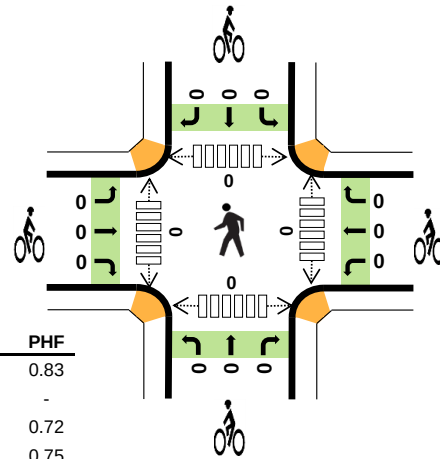
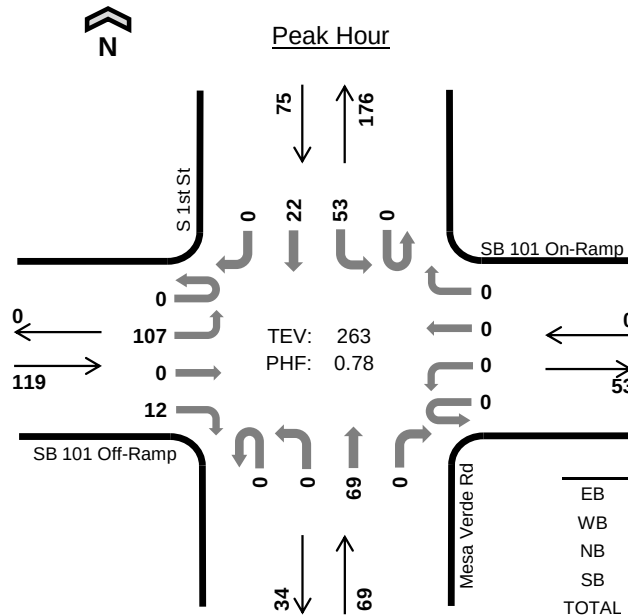
Mesa Verde Rd SB 101 Off-Ramp



Date: 04/27/2017

Count Period: 4:00 PM to 6:00 PM

Peak Hour: 4:00 PM to 5:00 PM



	HV %:	PHF
EB	15.1%	0.83
WB	-	-
NB	8.7%	0.72
SB	12.0%	0.75
TOTAL	12.5%	0.78

Two-Hour Count Summaries

Interval Start		SB 101 Off-Ramp				SB 101 On-Ramp				Mesa Verde Rd				S 1st St				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	28	0	2	0	0	0	0	0	0	7	0	0	13	6	0	56	0
4:15 PM		0	27	0	1	0	0	0	0	0	0	24	0	0	8	7	0	67	0
4:30 PM		0	31	0	5	0	0	0	0	0	0	23	0	0	20	5	0	84	0
4:45 PM		0	21	0	4	0	0	0	0	0	0	15	0	0	12	4	0	56	263
5:00 PM		0	23	0	2	0	0	0	0	0	0	10	0	0	16	4	0	55	262
5:15 PM		0	34	0	5	0	0	0	0	0	0	10	0	0	11	5	0	65	260
5:30 PM		0	22	0	4	0	0	0	0	0	0	12	0	0	5	9	0	52	228
5:45 PM		0	25	0	1	0	0	0	0	0	0	13	0	0	9	9	0	57	229
Count Total		0	211	0	24	0	0	0	0	0	0	114	0	0	94	49	0	492	0
Peak Hour	All	0	107	0	12	0	0	0	0	0	0	69	0	0	53	22	0	263	0
	HV	0	15	0	3	0	0	0	0	0	0	6	0	0	7	2	0	33	0
	HV%	-	14%	-	25%	-	-	-	-	-	-	9%	-	-	13%	9%	-	13%	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	6	0	0	4	10	0	0	0	0	0	0	0	0	0	0
4:15 PM	3	0	1	1	5	0	0	0	0	0	0	0	0	0	0
4:30 PM	5	0	1	2	8	0	0	0	0	0	0	0	0	0	0
4:45 PM	4	0	4	2	10	0	0	0	0	0	0	0	0	0	0
5:00 PM	7	0	0	0	7	0	0	0	1	1	0	0	0	0	0
5:15 PM	7	0	3	1	11	0	0	0	0	0	0	0	0	0	0
5:30 PM	3	0	1	0	4	0	0	0	0	0	0	0	0	0	0
5:45 PM	5	0	1	1	7	0	0	0	0	0	0	0	0	0	0
Count Total	40	0	11	11	62	0	0	0	1	1	0	0	0	0	0
Peak Hour	18	0	6	9	33	0	0	0	0	0	0	0	0	0	0

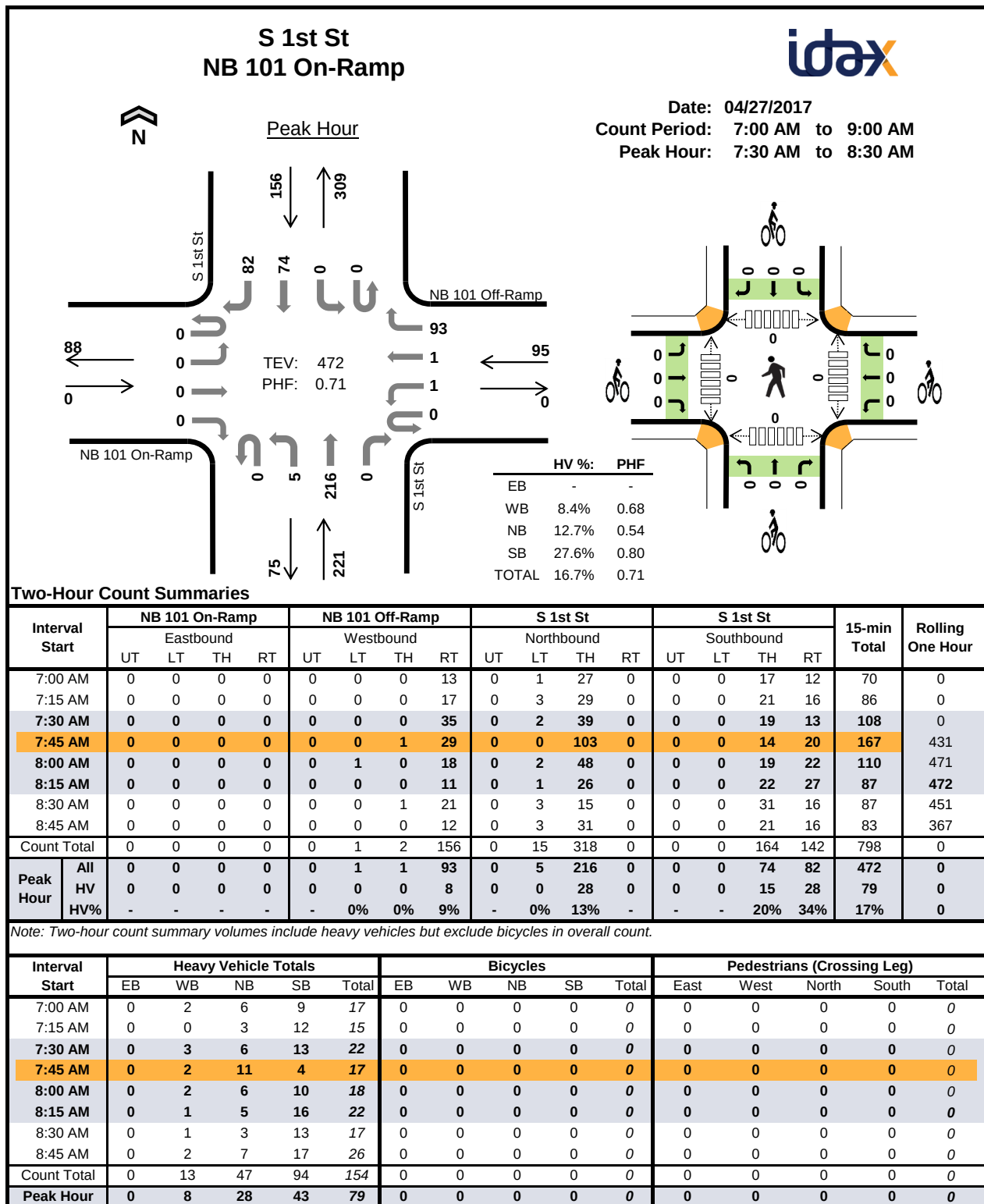
Two-Hour Count Summaries - Heavy Vehicles

Interval Start	SB 101 Off-Ramp				SB 101 On-Ramp				Mesa Verde Rd				S 1st St				15-min Total	Rolling One Hour	
	Eastbound				Westbound				Northbound				Southbound						
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
4:00 PM	0	6	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	10	0
4:15 PM	0	3	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	5	0
4:30 PM	0	4	0	1	0	0	0	0	0	0	0	1	0	0	2	0	0	8	0
4:45 PM	0	2	0	2	0	0	0	0	0	0	0	4	0	0	1	1	0	10	33
5:00 PM	0	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	7	30
5:15 PM	0	7	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	11	36
5:30 PM	0	1	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	4	32
5:45 PM	0	5	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	7	29
Count Total	0	34	0	6	0	0	0	0	0	0	0	11	0	0	7	4	0	62	0
Peak Hour	0	15	0	3	0	0	0	0	0	0	0	6	0	0	7	2	0	33	0

Two-Hour Count Summaries - Bikes

Interval Start	SB 101 Off-Ramp			SB 101 On-Ramp			Mesa Verde Rd			S 1st St			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	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	0	0
4:30 PM	0	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	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Count Total	0	0	0	0	0	0	0	0	0	0	1	0	1	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



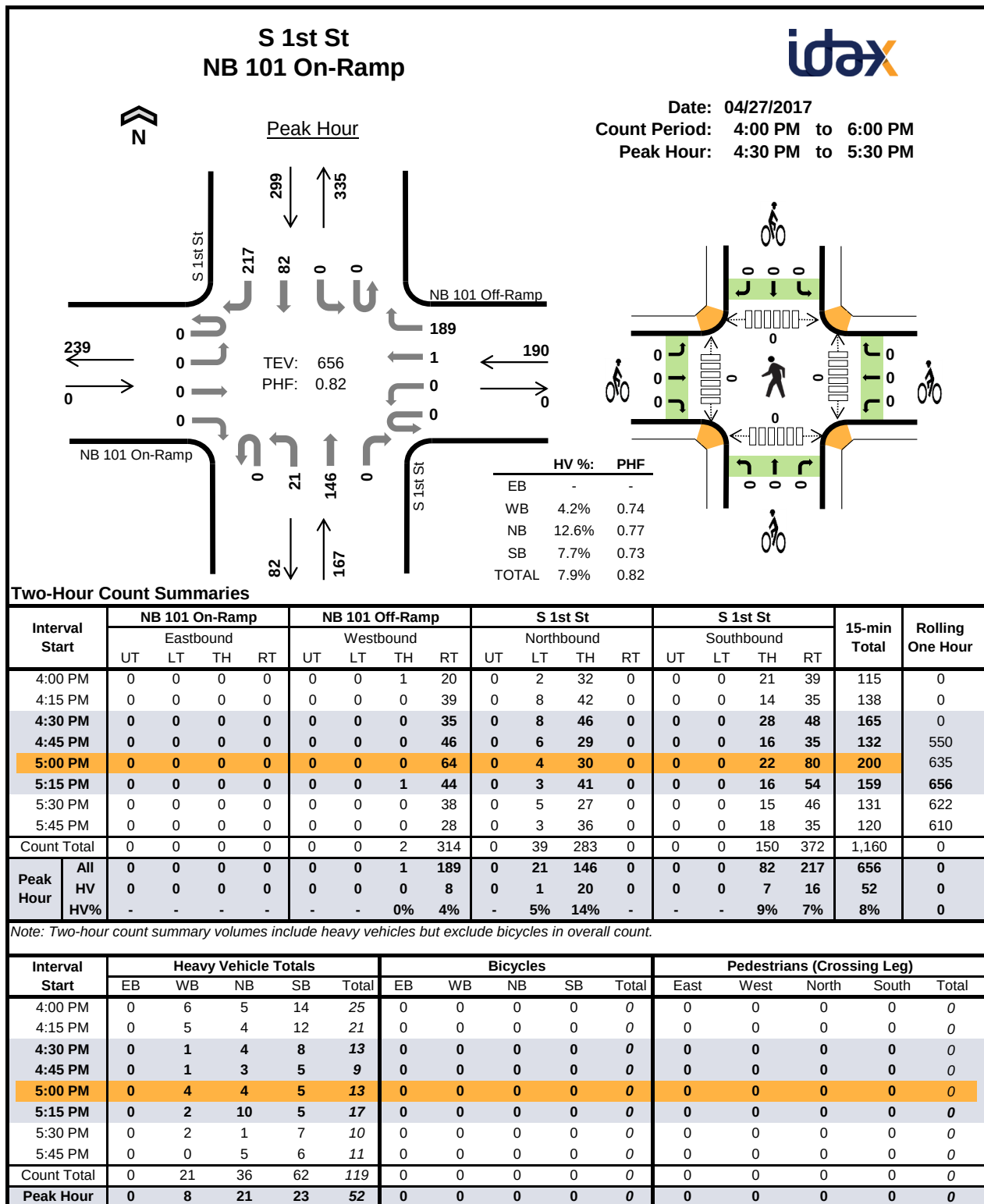
Two-Hour Count Summaries - Heavy Vehicles

Interval Start	NB 101 On-Ramp				NB 101 Off-Ramp				S 1st St				S 1st St				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	2	0	0	6	0	0	0	3	6	17	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	9	3	15	0
7:30 AM	0	0	0	0	0	0	0	3	0	0	6	0	0	0	6	7	22	0
7:45 AM	0	0	0	0	0	0	0	2	0	0	11	0	0	0	0	4	17	71
8:00 AM	0	0	0	0	0	0	0	2	0	0	6	0	0	0	4	6	18	72
8:15 AM	0	0	0	0	0	0	0	1	0	0	5	0	0	0	5	11	22	79
8:30 AM	0	0	0	0	0	0	0	1	0	1	2	0	0	0	7	6	17	74
8:45 AM	0	0	0	0	0	0	0	2	0	0	7	0	0	0	9	8	26	83
Count Total	0	0	0	0	0	0	0	13	0	1	46	0	0	0	43	51	154	0
Peak Hour	0	0	0	0	0	0	0	8	0	0	28	0	0	0	15	28	79	0

Two-Hour Count Summaries - Bikes

Interval Start	NB 101 On-Ramp			NB 101 Off-Ramp			S 1st St			S 1st St			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	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	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	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	0	0
8:30 AM	0	0	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	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



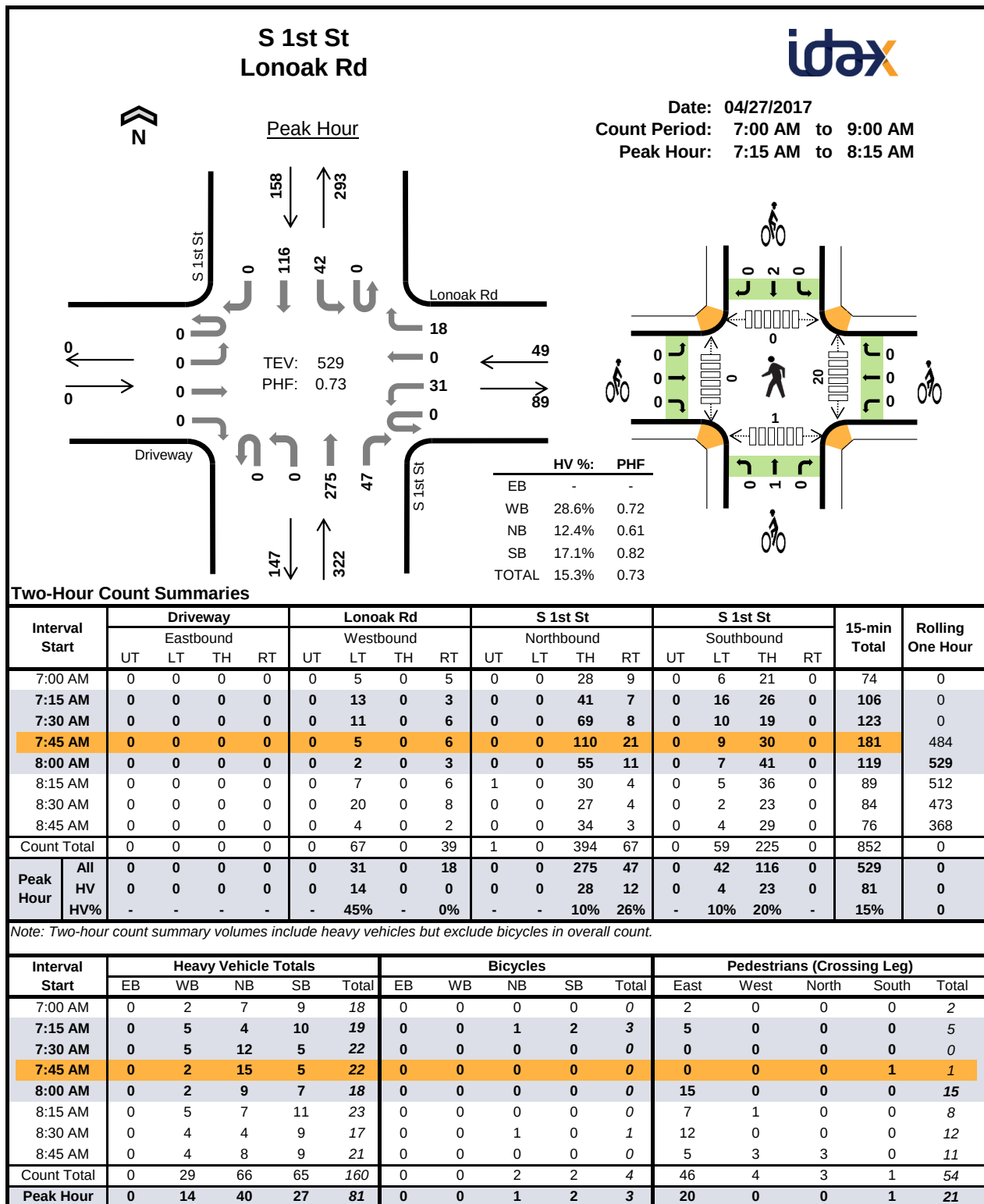
Two-Hour Count Summaries - Heavy Vehicles

Interval Start	NB 101 On-Ramp				NB 101 Off-Ramp				S 1st St				S 1st St				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	1	5	0	0	5	0	0	0	5	9	25	0
4:15 PM	0	0	0	0	0	0	0	5	0	1	3	0	0	0	2	10	21	0
4:30 PM	0	0	0	0	0	0	0	1	0	0	4	0	0	0	4	4	13	0
4:45 PM	0	0	0	0	0	0	0	1	0	0	3	0	0	0	2	3	9	68
5:00 PM	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	5	13	56
5:15 PM	0	0	0	0	0	0	0	2	0	1	9	0	0	0	1	4	17	52
5:30 PM	0	0	0	0	0	0	0	2	0	0	1	0	0	0	1	6	10	49
5:45 PM	0	0	0	0	0	0	0	0	0	0	5	0	0	0	1	5	11	51
Count Total	0	0	0	0	0	0	1	20	0	2	34	0	0	0	16	46	119	0
Peak Hour	0	0	0	0	0	0	0	8	0	1	20	0	0	0	7	16	52	0

Two-Hour Count Summaries - Bikes

Interval Start	NB 101 On-Ramp			NB 101 Off-Ramp			S 1st St			S 1st St			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	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	0	0
4:30 PM	0	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	0
5:00 PM	0	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	0
5:30 PM	0	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	0
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



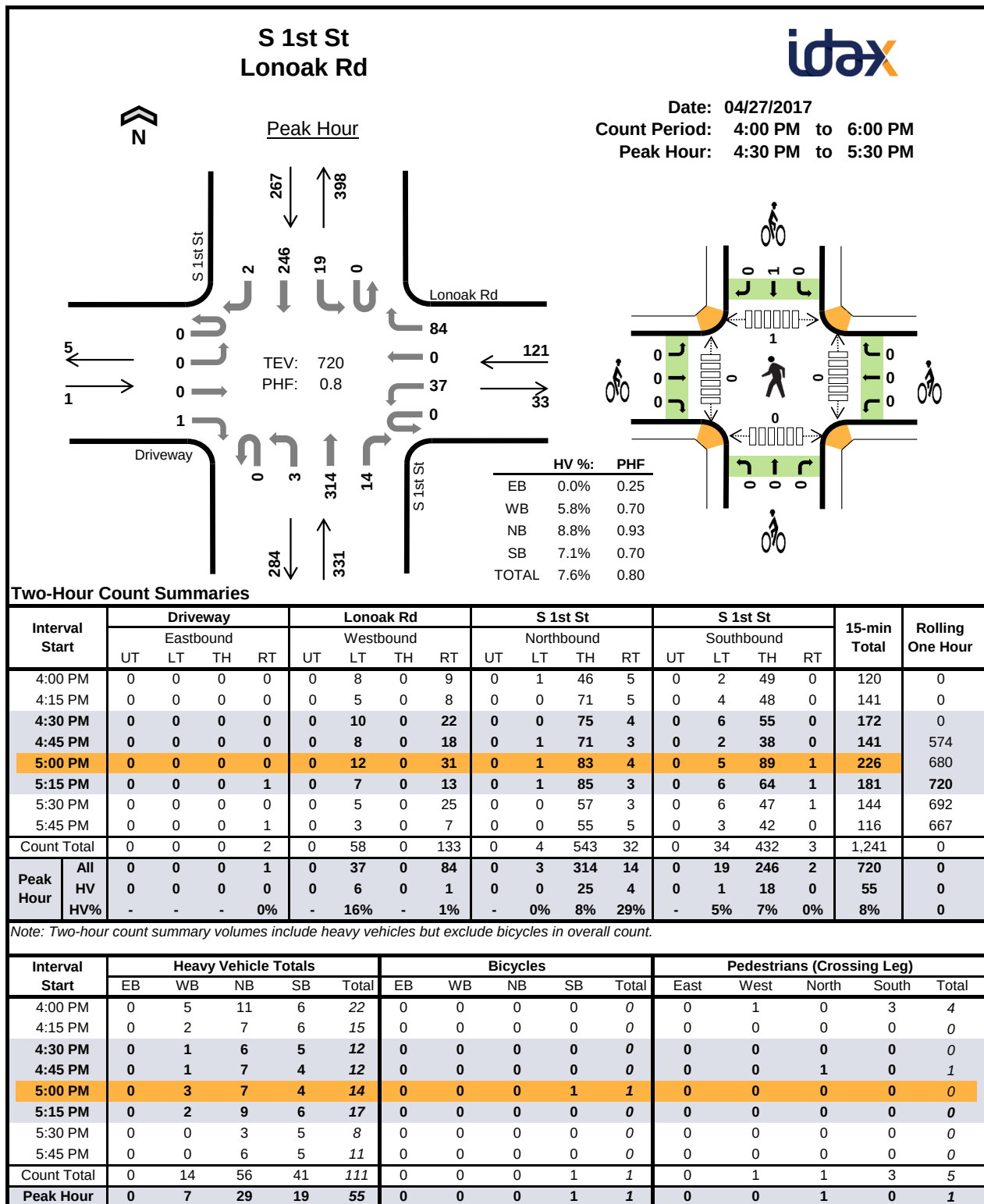
Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Driveway				Lonoak Rd				S 1st St				S 1st St				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	1	0	1	0	0	2	5	0	1	8	0	18	0
7:15 AM	0	0	0	0	0	5	0	0	0	0	1	3	0	2	8	0	19	0
7:30 AM	0	0	0	0	0	5	0	0	0	0	11	1	0	1	4	0	22	0
7:45 AM	0	0	0	0	0	2	0	0	0	0	0	10	5	0	0	5	22	81
8:00 AM	0	0	0	0	0	2	0	0	0	0	0	6	3	0	1	6	18	81
8:15 AM	0	0	0	0	0	4	0	1	0	0	5	2	0	2	9	0	23	85
8:30 AM	0	0	0	0	0	4	0	0	0	0	2	2	0	0	9	0	17	80
8:45 AM	0	0	0	0	0	3	0	1	0	0	7	1	0	1	8	0	21	79
Count Total	0	0	0	0	0	26	0	3	0	0	44	22	0	8	57	0	160	0
Peak Hour	0	0	0	0	0	14	0	0	0	0	28	12	0	4	23	0	81	0

Two-Hour Count Summaries - Bikes

Interval Start	Driveway			Lonoak Rd			S 1st St			S 1st St			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	1	0	0	0	2	0	3
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	3
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	3
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Count Total	0	0	0	0	0	0	0	2	0	0	2	0	4	0
Peak Hour	0	0	0	0	0	0	0	1	0	0	2	0	3	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



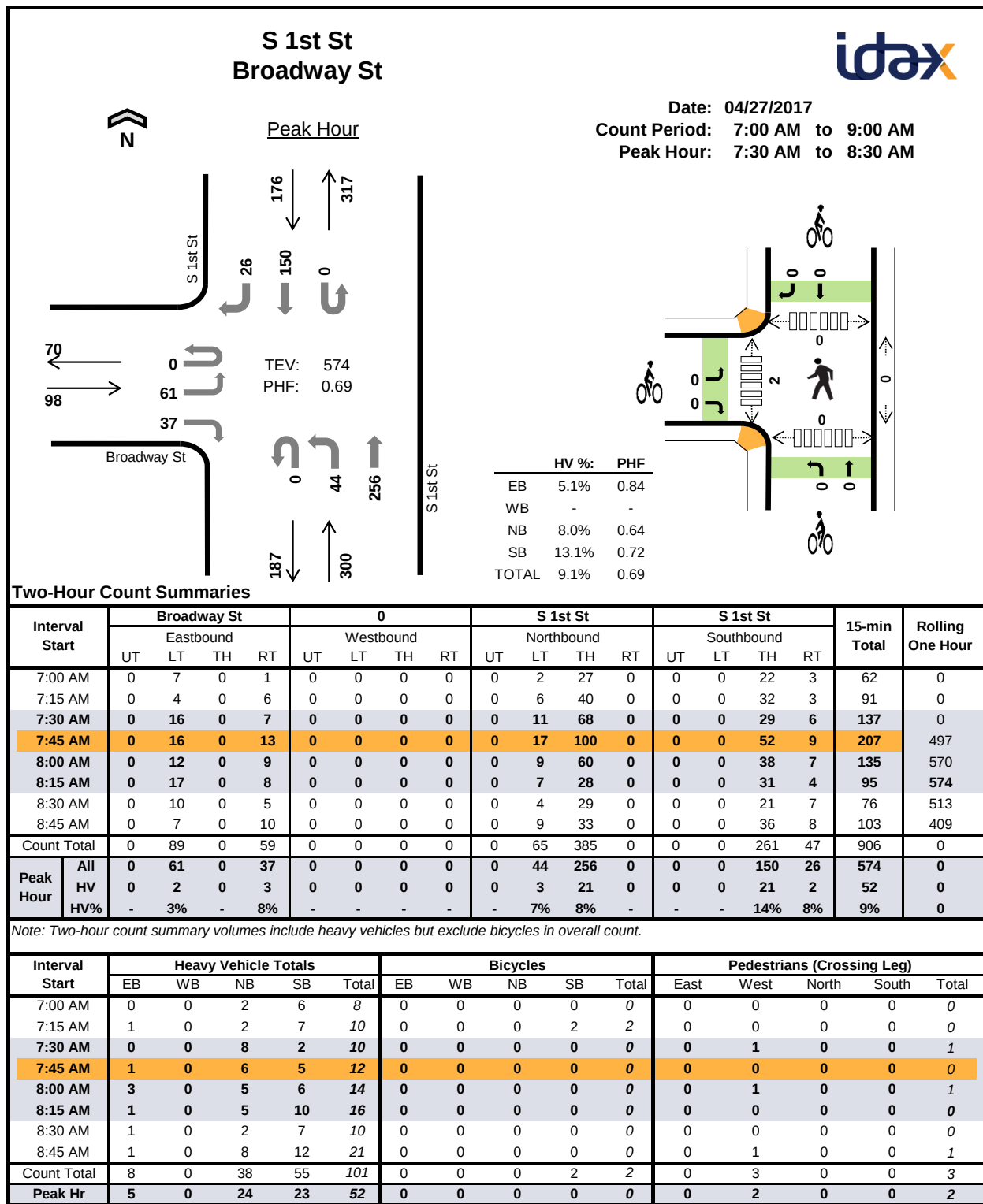
Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Driveway				Lonoak Rd				S 1st St				S 1st St				15-min Total	Rolling One Hour	
	Eastbound				Westbound				Northbound				Southbound						
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
4:00 PM	0	0	0	0	0	5	0	0	0	0	0	9	2	0	0	6	0	22	0
4:15 PM	0	0	0	0	0	2	0	0	0	0	0	6	1	0	0	6	0	15	0
4:30 PM	0	0	0	0	0	1	0	0	0	0	0	6	0	0	0	5	0	12	0
4:45 PM	0	0	0	0	0	1	0	0	0	0	0	6	1	0	0	4	0	12	61
5:00 PM	0	0	0	0	0	2	0	1	0	0	0	6	1	0	1	3	0	14	53
5:15 PM	0	0	0	0	0	2	0	0	0	0	0	7	2	0	0	6	0	17	55
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	2	1	0	1	4	0	8	51
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	5	0	11	50
Count Total	0	0	0	0	0	13	0	1	0	0	0	45	11	0	2	39	0	111	0
Peak Hour	0	0	0	0	0	6	0	1	0	0	0	25	4	0	1	18	0	55	0

Two-Hour Count Summaries - Bikes

Interval Start	Driveway			Lonoak Rd			S 1st St			S 1st St			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	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	0	0
4:30 PM	0	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	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Count Total	0	0	0	0	0	0	0	0	0	0	1	0	1	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	1	0	1	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



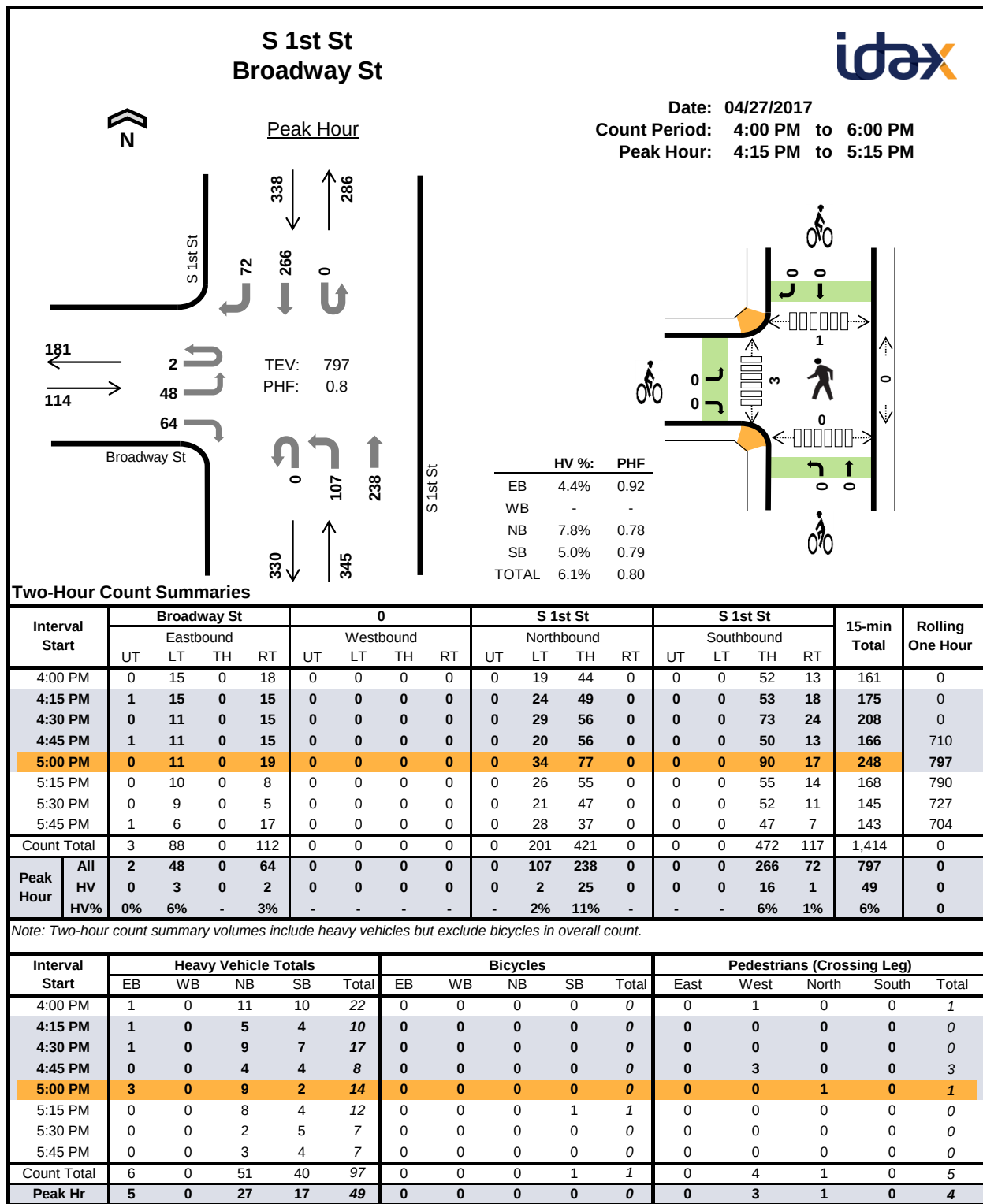
Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Broadway St				0				S 1st St				S 1st St				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	6	0	8	0
7:15 AM	0	0	0	1	0	0	0	0	0	0	2	0	0	0	7	0	10	0
7:30 AM	0	0	0	0	0	0	0	0	0	2	6	0	0	0	2	0	10	0
7:45 AM	0	1	0	0	0	0	0	0	0	1	5	0	0	0	4	1	12	40
8:00 AM	0	1	0	2	0	0	0	0	0	0	5	0	0	0	5	1	14	46
8:15 AM	0	0	0	1	0	0	0	0	0	0	5	0	0	0	10	0	16	52
8:30 AM	0	0	0	1	0	0	0	0	0	0	2	0	0	0	6	1	10	52
8:45 AM	0	0	0	1	0	0	0	0	0	2	6	0	0	0	12	0	21	61
Count Total	0	2	0	6	0	0	0	0	0	5	33	0	0	0	52	3	101	0
Peak Hour	0	2	0	3	0	0	0	0	0	3	21	0	0	0	21	2	52	0

Two-Hour Count Summaries - Bikes

Interval Start	Broadway St			0			S 1st St			S 1st St			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:15 AM	0	0	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	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	2	0	2	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0

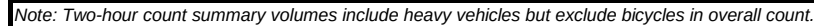
Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Broadway St				0				S 1st St				S 1st St				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	1	0	0	0	0	0	2	9	0	0	0	9	1	22	0
4:15 PM	0	1	0	0	0	0	0	0	0	1	4	0	0	0	4	0	10	0
4:30 PM	0	0	0	1	0	0	0	0	0	0	9	0	0	0	6	1	17	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	0	8	57
5:00 PM	0	2	0	1	0	0	0	0	0	1	8	0	0	0	2	0	14	49
5:15 PM	0	0	0	0	0	0	0	0	0	2	6	0	0	0	4	0	12	51
5:30 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	5	0	7	41
5:45 PM	0	0	0	0	0	0	0	0	0	1	2	0	0	0	4	0	7	40
Count Total	0	3	0	3	0	0	0	0	0	7	44	0	0	0	38	2	97	0
Peak Hour	0	3	0	2	0	0	0	0	0	2	25	0	0	0	16	1	49	0

Two-Hour Count Summaries - Bikes																		
Interval Start	Broadway St				0				S 1st St				S 1st St				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	LT	TH	RT		LT	TH	RT		LT	TH	RT		LT	TH	RT			
4:00 PM	0	0	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		0	0
4:30 PM	0	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	0
5:00 PM	0	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	1		1	1
5:30 PM	0	0	0		0	0	0		0	0	0		0	0	0		0	1
5:45 PM	0	0	0		0	0	0		0	0	0		0	0	0		0	1
Count Total	0	0	0		0	0	0		0	0	0		0	0	1		1	0
Peak Hour	0	0	0		0	0	0		0	0	0		0	0	0		0	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



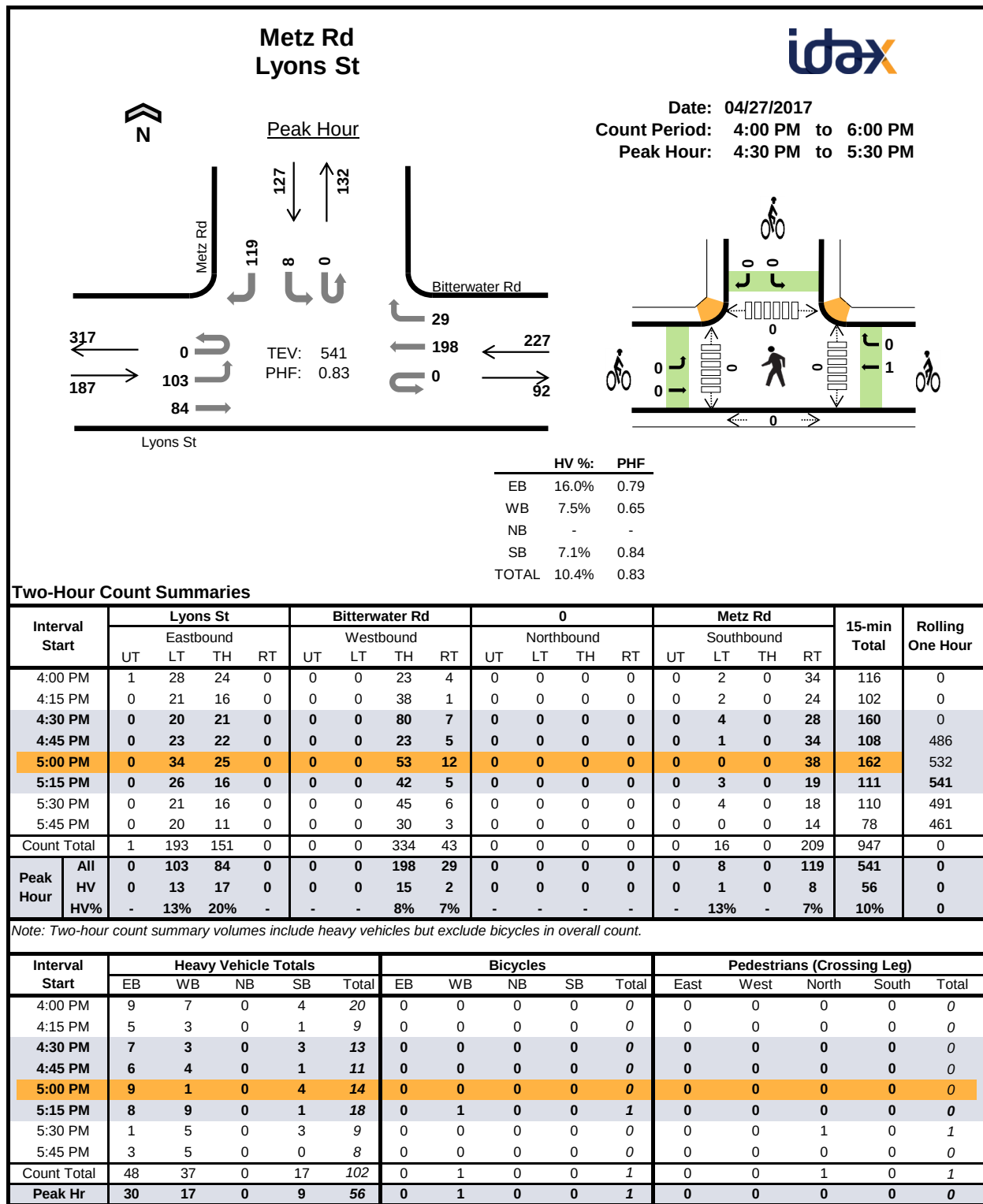
Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Lyons St				Bitterwater Rd				0				Metz Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	1	0	0	0	0	3	0	0	0	0	0	0	0	0	5	9	0
7:15 AM	0	2	1	0	0	0	5	0	0	0	0	0	0	0	0	3	11	0
7:30 AM	0	1	3	0	0	0	2	0	0	0	0	0	0	0	0	1	7	0
7:45 AM	0	2	4	0	0	0	3	0	0	0	0	0	0	1	0	2	12	39
8:00 AM	0	0	5	0	0	0	4	1	0	0	0	0	0	1	0	3	14	44
8:15 AM	0	3	2	0	0	0	6	0	0	0	0	0	0	0	0	4	15	48
8:30 AM	0	0	2	0	0	0	6	1	0	0	0	0	0	0	0	1	10	51
8:45 AM	0	1	5	0	0	0	4	0	0	0	0	0	0	0	0	5	15	54
Count Total	0	10	22	0	0	0	33	2	0	0	0	0	0	2	0	24	93	0
Peak Hour	0	6	14	0	0	0	15	1	0	0	0	0	0	2	0	10	48	0

Two-Hour Count Summaries - Bikes

Interval Start	Lyons St			Bitterwater Rd			0			Metz Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	2	2	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	1
8:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	2
Count Total	0	2	0	0	0	0	0	0	0	0	0	2	4	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



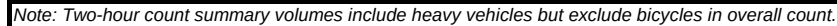
Two-Hour Count Summaries - Heavy Vehicles

Interval Start	Lyons St				Bitterwater Rd				0				Metz Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	5	4	0	0	0	7	0	0	0	0	0	0	1	0	3	20	0
4:15 PM	0	1	4	0	0	0	3	0	0	0	0	0	0	1	0	0	9	0
4:30 PM	0	3	4	0	0	0	3	0	0	0	0	0	0	1	0	2	13	0
4:45 PM	0	2	4	0	0	0	3	1	0	0	0	0	0	0	0	1	11	53
5:00 PM	0	3	6	0	0	0	1	0	0	0	0	0	0	0	0	4	14	47
5:15 PM	0	5	3	0	0	0	8	1	0	0	0	0	0	0	0	1	18	56
5:30 PM	0	1	0	0	0	0	5	0	0	0	0	0	0	1	0	2	9	52
5:45 PM	0	0	3	0	0	0	5	0	0	0	0	0	0	0	0	0	8	49
Count Total	0	20	28	0	0	0	35	2	0	0	0	0	0	4	0	13	102	0
Peak Hour	0	13	17	0	0	0	15	2	0	0	0	0	0	1	0	8	56	0

Two-Hour Count Summaries - Bikes

Interval Start	Lyons St			Bitterwater Rd			0			Metz Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	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	0	0
4:30 PM	0	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	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	1	1
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Count Total	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Peak Hour	0	0	0	0	1	0	0	0	0	0	0	0	1	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



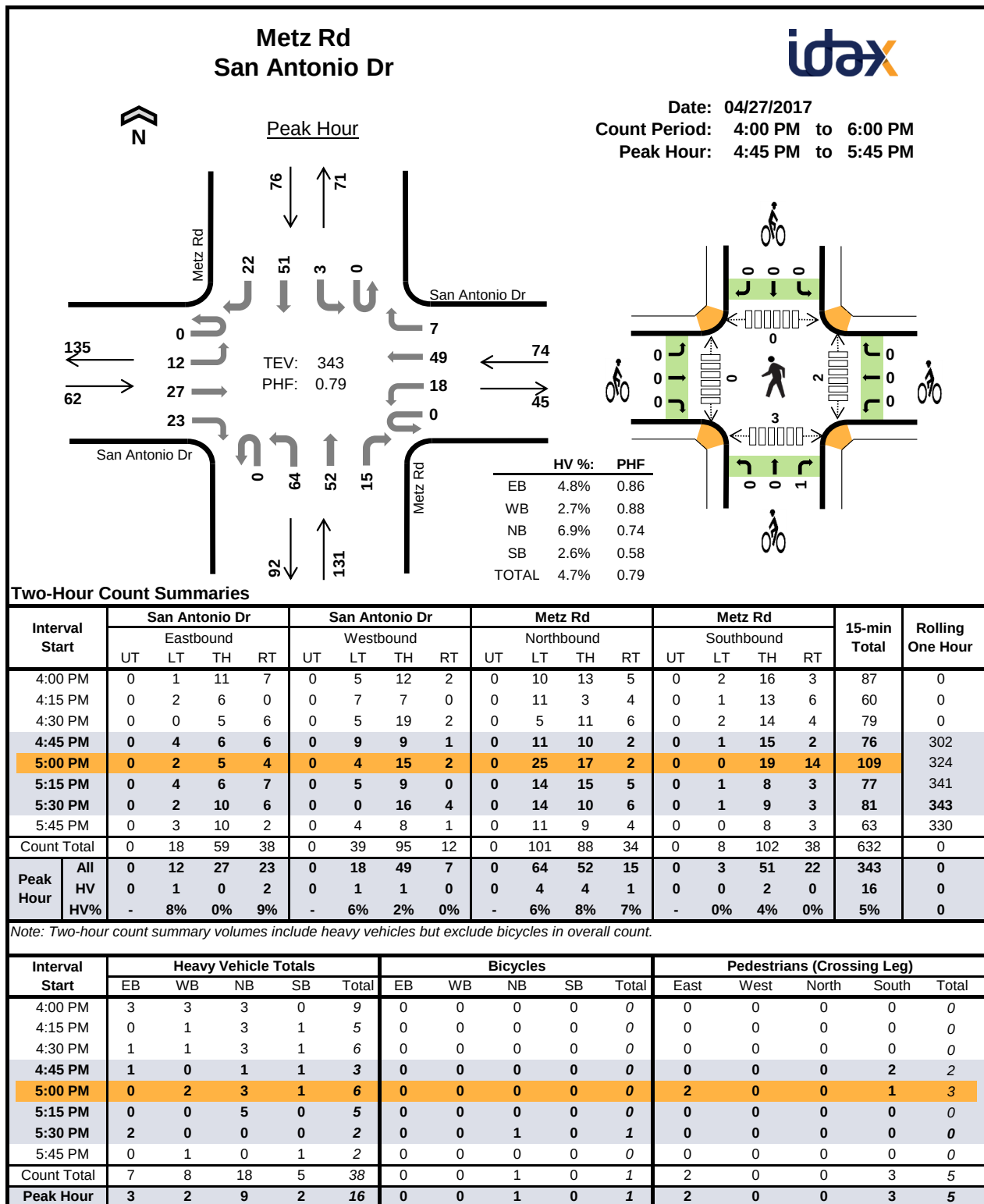
Two-Hour Count Summaries - Heavy Vehicles

Interval Start	San Antonio Dr				San Antonio Dr				Metz Rd				Metz Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	1	0	0	0	3	1	0	0	0	1	0	0	1	2	0	9	0
7:15 AM	0	0	0	2	0	1	0	0	0	1	0	0	0	0	0	0	4	0
7:30 AM	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	3	0
7:45 AM	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	3	19
8:00 AM	0	0	0	1	0	1	0	0	0	0	1	0	0	1	0	0	4	14
8:15 AM	0	0	0	2	0	1	1	0	0	0	1	2	0	0	0	0	7	17
8:30 AM	0	0	0	1	0	1	1	0	0	0	0	0	0	0	1	0	4	18
8:45 AM	0	0	0	0	0	3	0	1	0	1	0	1	0	0	0	0	6	21
Count Total	0	1	0	7	0	12	3	1	0	3	4	3	0	2	4	0	40	0
Peak Hour	0	0	0	4	0	4	1	0	0	1	3	2	0	1	1	0	17	0

Two-Hour Count Summaries - Bikes

Interval Start	San Antonio Dr			San Antonio Dr			Metz Rd			Metz Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	2	0	2	0
7:15 AM	0	0	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	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:00 AM	0	0	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	0	0
8:30 AM	0	0	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	0	0
Count Total	0	0	0	0	0	0	0	0	0	0	2	0	2	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Two-Hour Count Summaries - Heavy Vehicles

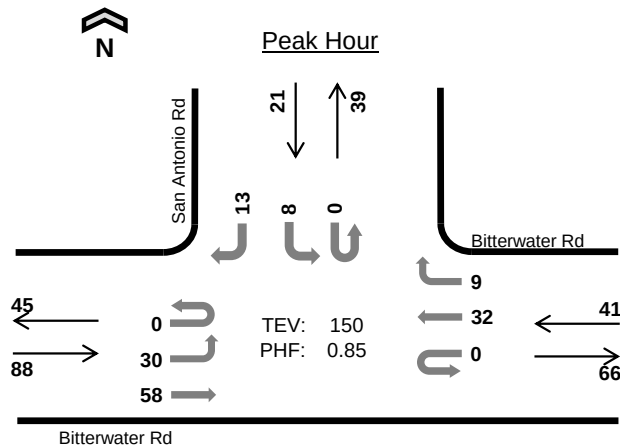
Interval Start	San Antonio Dr				San Antonio Dr				Metz Rd				Metz Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	2	1	0	1	2	0	0	1	1	1	0	0	0	0	9	0
4:15 PM	0	0	0	0	0	1	0	0	0	2	0	1	0	0	1	0	5	0
4:30 PM	0	0	0	1	0	1	0	0	0	0	1	2	0	0	1	0	6	0
4:45 PM	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	3	23
5:00 PM	0	0	0	0	0	1	1	0	0	0	2	1	0	0	1	0	6	20
5:15 PM	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	5	20
5:30 PM	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	16
5:45 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	2	15
Count Total	0	1	2	4	0	4	4	0	0	7	6	5	0	0	4	1	38	0
Peak Hour	0	1	0	2	0	1	1	0	0	4	4	1	0	0	2	0	16	0

Two-Hour Count Summaries - Bikes

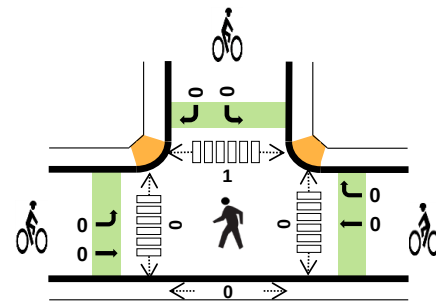
Interval Start	San Antonio Dr			San Antonio Dr			Metz Rd			Metz Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	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	0
5:30 PM	0	0	0	0	0	0	0	0	1	0	0	0	1	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Count Total	0	0	0	0	0	0	0	0	1	0	0	0	1	0
Peak Hour	0	0	0	0	0	0	0	0	1	0	0	0	1	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

San Antonio Rd Bitterwater Rd



Date: 04/27/2017
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM



	HV %:	PHF
EB	14.8%	0.71
WB	31.7%	0.73
NB	-	-
SB	14.3%	0.66
TOTAL	19.3%	0.85

Two-Hour Count Summaries

Interval Start	Bitterwater Rd Eastbound				Bitterwater Rd Westbound				0 Northbound				San Antonio Rd Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	1	9	0	0	0	11	3	0	0	0	0	0	7	0	0	31	0
7:15 AM	0	2	10	0	0	0	9	0	0	0	0	0	0	2	0	2	25	0
7:30 AM	0	7	12	0	0	0	8	6	0	0	0	0	0	2	0	6	41	0
7:45 AM	0	10	21	0	0	0	8	1	0	0	0	0	0	0	0	4	44	141
8:00 AM	0	9	14	0	0	0	10	1	0	0	0	0	0	4	0	1	39	149
8:15 AM	0	4	11	0	0	0	6	1	0	0	0	0	0	2	0	2	26	150
8:30 AM	0	0	15	0	0	0	12	2	0	0	0	0	0	3	0	4	36	145
8:45 AM	0	2	16	0	0	0	15	2	0	0	0	0	0	2	0	2	39	140
Count Total	0	35	108	0	0	0	79	16	0	0	0	0	0	22	0	21	281	0
Peak Hour	All	0	30	58	0	0	0	32	9	0	0	0	0	8	0	13	150	0
	HV	0	3	10	0	0	0	11	2	0	0	0	0	0	0	3	29	0
	HV%	-	10%	17%	-	-	-	34%	22%	-	-	-	-	-	0%	23%	19%	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	2	0	2	4	0	0	0	0	0	0	0	0	0	0
7:15 AM	1	3	0	0	4	0	0	0	0	0	0	0	1	0	1
7:30 AM	3	2	0	0	5	0	0	0	0	0	0	0	1	0	1
7:45 AM	4	3	0	1	8	0	0	0	0	0	0	0	0	0	0
8:00 AM	6	4	0	1	11	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	4	0	1	5	0	0	0	0	0	0	0	0	0	0
8:30 AM	1	6	0	1	8	1	0	0	0	1	0	0	1	0	1
8:45 AM	2	2	0	1	5	0	0	0	0	0	0	0	1	0	1
Count Total	17	26	0	7	50	1	0	0	0	1	0	0	4	0	4
Peak Hr	13	13	0	3	29	0	0	0	0	0	0	0	1	0	1

Two-Hour Count Summaries - Heavy Vehicles

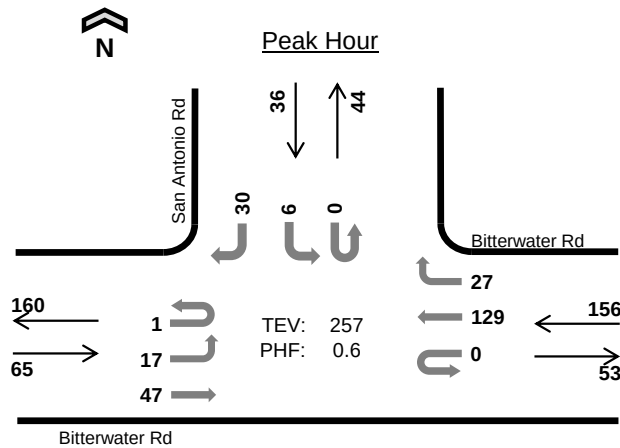
Interval Start	Bitterwater Rd				Bitterwater Rd				0				San Antonio Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	1	1	0	0	0	0	0	2	0	0	4	0
7:15 AM	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	4	0
7:30 AM	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	0	5	0
7:45 AM	0	1	3	0	0	0	3	0	0	0	0	0	0	0	0	1	8	21
8:00 AM	0	2	4	0	0	0	3	1	0	0	0	0	0	0	0	1	11	28
8:15 AM	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	1	5	29
8:30 AM	0	0	1	0	0	0	5	1	0	0	0	0	0	0	0	1	8	32
8:45 AM	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	1	5	29
Count Total	0	3	14	0	0	0	22	4	0	0	0	0	0	2	0	5	50	0
Peak Hour	0	3	10	0	0	0	11	2	0	0	0	0	0	0	0	3	29	0

Two-Hour Count Summaries - Bikes

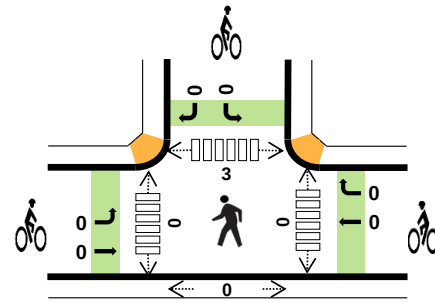
Interval Start	Bitterwater Rd			Bitterwater Rd			0			San Antonio Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	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	0	0
8:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	1
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Count Total	0	1	0	0	0	0	0	0	0	0	0	0	1	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

San Antonio Rd Bitterwater Rd



Date: 04/27/2017
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM



	HV %:	PHF
EB	26.2%	0.71
WB	7.1%	0.51
NB	-	-
SB	5.6%	0.60
TOTAL	11.7%	0.60

Two-Hour Count Summaries

Interval Start		Bitterwater Rd				Bitterwater Rd				0				San Antonio Rd				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	1	20	0	0	0	17	5	0	0	0	0	0	5	0	6	54	0
4:15 PM		0	0	14	0	0	0	30	3	0	0	0	0	0	1	0	2	50	0
4:30 PM		0	3	13	0	0	0	64	12	0	0	0	0	0	2	0	13	107	0
4:45 PM		0	4	10	0	0	0	14	2	0	0	0	0	0	4	0	3	37	248
5:00 PM		0	5	18	0	0	0	25	6	0	0	0	0	0	0	0	6	60	254
5:15 PM		1	5	6	0	0	0	26	7	0	0	0	0	0	0	0	8	53	257
5:30 PM		0	3	13	0	0	0	34	7	0	0	0	0	0	3	0	5	65	215
5:45 PM		0	2	8	0	0	0	23	3	0	0	0	0	0	0	0	7	43	221
Count Total		1	23	102	0	0	0	233	45	0	0	0	0	0	15	0	50	469	0
Peak Hour	All	1	17	47	0	0	0	129	27	0	0	0	0	0	6	0	30	257	0
	HV	0	6	11	0	0	0	11	0	0	0	0	0	0	1	0	1	30	0
	HV%	0%	35%	23%	-	-	-	9%	0%	-	-	-	-	-	17%	-	3%	12%	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	4	6	0	3	13	0	0	0	0	0	0	0	0	0	0
4:15 PM	4	4	0	1	9	0	0	0	0	0	0	0	0	0	0
4:30 PM	3	2	0	0	5	0	0	0	0	0	0	0	0	0	0
4:45 PM	5	4	0	1	10	0	0	0	0	0	0	0	1	0	1
5:00 PM	7	0	0	0	7	0	0	0	0	0	0	0	1	0	1
5:15 PM	2	5	0	1	8	0	0	0	0	0	0	0	1	0	1
5:30 PM	2	4	0	0	6	0	0	0	0	0	0	0	1	0	1
5:45 PM	3	7	0	0	10	0	0	0	0	0	0	0	0	0	0
Count Total	30	32	0	6	68	0	0	0	0	0	0	0	4	0	4
Peak Hr	17	11	0	2	30	0	0	0	0	0	0	0	3	0	3

Two-Hour Count Summaries - Heavy Vehicles																			
Interval Start	Bitterwater Rd				Bitterwater Rd				0				San Antonio Rd				15-min Total	Rolling One Hour	
	Eastbound				Westbound				Northbound				Southbound						
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
4:00 PM	0	0	4	0	0	0	5	1	0	0	0	0	0	0	3	0	0	13	0
4:15 PM	0	0	4	0	0	0	3	1	0	0	0	0	0	0	0	0	1	9	0
4:30 PM	0	1	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	5	0
4:45 PM	0	2	3	0	0	0	4	0	0	0	0	0	0	0	1	0	0	10	37
5:00 PM	0	2	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	31
5:15 PM	0	1	1	0	0	0	5	0	0	0	0	0	0	0	0	0	1	8	30
5:30 PM	0	0	2	0	0	0	4	0	0	0	0	0	0	0	0	0	0	6	31
5:45 PM	0	0	3	0	0	0	5	2	0	0	0	0	0	0	0	0	0	10	31
Count Total	0	6	24	0	0	0	28	4	0	0	0	0	0	0	4	0	2	68	0
Peak Hour	0	6	11	0	0	0	11	0	0	0	0	0	0	0	1	0	1	30	0

Two-Hour Count Summaries - Bikes																		
Interval Start	Bitterwater Rd				Bitterwater Rd				0				San Antonio Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	LT	TH	RT		LT	TH	RT		LT	TH	RT		LT	TH	RT			
4:00 PM	0	0	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		0	0
4:30 PM	0	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	0
5:00 PM	0	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	0
5:30 PM	0	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	0
Count Total	0	0	0		0	0	0		0	0	0		0	0	0		0	0
Peak Hour	0	0	0		0	0	0		0	0	0		0	0	0		0	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Appendix C

Intersection
Level of Service
Calculations

Existing Conditions

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HCM Unsignalized Intersection Capacity Analysis

Existing AM

1: River Dr/SB US 101 Ramps & Broadway Cir

																		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR						
Lane Configurations																		
Sign Control	Stop			Stop			Stop			Stop								
Traffic Volume (vph)	77	21	29	2	17	2	52	1	4	7	3	373						
Future Volume (vph)	77	21	29	2	17	2	52	1	4	7	3	373						
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81						
Hourly flow rate (vph)	95	26	36	2	21	2	64	1	5	9	4	460						
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1	SB 2												
Volume Total (vph)	95	62	25	70	13	460												
Volume Left (vph)	95	0	2	64	9	0												
Volume Right (vph)	0	36	2	5	0	460												
Hadj (s)	0.55	-0.36	0.05	0.17	0.22	-0.52												
Departure Headway (s)	5.3	4.4	4.4	4.5	4.6	3.2												
Degree Utilization, x	0.14	0.08	0.03	0.09	0.02	0.41												
Capacity (veh/h)	666	801	791	761	733	1115												
Control Delay (s)	7.9	6.5	7.6	8.0	7.7	8.4												
Approach Delay (s)	7.4		7.6	8.0	8.4													
Approach LOS	A		A	A	A													
Intersection Summary																		
Delay	8.1																	
Level of Service	A																	
Intersection Capacity Utilization	39.8%			ICU Level of Service			A											
Analysis Period (min)	15																	

HCM 2010 Signalized Intersection Summary
2: Broadway Cir/San Antonio Dr & Broadway St

Existing AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	3	13	152	4	100	5	190	253	190	239	1
Future Volume (veh/h)	0	3	13	152	4	100	5	190	253	190	239	1
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1681	1900	1845	1845	1845	1810	1810	1810	1863	1863	1900
Adj Flow Rate, veh/h	0	4	16	190	5	125	6	238	316	238	299	1
Adj No. of Lanes	0	1	0	1	1	1	1	2	1	1	2	0
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	13	13	13	3	3	3	5	5	5	2	2	2
Cap, veh/h	0	7	28	280	294	246	14	1139	755	289	1760	6
Arrive On Green	0.00	0.02	0.02	0.16	0.16	0.16	0.01	0.33	0.33	0.16	0.49	0.49
Sat Flow, veh/h	0	295	1179	1757	1845	1547	1723	3438	1538	1774	3618	12
Grp Volume(v), veh/h	0	0	20	190	5	125	6	238	316	238	146	154
Grp Sat Flow(s),veh/h/ln	0	0	1473	1757	1845	1547	1723	1719	1538	1774	1770	1861
Q Serve(g_s), s	0.0	0.0	0.7	5.7	0.1	4.1	0.2	2.8	7.4	7.2	2.6	2.6
Cycle Q Clear(g_c), s	0.0	0.0	0.7	5.7	0.1	4.1	0.2	2.8	7.4	7.2	2.6	2.6
Prop In Lane	0.00		0.80	1.00		1.00	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	0	0	35	280	294	246	14	1139	755	289	861	905
V/C Ratio(X)	0.00	0.00	0.57	0.68	0.02	0.51	0.44	0.21	0.42	0.82	0.17	0.17
Avail Cap(c_a), veh/h	0	0	132	567	595	499	154	1139	755	334	861	905
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	27.0	22.1	19.8	21.5	27.6	13.4	9.1	22.6	8.0	8.0
Incr Delay (d2), s/veh	0.0	0.0	13.6	2.9	0.0	1.6	20.4	0.4	1.7	13.6	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.4	3.0	0.1	1.9	0.2	1.4	4.4	4.6	1.4	1.4
LnGrp Delay(d),s/veh	0.0	0.0	40.6	25.0	19.8	23.1	48.0	13.8	10.8	36.2	8.5	8.4
LnGrp LOS			D	C	B	C	D	B	B	D	A	A
Approach Vol, veh/h	20			320			560			538		
Approach Delay, s/veh	40.6			24.2			12.5			20.7		
Approach LOS	D			C			B			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.6	23.0		5.8	4.9	31.7		13.4				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.5	18.5		5.0	5.0	24.0		18.0				
Max Q Clear Time (g_c+I1), s	9.2	9.4		2.7	2.2	4.6		7.7				
Green Ext Time (p_c), s	0.1	3.1		0.0	0.0	4.4		0.7				
Intersection Summary												
HCM 2010 Ctrl Delay				18.6								
HCM 2010 LOS				B								

HCM 2010 TWSC
3: First St & SB US 101 Ramps

Existing AM

Intersection												
Int Delay, s/veh	9.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	186	0	7	0	0	0	0	40	0	42	33	0
Future Vol, veh/h	186	0	7	0	0	0	0	40	0	42	33	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	64	64	64	64	64	64	64	64	64	64	64	64
Heavy Vehicles, %	10	10	10	2	2	2	15	15	15	23	23	23
Mvmt Flow	291	0	11	0	0	0	0	63	0	66	52	0
Major/Minor	Minor2						Major1			Major2		
Conflicting Flow All	246	246	52				-	0	0	63	0	0
Stage 1	183	183	-				-	-	-	-	-	-
Stage 2	63	63	-				-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3				-	-	-	4.33	-	-
Critical Hdwy Stg 1	5.5	5.6	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-				-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39				-	-	-	2.407	-	-
Pot Cap-1 Maneuver	725	643	994				0	-	-	1416	-	0
Stage 1	829	733	-				0	-	-	-	-	0
Stage 2	940	827	-				0	-	-	-	-	0
Platoon blocked, %								-	-			-
Mov Cap-1 Maneuver	690	0	994				-	-	-	1416	-	-
Mov Cap-2 Maneuver	690	0	-				-	-	-	-	-	-
Stage 1	789	0	-				-	-	-	-	-	-
Stage 2	940	0	-				-	-	-	-	-	-
Approach	EB						NB			SB		
HCM Control Delay, s	13.8						0			4.3		
HCM LOS	B											
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT						
Capacity (veh/h)	-	-	690	994	1416	-						
HCM Lane V/C Ratio	-	-	0.421	0.011	0.046	-						
HCM Control Delay (s)	-	-	14	8.7	7.7	0						
HCM Lane LOS	-	-	B	A	A	A						
HCM 95th %tile Q(veh)	-	-	2.1	0	0.1	-						

HCM 2010 TWSC
4: First St & NB US 101 Ramps

Existing AM

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰	↱		↰			↱	
Traffic Vol, veh/h	0	0	0	1	1	93	5	221	0	0	74	82
Future Vol, veh/h	0	0	0	1	1	93	5	221	0	0	74	82
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	50	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	71	71	71	71	71	71	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	8	8	8	13	13	13	28	28	28
Mvmt Flow	0	0	0	1	1	131	7	311	0	0	104	115
Major/Minor				Minor1		Major1			Major2			
Conflicting Flow All				487	545	311	220	0	-	-	-	0
Stage 1				325	325	-	-	-	-	-	-	-
Stage 2				162	220	-	-	-	-	-	-	-
Critical Hdwy				6.48	6.58	6.28	4.23	-	-	-	-	-
Critical Hdwy Stg 1				5.48	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2				5.48	5.58	-	-	-	-	-	-	-
Follow-up Hdwy				3.572	4.072	3.372	2.317	-	-	-	-	-
Pot Cap-1 Maneuver				529	437	715	1287	-	0	0	-	-
Stage 1				719	638	-	-	-	0	0	-	-
Stage 2				853	710	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver				525	0	715	1287	-	-	-	-	-
Mov Cap-2 Maneuver				525	0	-	-	-	-	-	-	-
Stage 1				714	0	-	-	-	-	-	-	-
Stage 2				853	0	-	-	-	-	-	-	-
Approach				WB		NB			SB			
HCM Control Delay, s				11.2		0.2			0			
HCM LOS				B								
Minor Lane/Major Mvmt	NBL	NBT	WBLn1	WBLn2	SBT	SBR						
Capacity (veh/h)	1287	-	525	715	-	-						
HCM Lane V/C Ratio	0.005	-	0.005	0.183	-	-						
HCM Control Delay (s)	7.8	0	11.9	11.2	-	-						
HCM Lane LOS	A	A	B	B	-	-						
HCM 95th %tile O(veh)	0	-	0	0.7	-	-						

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Vol, veh/h	0	0	0	31	0	18	0	275	47	42	116	0
Future Vol, veh/h	0	0	0	31	0	18	0	275	47	42	116	0
Conflicting Peds, #/hr	0	0	1	1	0	0	2	0	21	21	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	73	73	73	73	73	73	73	73	73
Heavy Vehicles, %	2	2	2	29	29	29	12	12	12	17	17	17
Mvmt Flow	0	0	0	42	0	25	0	377	64	58	159	0
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	697	738	162	705	706	430	161	0	0	462	0	0
Stage 1	276	276	-	430	430	-	-	-	-	-	-	-
Stage 2	421	462	-	275	276	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.39	6.79	6.49	4.22	-	-	4.27	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.39	5.79	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.39	5.79	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.761	4.261	3.561	2.308	-	-	2.353	-	-
Pot Cap-1 Maneuver	356	346	883	318	329	572	1359	-	-	1025	-	-
Stage 1	730	682	-	554	540	-	-	-	-	-	-	-
Stage 2	610	565	-	676	635	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	324	317	880	297	302	561	1358	-	-	1025	-	-
Mov Cap-2 Maneuver	324	317	-	297	302	-	-	-	-	-	-	-
Stage 1	729	638	-	543	529	-	-	-	-	-	-	-
Stage 2	583	554	-	633	594	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			17.3			0			2.3		
HCM LOS	A			C								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1358	-	-	-	359	1025	-	-				
HCM Lane V/C Ratio	-	-	-	-	0.187	0.056	-	-				
HCM Control Delay (s)	0	-	-	0	17.3	8.7	0	-				
HCM Lane LOS	A	-	-	A	C	A	A	-				
HCM 95th %tile O(veh)	0	-	-	-	0.7	0.2	-	-				

Intersection									
Intersection Delay, s/veh	12.5								
Intersection LOS	B								
Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations									
Traffic Vol, veh/h	0	61	37	0	44	256	0	150	26
Future Vol, veh/h	0	61	37	0	44	256	0	150	26
Peak Hour Factor	0.92	0.69	0.69	0.92	0.69	0.69	0.92	0.69	0.69
Heavy Vehicles, %	2	5	5	2	8	8	2	13	13
Mvmt Flow	0	88	54	0	64	371	0	217	38
Number of Lanes	0	1	1	0	1	1	0	1	0
Approach	EB			NB			SB		
Opposing Approach				SB			NB		
Opposing Lanes	0			1			2		
Conflicting Approach Left	SB			EB					
Conflicting Lanes Left	1			2			0		
Conflicting Approach Right	NB						EB		
Conflicting Lanes Right	2			0			2		
HCM Control Delay	10.1			13.7			11.8		
HCM LOS	B			B			B		
Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1				
Vol Left, %	100%	0%	100%	0%	0%				
Vol Thru, %	0%	100%	0%	0%	85%				
Vol Right, %	0%	0%	0%	100%	15%				
Sign Control	Stop	Stop	Stop	Stop	Stop				
Traffic Vol by Lane	44	256	61	37	176				
LT Vol	44	0	61	0	0				
Through Vol	0	256	0	0	150				
RT Vol	0	0	0	37	26				
Lane Flow Rate	64	371	88	54	255				
Geometry Grp	7	7	7	7	4				
Degree of Util (X)	0.103	0.547	0.166	0.083	0.381				
Departure Headway (Hd)	5.815	5.312	6.775	5.56	5.377				
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes				
Cap	613	675	525	638	663				
Service Time	3.582	3.078	4.569	3.353	3.45				
HCM Lane V/C Ratio	0.104	0.55	0.168	0.085	0.385				
HCM Control Delay	9.3	14.4	10.9	8.9	11.8				
HCM Lane LOS	A	B	B	A	B				
HCM 95th-tile Q	0.3	3.3	0.6	0.3	1.8				

Intersection							
Int Delay, s/veh	5						
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		↰	↰		↰	↰	
Traffic Vol, veh/h	148	117	57	13	4	103	
Future Vol, veh/h	148	117	57	13	4	103	
Conflicting Peds, #/hr	1	0	0	1	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	-	-	100	0	
Veh in Median Storage, #	-	0	0	-	0	-	
Grade, %	-	0	0	-	0	-	
Peak Hour Factor	72	72	72	72	72	72	
Heavy Vehicles, %	8	8	23	23	11	11	
Mvmt Flow	206	163	79	18	6	143	
Major/Minor	Major1		Major2		Minor2		
Conflicting Flow All	98	0	-	0	663	89	
Stage 1	-	-	-	-	89	-	
Stage 2	-	-	-	-	574	-	
Critical Hdwy	4.18	-	-	-	6.51	6.31	
Critical Hdwy Stg 1	-	-	-	-	5.51	-	
Critical Hdwy Stg 2	-	-	-	-	5.51	-	
Follow-up Hdwy	2.272	-	-	-	3.599	3.399	
Pot Cap-1 Maneuver	1458	-	-	-	413	945	
Stage 1	-	-	-	-	912	-	
Stage 2	-	-	-	-	546	-	
Platoon blocked, %		-	-	-			
Mov Cap-1 Maneuver	1458	-	-	-	348	944	
Mov Cap-2 Maneuver	-	-	-	-	348	-	
Stage 1	-	-	-	-	911	-	
Stage 2	-	-	-	-	461	-	
Approach	EB		WB		SB		
HCM Control Delay, s	4.4		0		9.7		
HCM LOS					A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2	
Capacity (veh/h)	1458	-	-	-	348	944	
HCM Lane V/C Ratio	0.141	-	-	-	0.016	0.152	
HCM Control Delay (s)	7.9	0	-	-	15.5	9.5	
HCM Lane LOS	A	A	-	-	C	A	
HCM 95th %tile Q(veh)	0.5	-	-	-	0	0.5	

Intersection												
Int Delay, s/veh	6.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱	↱	↰	↱	↱
Traffic Vol, veh/h	19	31	68	17	18	1	67	46	21	7	23	10
Future Vol, veh/h	19	31	68	17	18	1	67	46	21	7	23	10
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	100	-	-	90	-	90	60	-	110
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	61	61	61	61	61	61	61	61	61	61	61	61
Heavy Vehicles, %	3	3	3	14	14	14	5	5	5	5	5	5
Mvmt Flow	31	51	111	28	30	2	110	75	34	11	38	16
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	31	0	0	163	0	0	275	257	108	293	312	30
Stage 1	-	-	-	-	-	-	170	170	-	86	86	-
Stage 2	-	-	-	-	-	-	105	87	-	207	226	-
Critical Hdwy	4.13	-	-	4.24	-	-	7.15	6.55	6.25	7.15	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Follow-up Hdwy	2.227	-	-	2.326	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	1575	-	-	1346	-	-	671	642	938	653	598	1036
Stage 1	-	-	-	-	-	-	825	752	-	914	818	-
Stage 2	-	-	-	-	-	-	893	817	-	788	711	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1575	-	-	1346	-	-	608	616	937	553	573	1036
Mov Cap-2 Maneuver	-	-	-	-	-	-	608	616	-	553	573	-
Stage 1	-	-	-	-	-	-	808	736	-	896	801	-
Stage 2	-	-	-	-	-	-	820	800	-	668	696	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.2			3.7			11.5			10.9		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	608	616	937	1575	-	-	1346	-	-	553	573	1036
HCM Lane V/C Ratio	0.181	0.122	0.037	0.02	-	-	0.021	-	-	0.021	0.066	0.016
HCM Control Delay (s)	12.2	11.7	9	7.3	-	-	7.7	-	-	11.6	11.7	8.5
HCM Lane LOS	B	B	A	A	-	-	A	-	-	B	B	A
HCM 95th %tile Q(veh)	0.7	0.4	0.1	0.1	-	-	0.1	-	-	0.1	0.2	0

Intersection							
Int Delay, s/veh	2.8						
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Vol, veh/h	30	58	32	9	8	13	
Future Vol, veh/h	30	58	32	9	8	13	
Conflicting Peds, #/hr	1	0	0	1	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	105	-	-	-	100	0	
Veh in Median Storage, #	-	0	0	-	0	-	
Grade, %	-	0	0	-	0	-	
Peak Hour Factor	85	85	85	85	85	85	
Heavy Vehicles, %	15	15	32	32	14	14	
Mvmt Flow	35	68	38	11	9	15	
Major/Minor	Major1		Major2		Minor2		
Conflicting Flow All	49	0	-	0	183	44	
Stage 1	-	-	-	-	44	-	
Stage 2	-	-	-	-	139	-	
Critical Hdwy	4.25	-	-	-	6.54	6.34	
Critical Hdwy Stg 1	-	-	-	-	5.54	-	
Critical Hdwy Stg 2	-	-	-	-	5.54	-	
Follow-up Hdwy	2.335	-	-	-	3.626	3.426	
Pot Cap-1 Maneuver	1478	-	-	-	780	993	
Stage 1	-	-	-	-	949	-	
Stage 2	-	-	-	-	859	-	
Platoon blocked, %		-	-	-			
Mov Cap-1 Maneuver	1478	-	-	-	760	992	
Mov Cap-2 Maneuver	-	-	-	-	760	-	
Stage 1	-	-	-	-	948	-	
Stage 2	-	-	-	-	838	-	
Approach	EB		WB		SB		
HCM Control Delay, s	2.6		0		9.1		
HCM LOS					A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2	
Capacity (veh/h)	1478	-	-	-	760	992	
HCM Lane V/C Ratio	0.024	-	-	-	0.012	0.015	
HCM Control Delay (s)	7.5	-	-	-	9.8	8.7	
HCM Lane LOS	A	-	-	-	A	A	
HCM 95th %tile Q(veh)	0.1	-	-	-	0	0	

HCM Unsignalized Intersection Capacity Analysis

Existing PM

1: River Dr/SB US 101 Ramps & Broadway Cir

																		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR						
Lane Configurations																		
Sign Control	Stop			Stop			Stop			Stop								
Traffic Volume (vph)	78	34	83	4	32	9	81	11	2	22	33	422						
Future Volume (vph)	78	34	83	4	32	9	81	11	2	22	33	422						
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)	80	35	86	4	33	9	84	11	2	23	34	435						
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1	SB 2												
Volume Total (vph)	80	121	46	97	57	435												
Volume Left (vph)	80	0	4	84	23	0												
Volume Right (vph)	0	86	9	2	0	435												
Hadj (s)	0.53	-0.46	0.02	0.19	0.11	-0.57												
Departure Headway (s)	5.5	4.5	4.6	4.7	4.7	3.2												
Degree Utilization, x	0.12	0.15	0.06	0.13	0.07	0.39												
Capacity (veh/h)	638	777	734	720	715	1114												
Control Delay (s)	8.0	7.0	7.9	8.4	8.1	8.2												
Approach Delay (s)	7.4		7.9	8.4	8.2													
Approach LOS	A		A	A	A													
Intersection Summary																		
Delay	8.0																	
Level of Service	A																	
Intersection Capacity Utilization	46.7%			ICU Level of Service				A										
Analysis Period (min)	15																	

HCM 2010 Signalized Intersection Summary
2: Broadway Cir/San Antonio Dr & Broadway St

Existing PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	18	21	248	19	245	22	282	299	179	186	10
Future Volume (veh/h)	4	18	21	248	19	245	22	282	299	179	186	10
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	4	20	24	279	21	275	25	317	336	201	209	11
Adj No. of Lanes	0	1	0	1	1	1	1	2	1	1	2	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	6	32	39	384	403	342	50	1073	823	248	1418	74
Arrive On Green	0.05	0.05	0.05	0.22	0.22	0.22	0.03	0.30	0.30	0.14	0.41	0.41
Sat Flow, veh/h	142	710	853	1774	1863	1581	1774	3539	1583	1774	3421	179
Grp Volume(v), veh/h	48	0	0	279	21	275	25	317	336	201	108	112
Grp Sat Flow(s),veh/h/ln	1705	0	0	1774	1863	1581	1774	1770	1583	1774	1770	1831
Q Serve(g_s), s	1.7	0.0	0.0	8.9	0.5	10.1	0.8	4.2	7.9	6.7	2.3	2.3
Cycle Q Clear(g_c), s	1.7	0.0	0.0	8.9	0.5	10.1	0.8	4.2	7.9	6.7	2.3	2.3
Prop In Lane	0.08		0.50	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	78	0	0	384	403	342	50	1073	823	248	733	759
V/C Ratio(X)	0.62	0.00	0.00	0.73	0.05	0.80	0.50	0.30	0.41	0.81	0.15	0.15
Avail Cap(c_a), veh/h	140	0	0	523	550	466	145	1073	823	305	733	759
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.6	0.0	0.0	22.2	18.9	22.7	29.2	16.3	8.9	25.5	11.1	11.1
Incr Delay (d2), s/veh	7.7	0.0	0.0	3.2	0.1	7.1	7.4	0.7	1.5	12.7	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	4.7	0.3	5.0	0.5	2.1	5.3	4.2	1.2	1.3
LnGrp Delay(d),s/veh	36.3	0.0	0.0	25.5	19.0	29.7	36.7	17.0	10.4	38.1	11.6	11.6
LnGrp LOS	D			C	B	C	D	B	B	D	B	B
Approach Vol, veh/h		48			575			678			421	
Approach Delay, s/veh		36.3			27.3			14.5			24.2	
Approach LOS		D			C			B			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.0	23.0		7.3	6.2	29.8		17.7				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.5	18.5		5.0	5.0	24.0		18.0				
Max Q Clear Time (g_c+I1), s	8.7	9.9		3.7	2.8	4.3		12.1				
Green Ext Time (p_c), s	0.1	3.1		0.0	0.0	4.5		1.1				
Intersection Summary												
HCM 2010 Ctrl Delay				21.7								
HCM 2010 LOS				C								

HCM 2010 TWSC
3: First St & SB US 101 Ramps

Existing PM

Intersection												
Int Delay, s/veh	6.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	107	0	12	0	0	0	0	69	0	58	24	0
Future Vol, veh/h	107	0	12	0	0	0	0	69	0	58	24	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	15	15	15	2	2	2	9	9	9	12	12	12
Mvmt Flow	137	0	15	0	0	0	0	88	0	74	31	0
Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	267	267	31				-	0	0	88	0	0
Stage 1	179	179	-				-	-	-	-	-	-
Stage 2	88	88	-				-	-	-	-	-	-
Critical Hdwy	7.25	6.65	6.35				-	-	-	4.22	-	-
Critical Hdwy Stg 1	6.25	5.65	-				-	-	-	-	-	-
Critical Hdwy Stg 2	6.25	5.65	-				-	-	-	-	-	-
Follow-up Hdwy	3.635	4.135	3.435				-	-	-	2.308	-	-
Pot Cap-1 Maneuver	660	617	1007				0	-	-	1447	-	0
Stage 1	793	727	-				0	-	-	-	-	0
Stage 2	888	797	-				0	-	-	-	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	634	585	1007				-	-	-	1447	-	-
Mov Cap-2 Maneuver	634	585	-				-	-	-	-	-	-
Stage 1	793	689	-				-	-	-	-	-	-
Stage 2	888	797	-				-	-	-	-	-	-
Approach	EB			NB			SB					
HCM Control Delay, s	11.8			0			5.4					
HCM LOS	B											
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT						
Capacity (veh/h)	-	-	634	1007	1447	-						
HCM Lane V/C Ratio	-	-	0.216	0.015	0.051	-						
HCM Control Delay (s)	-	-	12.2	8.6	7.6	0						
HCM Lane LOS	-	-	B	A	A	A						
HCM 95th %tile Q(veh)	-	-	0.8	0	0.2	-						

HCM 2010 TWSC
4: First St & NB US 101 Ramps

Existing PM

Intersection												
Int Delay, s/veh	3.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰	↱		↰			↱	
Traffic Vol, veh/h	0	0	0	1	1	189	21	155	0	0	82	217
Future Vol, veh/h	0	0	0	1	1	189	21	155	0	0	82	217
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	50	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	4	4	4	13	13	13	8	8	8
Mvmt Flow	0	0	0	1	1	230	26	189	0	0	100	265
Major/Minor				Minor1			Major1			Major2		
Conflicting Flow All				472	605	189	365	0	-	-	-	0
Stage 1				240	240	-	-	-	-	-	-	-
Stage 2				232	365	-	-	-	-	-	-	-
Critical Hdwy				6.44	6.54	6.24	4.23	-	-	-	-	-
Critical Hdwy Stg 1				5.44	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2				5.44	5.54	-	-	-	-	-	-	-
Follow-up Hdwy				3.536	4.036	3.336	2.317	-	-	-	-	-
Pot Cap-1 Maneuver				547	409	848	1135	-	0	0	-	-
Stage 1				795	703	-	-	-	0	0	-	-
Stage 2				802	620	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver				533	0	848	1135	-	-	-	-	-
Mov Cap-2 Maneuver				533	0	-	-	-	-	-	-	-
Stage 1				774	0	-	-	-	-	-	-	-
Stage 2				802	0	-	-	-	-	-	-	-
Approach				WB			NB			SB		
HCM Control Delay, s				10.8			1			0		
HCM LOS				B								
Minor Lane/Major Mvmt	NBL	NBT	WBLn1	WBLn2	SBT	SBR						
Capacity (veh/h)	1135	-	533	848	-	-						
HCM Lane V/C Ratio	0.023	-	0.005	0.272	-	-						
HCM Control Delay (s)	8.2	0	11.8	10.8	-	-						
HCM Lane LOS	A	A	B	B	-	-						
HCM 95th %tile O(veh)	0.1	-	0	1.1	-	-						

Intersection												
Int Delay, s/veh	3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	0	0	1	37	0	84	3	314	14	19	246	2
Future Vol, veh/h	0	0	1	37	0	84	3	314	14	19	246	2
Conflicting Peds, #/hr	1	0	0	0	0	1	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	6	6	6	9	9	9	7	7	7
Mvmt Flow	0	0	1	46	0	105	4	393	18	24	308	3
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	819	775	310	766	768	402	311	0	0	410	0	0
Stage 1	357	357	-	409	409	-	-	-	-	-	-	-
Stage 2	462	418	-	357	359	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.16	6.56	6.26	4.19	-	-	4.17	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.16	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.16	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.554	4.054	3.354	2.281	-	-	2.263	-	-
Pot Cap-1 Maneuver	294	329	730	315	327	640	1211	-	-	1122	-	-
Stage 1	661	628	-	611	589	-	-	-	-	-	-	-
Stage 2	580	591	-	652	620	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	240	319	729	307	317	639	1211	-	-	1121	-	-
Mov Cap-2 Maneuver	240	319	-	307	317	-	-	-	-	-	-	-
Stage 1	658	611	-	609	587	-	-	-	-	-	-	-
Stage 2	482	589	-	634	603	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	9.9			15.9			0.1			0.6		
HCM LOS	A			C								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1211	-	-	729	480	1121	-	-				
HCM Lane V/C Ratio	0.003	-	-	0.002	0.315	0.021	-	-				
HCM Control Delay (s)	8	0	-	9.9	15.9	8.3	0	-				
HCM Lane LOS	A	A	-	A	C	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0	1.3	0.1	-	-				

Intersection									
Intersection Delay, s/veh	13.5								
Intersection LOS	B								
Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations									
Traffic Vol, veh/h	0	50	64	0	107	238	0	266	72
Future Vol, veh/h	0	50	64	0	107	238	0	266	72
Peak Hour Factor	0.92	0.80	0.80	0.92	0.80	0.80	0.92	0.80	0.80
Heavy Vehicles, %	2	4	4	2	8	8	2	5	5
Mvmt Flow	0	63	80	0	134	298	0	333	90
Number of Lanes	0	1	1	0	1	1	0	1	0
Approach	EB			NB			SB		
Opposing Approach				SB			NB		
Opposing Lanes	0			1			2		
Conflicting Approach Left	SB			EB					
Conflicting Lanes Left	1			2			0		
Conflicting Approach Right	NB						EB		
Conflicting Lanes Right	2			0			2		
HCM Control Delay	10.2			12			16.1		
HCM LOS	B			B			C		
Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1				
Vol Left, %	100%	0%	100%	0%	0%				
Vol Thru, %	0%	100%	0%	0%	79%				
Vol Right, %	0%	0%	0%	100%	21%				
Sign Control	Stop	Stop	Stop	Stop	Stop				
Traffic Vol by Lane	107	238	50	64	338				
LT Vol	107	0	50	0	0				
Through Vol	0	238	0	0	266				
RT Vol	0	0	0	64	72				
Lane Flow Rate	134	298	62	80	422				
Geometry Grp	7	7	7	7	4				
Degree of Util (X)	0.222	0.451	0.125	0.133	0.608				
Departure Headway (Hd)	5.962	5.457	7.187	5.967	5.179				
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes				
Cap	597	652	502	605	689				
Service Time	3.76	3.255	4.887	3.667	3.267				
HCM Lane V/C Ratio	0.224	0.457	0.124	0.132	0.612				
HCM Control Delay	10.5	12.7	10.9	9.6	16.1				
HCM Lane LOS	B	B	B	A	C				
HCM 95th-tile Q	0.8	2.3	0.4	0.5	4.1				

Intersection

Int Delay, s/veh 5.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Vol, veh/h	103	84	198	29	8	199
Future Vol, veh/h	103	84	198	29	8	199
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	16	16	8	8	7	7
Mvmt Flow	124	101	239	35	10	240

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	274	0	606
Stage 1	-	-	257
Stage 2	-	-	349
Critical Hdwy	4.26	-	6.47
Critical Hdwy Stg 1	-	-	5.47
Critical Hdwy Stg 2	-	-	5.47
Follow-up Hdwy	2.344	-	3.563
Pot Cap-1 Maneuver	1213	-	452
Stage 1	-	-	774
Stage 2	-	-	703
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1213	-	402
Mov Cap-2 Maneuver	-	-	402
Stage 1	-	-	773
Stage 2	-	-	626

Approach	EB	WB	SB
HCM Control Delay, s	4.6	0	11.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1213	-	-	-	402	769
HCM Lane V/C Ratio	0.102	-	-	-	0.024	0.312
HCM Control Delay (s)	8.3	0	-	-	14.2	11.8
HCM Lane LOS	A	A	-	-	B	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.1	1.3

Intersection												
Int Delay, s/veh	7.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	27	23	18	49	7	64	52	15	3	51	22
Future Vol, veh/h	12	27	23	18	49	7	64	52	15	3	51	22
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	3	3	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	100	-	-	90	-	90	60	-	110
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	79	79	79	79	79	79	79	79	79
Heavy Vehicles, %	5	5	5	3	3	3	7	7	7	3	3	3
Mvmt Flow	15	34	29	23	62	9	81	66	19	4	65	28
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	71	0	0	66	0	0	226	198	55	227	209	66
Stage 1	-	-	-	-	-	-	82	82	-	112	112	-
Stage 2	-	-	-	-	-	-	144	116	-	115	97	-
Critical Hdwy	4.15	-	-	4.13	-	-	7.17	6.57	6.27	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.17	5.57	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.17	5.57	-	6.13	5.53	-
Follow-up Hdwy	2.245	-	-	2.227	-	-	3.563	4.063	3.363	3.527	4.027	3.327
Pot Cap-1 Maneuver	1510	-	-	1529	-	-	719	689	998	726	686	995
Stage 1	-	-	-	-	-	-	914	817	-	891	801	-
Stage 2	-	-	-	-	-	-	847	790	-	887	813	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1510	-	-	1525	-	-	633	670	992	644	667	995
Mov Cap-2 Maneuver	-	-	-	-	-	-	633	670	-	644	667	-
Stage 1	-	-	-	-	-	-	902	807	-	882	789	-
Stage 2	-	-	-	-	-	-	745	778	-	789	803	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.4			1.8			11			10.3		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	633	670	992	1510	-	-	1525	-	-	644	667	995
HCM Lane V/C Ratio	0.128	0.098	0.019	0.01	-	-	0.015	-	-	0.006	0.097	0.028
HCM Control Delay (s)	11.5	11	8.7	7.4	-	-	7.4	-	-	10.6	11	8.7
HCM Lane LOS	B	B	A	A	-	-	A	-	-	B	B	A
HCM 95th %tile Q(veh)	0.4	0.3	0.1	0	-	-	0	-	-	0	0.3	0.1

Intersection							
Int Delay, s/veh	2						
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Vol, veh/h	18	47	129	27	6	30	
Future Vol, veh/h	18	47	129	27	6	30	
Conflicting Peds, #/hr	3	0	0	3	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	105	-	-	-	100	0	
Veh in Median Storage, #	-	0	0	-	0	-	
Grade, %	-	0	0	-	0	-	
Peak Hour Factor	60	60	60	60	60	60	
Heavy Vehicles, %	26	26	7	7	6	6	
Mvmt Flow	30	78	215	45	10	50	
Major/Minor	Major1		Major2		Minor2		
Conflicting Flow All	263	0	-	0	379	241	
Stage 1	-	-	-	-	241	-	
Stage 2	-	-	-	-	138	-	
Critical Hdwy	4.36	-	-	-	6.46	6.26	
Critical Hdwy Stg 1	-	-	-	-	5.46	-	
Critical Hdwy Stg 2	-	-	-	-	5.46	-	
Follow-up Hdwy	2.434	-	-	-	3.554	3.354	
Pot Cap-1 Maneuver	1174	-	-	-	615	788	
Stage 1	-	-	-	-	790	-	
Stage 2	-	-	-	-	879	-	
Platoon blocked, %		-	-	-			
Mov Cap-1 Maneuver	1174	-	-	-	596	786	
Mov Cap-2 Maneuver	-	-	-	-	596	-	
Stage 1	-	-	-	-	788	-	
Stage 2	-	-	-	-	854	-	
Approach	EB		WB		SB		
HCM Control Delay, s	2.3		0		10.1		
HCM LOS					B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2	
Capacity (veh/h)	1174	-	-	-	596	786	
HCM Lane V/C Ratio	0.026	-	-	-	0.017	0.064	
HCM Control Delay (s)	8.1	-	-	-	11.1	9.9	
HCM Lane LOS	A	-	-	-	B	A	
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	0.2	

Appendix D

Detailed Derivation
of
Project
Trip Generation

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	Amount (per day)	Daily Trips	AM Peak Hour		Total	PM Peak Hour	
			Total	Out		In	Out
A. Buses and Shuttles	Fixed Route (Buses)	22	66	0	0	0	0
	On-call (Shuttles)	5	15	0	0	0	0
	RIDES (Paratransit)	5	15	0	0	0	0
	Subtotal		96	0	0	0	0
B. Staff	Bus Drivers (people)	32	96	0	0	0	0
	Fleet Maintenance Staff (people)	8	20	0	0	0	0
	Operational Supervisors (people)	5	15	0	0	0	0
	Subtotal		131	0	0	0	0
C. Relief Units	Relief Units (vehicles)	4	8	0	0	0	0
	Subtotal		8	0	0	0	0
D. Deliveries	Fuel Deliveries	0.2	2	0	0	0	0
	Non-Fuel Deliveries	10	20	0	0	0	0
	Subtotal		22	0	0	0	0
E. Visitors	Visitors (people)	3	6	1	1	1	1
	Subtotal		6	2	2	2	2
Total:			263	2	1	1	1

Notes:

General:

1. No staff or visitors are dropped off/picked up. (assumption)

Buses and Shuttles:

1. Hours of Operation:

2. Number of Vehicles:

Fixed-Route:	4:00 AM - 11:30 PM
On-Call:	6:00 AM - 7:00 PM
RIDES:	6:00 AM - 7:00 PM

Fixed-Route (Buses)	22 buses
On-Call (Shuttles):	5 buses
RIDES (Paratransit):	5 buses
Spare Buses:	5 buses
TOTAL:	37 buses

3. Spare buses are only in use when needed (e.g., if an active bus needs maintenance).

4. All (100%) of active fleet of buses and shuttles depart from or arrive at site during either the AM or PM peak hours.

5. Fifty Percent (50%) of active buses and shuttles come back to project site in late morning, only to leave and return to service in mid afternoon.

6. Bus and Shuttle Trip Rates: Fixed-Route (Buses):

Daily:	3.00 trips/bus
AM:	0.00 trips/bus
PM:	0.00 trips/bus
Daily:	3.00 trips/bus
AM:	0.00 trips/bus
PM:	0.00 trips/bus
Daily:	3.00 trips/bus
AM:	0.00 trips/bus
PM:	0.00 trips/bus

RIDES (Paratransit):

Daily:	3.00 trips/bus
AM:	0.00 trips/bus
PM:	0.00 trips/bus

Staff:

1. Work Hours:

Bus Drivers	4:00 AM - 11:30 PM
Fleet Maintenance Staff	8:00 PM - 5:00 AM
Operational Supervisors	6:00 AM - 9:00 PM

2. Number of Staff:

Bus Drivers:	32 staff (assumed)
Maintenance Staff:	8 staff (assumed)
Operational Sups.:	5 staff (assumed)
TOTAL:	45 staff (assumed)

3. Bus Drivers work varying and overlapping shifts, with most on duty during the AM and PM peak hours.

4. Fleet Maintenance Staff (which includes mechanics and utility service workers) only work during night shift.

5. Operational Supervisors are split into two back-to-back shifts plus one shift that overlaps the other two.

6. Fifty percent (50%) of operational supervisors take one trip out to the field (and one trip back) per day while on duty.

7. All staff uses a personal vehicle to travel to and from the project site (assumption).

8. Vehicle Occupancy Rates:

All Staff: 1.0 persons/vehicle

11. Staff Trip Rates:

Bus Drivers:

Daily:	3.00 trips per staff member
AM:	0.00 trips per staff member
PM:	0.00 trips per staff member

Fleet Maintenance Staff:

Daily:	2.50 trips per staff member
AM:	0.00 trips per staff member
PM:	0.00 trips per staff member

Operational Supervisors:

Daily:	3.00 trips per staff member
AM:	0.00 trips per staff member
PM:	0.00 trips per staff member

Relief Units

1. Relief Units will be driven off site by bus drivers beginning their shift and be driven back onsite by bus drivers ending their shift.

2. Hours of Operation: 10:00 AM - 2:00 PM

3. Number of Relief Units per day:

4 units per day

4. Relief Unit Trip Rates:

Daily:	2.00 trips per unit
AM:	0 trips per unit
PM:	0 trips per unit

Deliveries:

1. Deliveries includes both fuel deliveries (e.g., diesel fuel) and non-fuel deliveries (e.g., US mail, maintenance part deliveries, etc.).

2. Hours of Operation:

Fuel Deliveries	9:00 AM - 3:00 PM
Non-Fuel Deliveries	9:00 AM - 5:00 PM

4. Number of Deliveries:

Fuel Deliveries	1 delivery per week (i.e., 1 every 5 weekdays)
Non-Fuel Deliveries	10 deliveries per day

5. All deliveries arrive and depart in same hour.

6. No deliveries (fuel or non-fuel) during AM or PM peak hours.

7. Delivery Trip Rates:

(Assume worst-case scenario of fuel delivery occurring on same day as non-fuel deliveries.)

Fuel Deliveries	Daily:	2.00 trips per delivery
	AM:	0 trips per delivery
	PM:	0 trips per delivery
Non-Fuel Deliveries	Daily:	2.00 trips per delivery
	AM:	0 trips per delivery
	PM:	0 trips per delivery

Visitors:

1. Number of Visitors per day:

3 visitors per day

2. Visitor arrival period:

9:00 AM - 5:00 PM

3. All visitors arrive and depart in the same hour.

4. All visitors arrive and depart by car (assumption).

5. One-third of visitors arrive and depart in both the AM and PM peak hours.

6. Visitor Vehicle Occupancy Rate:

1 visitor/vehicle

7. Visitor Trip Rates:

Daily:	2.00 trips per visitor (0.325 in, 0.325 out)
AM:	0.67 trips per visitor
PM:	0.67 trips per visitor

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Appendix E

Intersection
Level of Service
Calculations

Existing Plus Project
Conditions

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HCM Unsignalized Intersection Capacity Analysis

1: River Dr/SB US 101 Ramps & Broadway Cir

Existing Plus Project AM

																		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR						
Lane Configurations																		
Sign Control	Stop			Stop			Stop			Stop								
Traffic Volume (vph)	77	21	29	2	17	2	52	1	4	7	3	374						
Future Volume (vph)	77	21	29	2	17	2	52	1	4	7	3	374						
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81						
Hourly flow rate (vph)	95	26	36	2	21	2	64	1	5	9	4	462						
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1	SB 2												
Volume Total (vph)	95	62	25	70	13	462												
Volume Left (vph)	95	0	2	64	9	0												
Volume Right (vph)	0	36	2	5	0	462												
Hadj (s)	0.55	-0.36	0.05	0.17	0.22	-0.52												
Departure Headway (s)	5.3	4.4	4.4	4.5	4.6	3.2												
Degree Utilization, x	0.14	0.08	0.03	0.09	0.02	0.41												
Capacity (veh/h)	666	801	791	761	733	1115												
Control Delay (s)	7.9	6.5	7.6	8.0	7.7	8.4												
Approach Delay (s)	7.4		7.6	8.0	8.4													
Approach LOS	A		A	A	A													
Intersection Summary																		
Delay	8.1																	
Level of Service	A																	
Intersection Capacity Utilization	39.8%			ICU Level of Service			A											
Analysis Period (min)	15																	

HCM 2010 Signalized Intersection Summary
2: Broadway Cir/San Antonio Dr & Broadway St

Existing Plus Project AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	3	13	152	4	100	5	191	253	190	240	1
Future Volume (veh/h)	0	3	13	152	4	100	5	191	253	190	240	1
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1681	1900	1845	1845	1845	1810	1810	1810	1863	1863	1900
Adj Flow Rate, veh/h	0	4	16	190	5	125	6	239	316	238	300	1
Adj No. of Lanes	0	1	0	1	1	1	1	2	1	1	2	0
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	13	13	13	3	3	3	5	5	5	2	2	2
Cap, veh/h	0	7	28	280	294	246	14	1139	755	289	1760	6
Arrive On Green	0.00	0.02	0.02	0.16	0.16	0.16	0.01	0.33	0.33	0.16	0.49	0.49
Sat Flow, veh/h	0	295	1179	1757	1845	1547	1723	3438	1538	1774	3618	12
Grp Volume(v), veh/h	0	0	20	190	5	125	6	239	316	238	147	154
Grp Sat Flow(s),veh/h/ln	0	0	1473	1757	1845	1547	1723	1719	1538	1774	1770	1861
Q Serve(g_s), s	0.0	0.0	0.7	5.7	0.1	4.1	0.2	2.8	7.4	7.2	2.6	2.6
Cycle Q Clear(g_c), s	0.0	0.0	0.7	5.7	0.1	4.1	0.2	2.8	7.4	7.2	2.6	2.6
Prop In Lane	0.00		0.80	1.00		1.00	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	0	0	35	280	294	246	14	1139	755	289	861	905
V/C Ratio(X)	0.00	0.00	0.57	0.68	0.02	0.51	0.44	0.21	0.42	0.82	0.17	0.17
Avail Cap(c_a), veh/h	0	0	132	567	595	499	154	1139	755	334	861	905
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	27.0	22.1	19.8	21.5	27.6	13.4	9.1	22.6	8.0	8.0
Incr Delay (d2), s/veh	0.0	0.0	13.6	2.9	0.0	1.6	20.4	0.4	1.7	13.6	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.4	3.0	0.1	1.9	0.2	1.4	4.4	4.6	1.4	1.4
LnGrp Delay(d),s/veh	0.0	0.0	40.6	25.0	19.8	23.1	48.0	13.8	10.8	36.2	8.5	8.4
LnGrp LOS			D	C	B	C	D	B	B	D	A	A
Approach Vol, veh/h	20			320			561			539		
Approach Delay, s/veh	40.6			24.2			12.5			20.7		
Approach LOS	D			C			B			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.6	23.0		5.8	4.9	31.7		13.4				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.5	18.5		5.0	5.0	24.0		18.0				
Max Q Clear Time (g_c+I1), s	9.2	9.4		2.7	2.2	4.6		7.7				
Green Ext Time (p_c), s	0.1	3.1		0.0	0.0	4.4		0.7				
Intersection Summary												
HCM 2010 Ctrl Delay	18.6											
HCM 2010 LOS	B											

HCM 2010 TWSC
3: First St & SB US 101 Ramps

Existing Plus Project AM

Intersection												
Int Delay, s/veh	9.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	186	0	7	0	0	0	0	40	0	43	33	0
Future Vol, veh/h	186	0	7	0	0	0	0	40	0	43	33	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	64	64	64	64	64	64	64	64	64	64	64	64
Heavy Vehicles, %	10	10	10	2	2	2	15	15	15	23	23	23
Mvmt Flow	291	0	11	0	0	0	0	63	0	67	52	0
Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	249	249	52				-	0	0	63	0	0
Stage 1	186	186	-				-	-	-	-	-	-
Stage 2	63	63	-				-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3				-	-	-	4.33	-	-
Critical Hdwy Stg 1	5.5	5.6	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-				-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39				-	-	-	2.407	-	-
Pot Cap-1 Maneuver	722	640	994				0	-	-	1416	-	0
Stage 1	827	731	-				0	-	-	-	-	0
Stage 2	940	827	-				0	-	-	-	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	687	0	994				-	-	-	1416	-	-
Mov Cap-2 Maneuver	687	0	-				-	-	-	-	-	-
Stage 1	786	0	-				-	-	-	-	-	-
Stage 2	940	0	-				-	-	-	-	-	-
Approach	EB			NB			SB					
HCM Control Delay, s	13.8			0			4.3					
HCM LOS	B											
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT						
Capacity (veh/h)	-	-	687	994	1416	-						
HCM Lane V/C Ratio	-	-	0.423	0.011	0.047	-						
HCM Control Delay (s)	-	-	14	8.7	7.7	0						
HCM Lane LOS	-	-	B	A	A	A						
HCM 95th %tile Q(veh)	-	-	2.1	0	0.1	-						

HCM 2010 TWSC
4: First St & NB US 101 Ramps

Existing Plus Project AM

Intersection												
Int Delay, s/veh		2.3										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕	↗		↕			↗	
Traffic Vol, veh/h	0	0	0	1	1	95	5	228	0	0	76	86
Future Vol, veh/h	0	0	0	1	1	95	5	228	0	0	76	86
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	50	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	71	71	71	71	71	71	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	8	8	8	13	13	13	28	28	28
Mvmt Flow	0	0	0	1	1	134	7	321	0	0	107	121
Major/Minor				Minor1			Major1			Major2		
Conflicting Flow All				503	563	321	228	0	-	-	-	0
Stage 1				335	335	-	-	-	-	-	-	-
Stage 2				168	228	-	-	-	-	-	-	-
Critical Hdwy				6.48	6.58	6.28	4.23	-	-	-	-	-
Critical Hdwy Stg 1				5.48	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2				5.48	5.58	-	-	-	-	-	-	-
Follow-up Hdwy				3.572	4.072	3.372	2.317	-	-	-	-	-
Pot Cap-1 Maneuver				518	427	706	1278	-	0	0	-	-
Stage 1				711	632	-	-	-	0	0	-	-
Stage 2				847	704	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver				514	0	706	1278	-	-	-	-	-
Mov Cap-2 Maneuver				514	0	-	-	-	-	-	-	-
Stage 1				706	0	-	-	-	-	-	-	-
Stage 2				847	0	-	-	-	-	-	-	-
Approach				WB			NB			SB		
HCM Control Delay, s				11.3			0.2			0		
HCM LOS				B								
Minor Lane/Major Mvmt	NBL	NBT	WBLn1	WBLn2	SBT	SBR						
Capacity (veh/h)	1278	-	514	706	-	-						
HCM Lane V/C Ratio	0.006	-	0.005	0.19	-	-						
HCM Control Delay (s)	7.8	0	12	11.3	-	-						
HCM Lane LOS	A	A	B	B	-	-						
HCM 95th %tile Q(veh)	0	-	0	0.7	-	-						

Intersection												
Int Delay, s/veh		2.3										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	0	31	0	18	0	276	47	42	117	0
Future Vol, veh/h	0	0	0	31	0	18	0	276	47	42	117	0
Conflicting Peds, #/hr	0	0	1	1	0	0	2	0	21	21	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	73	73	73	73	73	73	73	73	73
Heavy Vehicles, %	2	2	2	29	29	29	12	12	12	17	17	17
Mvmt Flow	0	0	0	42	0	25	0	378	64	58	160	0
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	700	740	163	707	708	431	162	0	0	463	0	0
Stage 1	277	277	-	431	431	-	-	-	-	-	-	-
Stage 2	423	463	-	276	277	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.39	6.79	6.49	4.22	-	-	4.27	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.39	5.79	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.39	5.79	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.761	4.261	3.561	2.308	-	-	2.353	-	-
Pot Cap-1 Maneuver	354	345	882	317	328	571	1358	-	-	1024	-	-
Stage 1	729	681	-	553	539	-	-	-	-	-	-	-
Stage 2	609	564	-	675	635	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	322	317	879	296	301	560	1357	-	-	1024	-	-
Mov Cap-2 Maneuver	322	317	-	296	301	-	-	-	-	-	-	-
Stage 1	728	638	-	542	528	-	-	-	-	-	-	-
Stage 2	582	553	-	633	594	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			17.4			0			2.3		
HCM LOS	A			C								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1357	-	-	-	358	1024	-	-				
HCM Lane V/C Ratio	-	-	-	-	0.187	0.056	-	-				
HCM Control Delay (s)	0	-	-	0	17.4	8.7	0	-				
HCM Lane LOS	A	-	-	A	C	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	-	0.7	0.2	-	-				

Intersection

Intersection Delay, s/veh 12.5
Intersection LOS B

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations		↰	↱		↰	↱		↰	
Traffic Vol, veh/h	0	61	37	0	44	257	0	151	26
Future Vol, veh/h	0	61	37	0	44	257	0	151	26
Peak Hour Factor	0.92	0.69	0.69	0.92	0.69	0.69	0.92	0.69	0.69
Heavy Vehicles, %	2	5	5	2	8	8	2	13	13
Mvmt Flow	0	88	54	0	64	372	0	219	38
Number of Lanes	0	1	1	0	1	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	2
HCM Control Delay	10.1	13.7	11.8
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	85%
Vol Right, %	0%	0%	0%	100%	15%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	44	257	61	37	177
LT Vol	44	0	61	0	0
Through Vol	0	257	0	0	151
RT Vol	0	0	0	37	26
Lane Flow Rate	64	372	88	54	257
Geometry Grp	7	7	7	7	4
Degree of Util (X)	0.103	0.55	0.167	0.083	0.383
Departure Headway (Hd)	5.817	5.313	6.781	5.566	5.379
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	613	674	525	637	664
Service Time	3.585	3.081	4.576	3.361	3.455
HCM Lane V/C Ratio	0.104	0.552	0.168	0.085	0.387
HCM Control Delay	9.3	14.5	10.9	8.9	11.8
HCM Lane LOS	A	B	B	A	B
HCM 95th-tile Q	0.3	3.4	0.6	0.3	1.8

Intersection

Int Delay, s/veh 5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Vol, veh/h	149	117	57	13	4	104
Future Vol, veh/h	149	117	57	13	4	104
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	72	72	72	72	72	72
Heavy Vehicles, %	8	8	23	23	11	11
Mvmt Flow	207	163	79	18	6	144

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	98	0	665
Stage 1	-	-	89
Stage 2	-	-	576
Critical Hdwy	4.18	-	6.51
Critical Hdwy Stg 1	-	-	5.51
Critical Hdwy Stg 2	-	-	5.51
Follow-up Hdwy	2.272	-	3.599
Pot Cap-1 Maneuver	1458	-	411
Stage 1	-	-	912
Stage 2	-	-	545
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1458	-	346
Mov Cap-2 Maneuver	-	-	346
Stage 1	-	-	911
Stage 2	-	-	460

Approach	EB	WB	SB
HCM Control Delay, s	4.4	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1458	-	-	-	346	944
HCM Lane V/C Ratio	0.142	-	-	-	0.016	0.153
HCM Control Delay (s)	7.9	0	-	-	15.6	9.5
HCM Lane LOS	A	A	-	-	C	A
HCM 95th %tile Q(veh)	0.5	-	-	-	0	0.5

Intersection												
Int Delay, s/veh	6.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	58	68	18	19	1	67	46	22	7	23	10
Future Vol, veh/h	30	58	68	18	19	1	67	46	22	7	23	10
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	100	-	-	90	-	90	60	-	110
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	61	61	61	61	61	61	61	61	61	61	61	61
Heavy Vehicles, %	3	3	3	14	14	14	5	5	5	5	5	5
Mvmt Flow	49	95	111	30	31	2	110	75	36	11	38	16
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	33	0	0	208	0	0	360	342	152	378	397	32
Stage 1	-	-	-	-	-	-	250	250	-	91	91	-
Stage 2	-	-	-	-	-	-	110	92	-	287	306	-
Critical Hdwy	4.13	-	-	4.24	-	-	7.15	6.55	6.25	7.15	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Follow-up Hdwy	2.227	-	-	2.326	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	1572	-	-	1295	-	-	590	575	886	574	536	1033
Stage 1	-	-	-	-	-	-	747	694	-	909	814	-
Stage 2	-	-	-	-	-	-	888	813	-	714	656	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1572	-	-	1295	-	-	525	544	885	472	507	1033
Mov Cap-2 Maneuver	-	-	-	-	-	-	525	544	-	472	507	-
Stage 1	-	-	-	-	-	-	723	672	-	881	795	-
Stage 2	-	-	-	-	-	-	813	794	-	589	635	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.4			3.7			12.6			11.7		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	525	544	885	1572	-	-	1295	-	-	472	507	1033
HCM Lane V/C Ratio	0.209	0.139	0.041	0.031	-	-	0.023	-	-	0.024	0.074	0.016
HCM Control Delay (s)	13.7	12.7	9.2	7.4	-	-	7.8	-	-	12.8	12.7	8.5
HCM Lane LOS	B	B	A	A	-	-	A	-	-	B	B	A
HCM 95th %tile Q(veh)	0.8	0.5	0.1	0.1	-	-	0.1	-	-	0.1	0.2	0

Intersection

Int Delay, s/veh 2.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	30	58	32	9	8	13
Future Vol, veh/h	30	58	32	9	8	13
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	105	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	15	15	32	32	14	14
Mvmt Flow	35	68	38	11	9	15

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	49	0	183
Stage 1	-	-	44
Stage 2	-	-	139
Critical Hdwy	4.25	-	6.54
Critical Hdwy Stg 1	-	-	5.54
Critical Hdwy Stg 2	-	-	5.54
Follow-up Hdwy	2.335	-	3.626
Pot Cap-1 Maneuver	1478	-	780
Stage 1	-	-	949
Stage 2	-	-	859
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1478	-	760
Mov Cap-2 Maneuver	-	-	760
Stage 1	-	-	948
Stage 2	-	-	838

Approach	EB	WB	SB
HCM Control Delay, s	2.6	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1478	-	-	-	760	992
HCM Lane V/C Ratio	0.024	-	-	-	0.012	0.015
HCM Control Delay (s)	7.5	-	-	-	9.8	8.7
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0	0

HCM Unsignalized Intersection Capacity Analysis

1: River Dr/SB US 101 Ramps & Broadway Cir

Existing Plus Project PM

																		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR						
Lane Configurations																		
Sign Control	Stop			Stop			Stop			Stop								
Traffic Volume (vph)	78	34	83	4	32	9	81	11	2	22	33	423						
Future Volume (vph)	78	34	83	4	32	9	81	11	2	22	33	423						
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)	80	35	86	4	33	9	84	11	2	23	34	436						
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1	SB 2												
Volume Total (vph)	80	121	46	97	57	436												
Volume Left (vph)	80	0	4	84	23	0												
Volume Right (vph)	0	86	9	2	0	436												
Hadj (s)	0.53	-0.46	0.02	0.19	0.11	-0.57												
Departure Headway (s)	5.5	4.5	4.6	4.7	4.7	3.2												
Degree Utilization, x	0.12	0.15	0.06	0.13	0.07	0.39												
Capacity (veh/h)	638	777	734	720	715	1114												
Control Delay (s)	8.0	7.0	7.9	8.4	8.1	8.2												
Approach Delay (s)	7.4		7.9	8.4	8.2													
Approach LOS	A		A	A	A													
Intersection Summary																		
Delay	8.0																	
Level of Service	A																	
Intersection Capacity Utilization	46.8%			ICU Level of Service			A											
Analysis Period (min)	15																	

HCM 2010 Signalized Intersection Summary

2: Broadway Cir/San Antonio Dr & Broadway St

Existing Plus Project PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	18	21	248	19	245	22	283	299	179	187	10
Future Volume (veh/h)	4	18	21	248	19	245	22	283	299	179	187	10
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	4	20	24	279	21	275	25	318	336	201	210	11
Adj No. of Lanes	0	1	0	1	1	1	1	2	1	1	2	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	6	32	39	384	403	342	50	1073	823	248	1418	74
Arrive On Green	0.05	0.05	0.05	0.22	0.22	0.22	0.03	0.30	0.30	0.14	0.41	0.41
Sat Flow, veh/h	142	710	853	1774	1863	1581	1774	3539	1583	1774	3422	178
Grp Volume(v), veh/h	48	0	0	279	21	275	25	318	336	201	108	113
Grp Sat Flow(s),veh/h/ln	1705	0	0	1774	1863	1581	1774	1770	1583	1774	1770	1831
Q Serve(g_s), s	1.7	0.0	0.0	8.9	0.5	10.1	0.8	4.2	7.9	6.7	2.3	2.3
Cycle Q Clear(g_c), s	1.7	0.0	0.0	8.9	0.5	10.1	0.8	4.2	7.9	6.7	2.3	2.3
Prop In Lane	0.08		0.50	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	78	0	0	384	403	342	50	1073	823	248	733	759
V/C Ratio(X)	0.62	0.00	0.00	0.73	0.05	0.80	0.50	0.30	0.41	0.81	0.15	0.15
Avail Cap(c_a), veh/h	140	0	0	523	550	466	145	1073	823	305	733	759
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.6	0.0	0.0	22.2	18.9	22.7	29.2	16.3	8.9	25.5	11.1	11.1
Incr Delay (d2), s/veh	7.7	0.0	0.0	3.2	0.1	7.1	7.4	0.7	1.5	12.7	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	4.7	0.3	5.0	0.5	2.1	5.3	4.2	1.2	1.3
LnGrp Delay(d),s/veh	36.3	0.0	0.0	25.5	19.0	29.7	36.7	17.0	10.4	38.1	11.6	11.6
LnGrp LOS	D			C	B	C	D	B	B	D	B	B
Approach Vol, veh/h		48			575			679			422	
Approach Delay, s/veh		36.3			27.3			14.5			24.2	
Approach LOS		D			C			B			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.0	23.0		7.3	6.2	29.8		17.7				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.5	18.5		5.0	5.0	24.0		18.0				
Max Q Clear Time (g_c+I1), s	8.7	9.9		3.7	2.8	4.3		12.1				
Green Ext Time (p_c), s	0.1	3.1		0.0	0.0	4.6		1.1				
Intersection Summary												
HCM 2010 Ctrl Delay				21.7								
HCM 2010 LOS				C								

HCM 2010 TWSC
3: First St & SB US 101 Ramps

Existing Plus Project PM

Intersection												
Int Delay, s/veh	6.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	107	0	12	0	0	0	0	69	0	59	24	0
Future Vol, veh/h	107	0	12	0	0	0	0	69	0	59	24	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	15	15	15	2	2	2	9	9	9	12	12	12
Mvmt Flow	137	0	15	0	0	0	0	88	0	76	31	0
Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	270	270	31				-	0	0	88	0	0
Stage 1	182	182	-				-	-	-	-	-	-
Stage 2	88	88	-				-	-	-	-	-	-
Critical Hdwy	7.25	6.65	6.35				-	-	-	4.22	-	-
Critical Hdwy Stg 1	6.25	5.65	-				-	-	-	-	-	-
Critical Hdwy Stg 2	6.25	5.65	-				-	-	-	-	-	-
Follow-up Hdwy	3.635	4.135	3.435				-	-	-	2.308	-	-
Pot Cap-1 Maneuver	657	615	1007				0	-	-	1447	-	0
Stage 1	790	725	-				0	-	-	-	-	0
Stage 2	888	797	-				0	-	-	-	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	630	582	1007				-	-	-	1447	-	-
Mov Cap-2 Maneuver	630	582	-				-	-	-	-	-	-
Stage 1	790	687	-				-	-	-	-	-	-
Stage 2	888	797	-				-	-	-	-	-	-
Approach	EB			NB			SB					
HCM Control Delay, s	11.9			0			5.4					
HCM LOS	B											
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT						
Capacity (veh/h)	-	-	630	1007	1447	-						
HCM Lane V/C Ratio	-	-	0.218	0.015	0.052	-						
HCM Control Delay (s)	-	-	12.3	8.6	7.6	0						
HCM Lane LOS	-	-	B	A	A	A						
HCM 95th %tile Q(veh)	-	-	0.8	0	0.2	-						

HCM 2010 TWSC
4: First St & NB US 101 Ramps

Existing Plus Project PM

Intersection												
Int Delay, s/veh	3.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔	↔		↔			↔	
Traffic Vol, veh/h	0	0	0	1	1	190	21	160	0	0	85	225
Future Vol, veh/h	0	0	0	1	1	190	21	160	0	0	85	225
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	50	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	4	4	4	13	13	13	8	8	8
Mvmt Flow	0	0	0	1	1	232	26	195	0	0	104	274
Major/Minor				Minor1		Major1			Major2			
Conflicting Flow All				487	624	195	378	0	-	-	-	0
Stage 1				246	246	-	-	-	-	-	-	-
Stage 2				241	378	-	-	-	-	-	-	-
Critical Hdwy				6.44	6.54	6.24	4.23	-	-	-	-	-
Critical Hdwy Stg 1				5.44	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2				5.44	5.54	-	-	-	-	-	-	-
Follow-up Hdwy				3.536	4.036	3.336	2.317	-	-	-	-	-
Pot Cap-1 Maneuver				536	399	841	1123	-	0	0	-	-
Stage 1				790	699	-	-	-	0	0	-	-
Stage 2				794	612	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver				522	0	841	1123	-	-	-	-	-
Mov Cap-2 Maneuver				522	0	-	-	-	-	-	-	-
Stage 1				769	0	-	-	-	-	-	-	-
Stage 2				794	0	-	-	-	-	-	-	-
Approach				WB		NB			SB			
HCM Control Delay, s				10.9		1			0			
HCM LOS				B								
Minor Lane/Major Mvmt	NBL	NBT	WBLn1	WBLn2	SBT	SBR						
Capacity (veh/h)	1123	-	522	841	-	-						
HCM Lane V/C Ratio	0.023	-	0.005	0.276	-	-						
HCM Control Delay (s)	8.3	0	11.9	10.9	-	-						
HCM Lane LOS	A	A	B	B	-	-						
HCM 95th %tile Q(veh)	0.1	-	0	1.1	-	-						

Intersection												
Int Delay, s/veh	2.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	0	0	1	37	0	84	3	315	14	19	247	2
Future Vol, veh/h	0	0	1	37	0	84	3	315	14	19	247	2
Conflicting Peds, #/hr	1	0	0	0	0	1	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	6	6	6	9	9	9	7	7	7
Mvmt Flow	0	0	1	46	0	105	4	394	18	24	309	3
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	823	778	311	768	770	404	312	0	0	411	0	0
Stage 1	359	359	-	410	410	-	-	-	-	-	-	-
Stage 2	464	419	-	358	360	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.16	6.56	6.26	4.19	-	-	4.17	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.16	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.16	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.554	4.054	3.354	2.281	-	-	2.263	-	-
Pot Cap-1 Maneuver	292	328	729	314	326	638	1210	-	-	1121	-	-
Stage 1	659	627	-	611	589	-	-	-	-	-	-	-
Stage 2	578	590	-	652	619	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	238	318	728	306	316	637	1210	-	-	1120	-	-
Mov Cap-2 Maneuver	238	318	-	306	316	-	-	-	-	-	-	-
Stage 1	656	610	-	609	587	-	-	-	-	-	-	-
Stage 2	480	588	-	634	602	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	10			15.9			0.1			0.6		
HCM LOS	B			C								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1210	-	-	728	479	1120	-	-				
HCM Lane V/C Ratio	0.003	-	-	0.002	0.316	0.021	-	-				
HCM Control Delay (s)	8	0	-	10	15.9	8.3	0	-				
HCM Lane LOS	A	A	-	B	C	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0	1.3	0.1	-	-				

Intersection

Intersection Delay, s/veh 13.6
Intersection LOS B

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations									
Traffic Vol, veh/h	0	50	64	0	107	239	0	267	72
Future Vol, veh/h	0	50	64	0	107	239	0	267	72
Peak Hour Factor	0.92	0.80	0.80	0.92	0.80	0.80	0.92	0.80	0.80
Heavy Vehicles, %	2	4	4	2	8	8	2	5	5
Mvmt Flow	0	63	80	0	134	299	0	334	90
Number of Lanes	0	1	1	0	1	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	2
HCM Control Delay	10.2	12.1	16.2
HCM LOS	B	B	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	79%
Vol Right, %	0%	0%	0%	100%	21%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	107	239	50	64	339
LT Vol	107	0	50	0	0
Through Vol	0	239	0	0	267
RT Vol	0	0	0	64	72
Lane Flow Rate	134	299	62	80	424
Geometry Grp	7	7	7	7	4
Degree of Util (X)	0.222	0.453	0.125	0.133	0.61
Departure Headway (Hd)	5.963	5.458	7.193	5.973	5.181
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	597	651	501	604	691
Service Time	3.762	3.257	4.893	3.673	3.269
HCM Lane V/C Ratio	0.224	0.459	0.124	0.132	0.614
HCM Control Delay	10.5	12.8	10.9	9.6	16.2
HCM Lane LOS	B	B	B	A	C
HCM 95th-tile Q	0.8	2.4	0.4	0.5	4.2

Intersection

Int Delay, s/veh 5.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	104	84	198	29	8	200
Future Vol, veh/h	104	84	198	29	8	200
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	16	16	8	8	7	7
Mvmt Flow	125	101	239	35	10	241

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	274	0	609
Stage 1	-	-	257
Stage 2	-	-	352
Critical Hdwy	4.26	-	6.47
Critical Hdwy Stg 1	-	-	5.47
Critical Hdwy Stg 2	-	-	5.47
Follow-up Hdwy	2.344	-	3.563
Pot Cap-1 Maneuver	1213	-	450
Stage 1	-	-	774
Stage 2	-	-	701
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1213	-	400
Mov Cap-2 Maneuver	-	-	400
Stage 1	-	-	773
Stage 2	-	-	624

Approach	EB	WB	SB
HCM Control Delay, s	4.6	0	11.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1213	-	-	-	400	769
HCM Lane V/C Ratio	0.103	-	-	-	0.024	0.313
HCM Control Delay (s)	8.3	0	-	-	14.2	11.8
HCM Lane LOS	A	A	-	-	B	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.1	1.3

Intersection

Int Delay, s/veh 7.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	28	23	19	50	7	64	52	16	3	51	22
Future Vol, veh/h	12	28	23	19	50	7	64	52	16	3	51	22
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	3	3	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	100	-	-	90	-	90	60	-	110
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	79	79	79	79	79	79	79	79	79
Heavy Vehicles, %	5	5	5	3	3	3	7	7	7	3	3	3
Mvmt Flow	15	35	29	24	63	9	81	66	20	4	65	28

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	72	0	0	68	0	0	231	203	56	232	214	68
Stage 1	-	-	-	-	-	-	83	83	-	116	116	-
Stage 2	-	-	-	-	-	-	148	120	-	116	98	-
Critical Hdwy	4.15	-	-	4.13	-	-	7.17	6.57	6.27	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.17	5.57	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.17	5.57	-	6.13	5.53	-
Follow-up Hdwy	2.245	-	-	2.227	-	-	3.563	4.063	3.363	3.527	4.027	3.327
Pot Cap-1 Maneuver	1509	-	-	1527	-	-	713	684	997	721	682	992
Stage 1	-	-	-	-	-	-	913	816	-	886	798	-
Stage 2	-	-	-	-	-	-	843	787	-	886	812	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1509	-	-	1523	-	-	627	665	991	638	663	992
Mov Cap-2 Maneuver	-	-	-	-	-	-	627	665	-	638	663	-
Stage 1	-	-	-	-	-	-	901	806	-	877	785	-
Stage 2	-	-	-	-	-	-	740	775	-	787	802	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	1.9	11	10.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	627	665	991	1509	-	-	1523	-	-	638	663	992
HCM Lane V/C Ratio	0.129	0.099	0.02	0.01	-	-	0.016	-	-	0.006	0.097	0.028
HCM Control Delay (s)	11.6	11	8.7	7.4	-	-	7.4	-	-	10.7	11	8.7
HCM Lane LOS	B	B	A	A	-	-	A	-	-	B	B	A
HCM 95th %tile Q(veh)	0.4	0.3	0.1	0	-	-	0	-	-	0	0.3	0.1

Intersection

Int Delay, s/veh 2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	18	47	129	27	6	30
Future Vol, veh/h	18	47	129	27	6	30
Conflicting Peds, #/hr	3	0	0	3	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	105	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	60	60	60	60	60	60
Heavy Vehicles, %	26	26	7	7	6	6
Mvmt Flow	30	78	215	45	10	50

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	263	0	379
Stage 1	-	-	241
Stage 2	-	-	138
Critical Hdwy	4.36	-	6.46
Critical Hdwy Stg 1	-	-	5.46
Critical Hdwy Stg 2	-	-	5.46
Follow-up Hdwy	2.434	-	3.554
Pot Cap-1 Maneuver	1174	-	615
Stage 1	-	-	790
Stage 2	-	-	879
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1174	-	596
Mov Cap-2 Maneuver	-	-	596
Stage 1	-	-	788
Stage 2	-	-	854

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1174	-	-	-	596	786
HCM Lane V/C Ratio	0.026	-	-	-	0.017	0.064
HCM Control Delay (s)	8.1	-	-	-	11.1	9.9
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	0.2

Appendix F

Intersection
Level of Service
Calculations

Background Conditions

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HCM Unsignalized Intersection Capacity Analysis

Background AM

1: River Dr/SB US 101 Ramps & Broadway Cir

																		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR						
Lane Configurations																		
Sign Control	Stop			Stop			Stop			Stop								
Traffic Volume (vph)	77	21	29	2	17	2	52	1	4	7	3	430						
Future Volume (vph)	77	21	29	2	17	2	52	1	4	7	3	430						
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81						
Hourly flow rate (vph)	95	26	36	2	21	2	64	1	5	9	4	531						
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1	SB 2												
Volume Total (vph)	95	62	25	70	13	531												
Volume Left (vph)	95	0	2	64	9	0												
Volume Right (vph)	0	36	2	5	0	531												
Hadj (s)	0.55	-0.36	0.05	0.17	0.22	-0.52												
Departure Headway (s)	5.3	4.4	4.4	4.5	4.6	3.2												
Degree Utilization, x	0.14	0.08	0.03	0.09	0.02	0.47												
Capacity (veh/h)	666	801	791	761	733	1116												
Control Delay (s)	7.9	6.5	7.6	8.0	7.7	9.0												
Approach Delay (s)	7.4		7.6	8.0	9.0													
Approach LOS	A		A	A	A													
Intersection Summary																		
Delay	8.5																	
Level of Service	A																	
Intersection Capacity Utilization	43.3%			ICU Level of Service			A											
Analysis Period (min)	15																	

HCM 2010 Signalized Intersection Summary
2: Broadway Cir/San Antonio Dr & Broadway St

Background AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	3	13	153	4	100	5	245	255	190	297	1
Future Volume (veh/h)	0	3	13	153	4	100	5	245	255	190	297	1
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1681	1900	1845	1845	1845	1810	1810	1810	1863	1863	1900
Adj Flow Rate, veh/h	0	4	16	191	5	125	6	306	319	238	371	1
Adj No. of Lanes	0	1	0	1	1	1	1	2	1	1	2	0
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	13	13	13	3	3	3	5	5	5	2	2	2
Cap, veh/h	0	7	28	281	295	247	14	1139	755	289	1760	5
Arrive On Green	0.00	0.02	0.02	0.16	0.16	0.16	0.01	0.33	0.33	0.16	0.49	0.49
Sat Flow, veh/h	0	295	1179	1757	1845	1547	1723	3438	1538	1774	3621	10
Grp Volume(v), veh/h	0	0	20	191	5	125	6	306	319	238	181	191
Grp Sat Flow(s),veh/h/ln	0	0	1473	1757	1845	1547	1723	1719	1538	1774	1770	1861
Q Serve(g_s), s	0.0	0.0	0.8	5.7	0.1	4.1	0.2	3.7	7.4	7.2	3.3	3.3
Cycle Q Clear(g_c), s	0.0	0.0	0.8	5.7	0.1	4.1	0.2	3.7	7.4	7.2	3.3	3.3
Prop In Lane	0.00		0.80	1.00		1.00	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	0	0	35	281	295	247	14	1139	755	289	860	905
V/C Ratio(X)	0.00	0.00	0.57	0.68	0.02	0.51	0.44	0.27	0.42	0.82	0.21	0.21
Avail Cap(c_a), veh/h	0	0	132	566	594	499	154	1139	755	333	860	905
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	27.0	22.1	19.8	21.5	27.6	13.7	9.1	22.6	8.2	8.2
Incr Delay (d2), s/veh	0.0	0.0	13.6	2.9	0.0	1.6	20.4	0.6	1.7	13.6	0.6	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.4	3.0	0.1	1.9	0.2	1.8	4.4	4.6	1.7	1.8
LnGrp Delay(d),s/veh	0.0	0.0	40.6	25.0	19.8	23.1	48.0	14.3	10.9	36.2	8.8	8.7
LnGrp LOS			D	C	B	C	D	B	B	D	A	A
Approach Vol, veh/h	20			321			631			610		
Approach Delay, s/veh	40.6			24.2			12.9			19.5		
Approach LOS	D			C			B			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.6	23.0		5.8	4.9	31.7		13.4				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.5	18.5		5.0	5.0	24.0		18.0				
Max Q Clear Time (g_c+I1), s	9.2	9.4		2.8	2.2	5.3		7.7				
Green Ext Time (p_c), s	0.1	3.7		0.0	0.0	5.3		0.7				
Intersection Summary												
HCM 2010 Ctrl Delay				18.1								
HCM 2010 LOS				B								

HCM 2010 TWSC
3: First St & SB US 101 Ramps

Background AM

Intersection												
Int Delay, s/veh	15.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	244	0	7	0	0	0	0	40	0	73	33	0
Future Vol, veh/h	244	0	7	0	0	0	0	40	0	73	33	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	64	64	64	64	64	64	64	64	64	64	64	64
Heavy Vehicles, %	10	10	10	2	2	2	15	15	15	23	23	23
Mvmt Flow	381	0	11	0	0	0	0	63	0	114	52	0
Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	343	343	52				-	0	0	63	0	0
Stage 1	280	280	-				-	-	-	-	-	-
Stage 2	63	63	-				-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3				-	-	-	4.33	-	-
Critical Hdwy Stg 1	5.5	5.6	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-				-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39				-	-	-	2.407	-	-
Pot Cap-1 Maneuver	637	567	994				0	-	-	1416	-	0
Stage 1	749	665	-				0	-	-	-	-	0
Stage 2	940	827	-				0	-	-	-	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	584	0	994				-	-	-	1416	-	-
Mov Cap-2 Maneuver	584	0	-				-	-	-	-	-	-
Stage 1	687	0	-				-	-	-	-	-	-
Stage 2	940	0	-				-	-	-	-	-	-
Approach	EB			NB			SB					
HCM Control Delay, s	21.6			0			5.3					
HCM LOS	C											
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT						
Capacity (veh/h)	-	-	584	994	1416	-						
HCM Lane V/C Ratio	-	-	0.653	0.011	0.081	-						
HCM Control Delay (s)	-	-	22	8.7	7.8	0						
HCM Lane LOS	-	-	C	A	A	A						
HCM 95th %tile Q(veh)	-	-	4.8	0	0.3	-						

Intersection												
Int Delay, s/veh		2.8										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰	↱		↰			↱	
Traffic Vol, veh/h	0	0	0	1	1	134	5	279	0	0	105	107
Future Vol, veh/h	0	0	0	1	1	134	5	279	0	0	105	107
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	50	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	71	71	71	71	71	71	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	8	8	8	13	13	13	28	28	28
Mvmt Flow	0	0	0	1	1	189	7	393	0	0	148	151
Major/Minor				Minor1			Major1			Major2		
Conflicting Flow All				630	706	393	299	0	-	-	-	0
Stage 1				407	407	-	-	-	-	-	-	-
Stage 2				223	299	-	-	-	-	-	-	-
Critical Hdwy				6.48	6.58	6.28	4.23	-	-	-	-	-
Critical Hdwy Stg 1				5.48	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2				5.48	5.58	-	-	-	-	-	-	-
Follow-up Hdwy				3.572	4.072	3.372	2.317	-	-	-	-	-
Pot Cap-1 Maneuver				436	353	643	1202	-	0	0	-	-
Stage 1				659	587	-	-	-	0	0	-	-
Stage 2				800	656	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver				433	0	643	1202	-	-	-	-	-
Mov Cap-2 Maneuver				433	0	-	-	-	-	-	-	-
Stage 1				654	0	-	-	-	-	-	-	-
Stage 2				800	0	-	-	-	-	-	-	-
Approach				WB			NB			SB		
HCM Control Delay, s				12.9			0.1			0		
HCM LOS				B								
Minor Lane/Major Mvmt	NBL	NBT	WBLn1	WBLn2	SBT	SBR						
Capacity (veh/h)	1202	-	433	643	-	-						
HCM Lane V/C Ratio	0.006	-	0.007	0.294	-	-						
HCM Control Delay (s)	8	0	13.4	12.9	-	-						
HCM Lane LOS	A	A	B	B	-	-						
HCM 95th %tile Q(veh)	0	-	0	1.2	-	-						

Intersection												
Int Delay, s/veh	2.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Vol, veh/h	0	0	0	31	0	18	0	384	47	42	172	0
Future Vol, veh/h	0	0	0	31	0	18	0	384	47	42	172	0
Conflicting Peds, #/hr	0	0	1	1	0	0	2	0	21	21	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	73	73	73	73	73	73	73	73	73
Heavy Vehicles, %	2	2	2	29	29	29	12	12	12	17	17	17
Mvmt Flow	0	0	0	42	0	25	0	526	64	58	236	0
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	924	964	239	931	932	579	238	0	0	611	0	0
Stage 1	353	353	-	579	579	-	-	-	-	-	-	-
Stage 2	571	611	-	352	353	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.39	6.79	6.49	4.22	-	-	4.27	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.39	5.79	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.39	5.79	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.761	4.261	3.561	2.308	-	-	2.353	-	-
Pot Cap-1 Maneuver	250	255	800	221	240	468	1272	-	-	899	-	-
Stage 1	664	631	-	456	460	-	-	-	-	-	-	-
Stage 2	506	484	-	612	586	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	223	231	798	204	217	459	1271	-	-	899	-	-
Mov Cap-2 Maneuver	223	231	-	204	217	-	-	-	-	-	-	-
Stage 1	663	583	-	447	451	-	-	-	-	-	-	-
Stage 2	479	474	-	566	542	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			24			0			1.8		
HCM LOS	A			C								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1271	-	-	-	256	899	-	-				
HCM Lane V/C Ratio	-	-	-	-	0.262	0.064	-	-				
HCM Control Delay (s)	0	-	-	0	24	9.3	0	-				
HCM Lane LOS	A	-	-	A	C	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	-	1	0.2	-	-				

Intersection

Intersection Delay, s/veh	22.2
Intersection LOS	C

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations									
Traffic Vol, veh/h	0	95	49	0	49	360	0	194	31
Future Vol, veh/h	0	95	49	0	49	360	0	194	31
Peak Hour Factor	0.92	0.69	0.69	0.92	0.69	0.69	0.92	0.69	0.69
Heavy Vehicles, %	2	5	5	2	8	8	2	13	13
Mvmt Flow	0	138	71	0	71	522	0	281	45
Number of Lanes	0	1	1	0	1	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	2
HCM Control Delay	12.1	29.2	16
HCM LOS	B	D	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	86%
Vol Right, %	0%	0%	0%	100%	14%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	49	360	95	49	225
LT Vol	49	0	95	0	0
Through Vol	0	360	0	0	194
RT Vol	0	0	0	49	31
Lane Flow Rate	71	522	138	71	326
Geometry Grp	7	7	7	7	4
Degree of Util (X)	0.124	0.841	0.288	0.124	0.543
Departure Headway (Hd)	6.311	5.805	7.521	6.297	6
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	569	626	478	568	600
Service Time	4.044	3.538	5.269	4.045	4.04
HCM Lane V/C Ratio	0.125	0.834	0.289	0.125	0.543
HCM Control Delay	9.9	31.8	13.3	9.9	16
HCM Lane LOS	A	D	B	A	C
HCM 95th-tile Q	0.4	9.1	1.2	0.4	3.3

Intersection

Int Delay, s/veh 5.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↖	↗		↖	↗
Traffic Vol, veh/h	259	143	61	13	4	147
Future Vol, veh/h	259	143	61	13	4	147
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	72	72	72	72	72	72
Heavy Vehicles, %	8	8	23	23	11	11
Mvmt Flow	360	199	85	18	6	204

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	104	0	1013
Stage 1	-	-	95
Stage 2	-	-	918
Critical Hdwy	4.18	-	6.51
Critical Hdwy Stg 1	-	-	5.51
Critical Hdwy Stg 2	-	-	5.51
Follow-up Hdwy	2.272	-	3.599
Pot Cap-1 Maneuver	1451	-	255
Stage 1	-	-	907
Stage 2	-	-	375
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1451	-	184
Mov Cap-2 Maneuver	-	-	184
Stage 1	-	-	906
Stage 2	-	-	270

Approach	EB	WB	SB
HCM Control Delay, s	5.3	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1451	-	-	-	184	936
HCM Lane V/C Ratio	0.248	-	-	-	0.03	0.218
HCM Control Delay (s)	8.3	0	-	-	25.2	9.9
HCM Lane LOS	A	A	-	-	D	A
HCM 95th %tile Q(veh)	1	-	-	-	0.1	0.8

Intersection												
Int Delay, s/veh	14											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱	↱	↰	↱	↱
Traffic Vol, veh/h	119	82	99	21	27	1	79	104	54	9	30	29
Future Vol, veh/h	119	82	99	21	27	1	79	104	54	9	30	29
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	100	-	-	90	-	90	60	-	110
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	61	61	61	61	61	61	61	61	61	61	61	61
Heavy Vehicles, %	3	3	3	14	14	14	5	5	5	5	5	5
Mvmt Flow	195	134	162	34	44	2	130	170	89	15	49	48
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	46	0	0	298	0	0	746	722	217	805	802	45
Stage 1	-	-	-	-	-	-	607	607	-	114	114	-
Stage 2	-	-	-	-	-	-	139	115	-	691	688	-
Critical Hdwy	4.13	-	-	4.24	-	-	7.15	6.55	6.25	7.15	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Follow-up Hdwy	2.227	-	-	2.326	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	1555	-	-	1198	-	-	326	349	815	297	314	1016
Stage 1	-	-	-	-	-	-	478	482	-	884	795	-
Stage 2	-	-	-	-	-	-	857	795	-	430	442	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1555	-	-	1198	-	-	237	296	814	129	267	1016
Mov Cap-2 Maneuver	-	-	-	-	-	-	237	296	-	129	267	-
Stage 1	-	-	-	-	-	-	418	421	-	773	772	-
Stage 2	-	-	-	-	-	-	743	772	-	199	386	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	3			3.5			28.9			18		
HCM LOS							D			C		
Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	237	296	814	1555	-	-	1198	-	-	129	267	1016
HCM Lane V/C Ratio	0.546	0.576	0.109	0.125	-	-	0.029	-	-	0.114	0.184	0.047
HCM Control Delay (s)	37.1	32.5	10	7.6	-	-	8.1	-	-	36.5	21.5	8.7
HCM Lane LOS	E	D	B	A	-	-	A	-	-	E	C	A
HCM 95th %tile Q(veh)	3	3.4	0.4	0.4	-	-	0.1	-	-	0.4	0.7	0.1

Intersection

Int Delay, s/veh 3.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	39	75	34	11	21	15
Future Vol, veh/h	39	75	34	11	21	15
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	105	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	15	15	32	32	14	14
Mvmt Flow	46	88	40	13	25	18

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	54	0	227
Stage 1	-	-	47
Stage 2	-	-	180
Critical Hdwy	4.25	-	6.54
Critical Hdwy Stg 1	-	-	5.54
Critical Hdwy Stg 2	-	-	5.54
Follow-up Hdwy	2.335	-	3.626
Pot Cap-1 Maneuver	1472	-	735
Stage 1	-	-	946
Stage 2	-	-	823
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1472	-	711
Mov Cap-2 Maneuver	-	-	711
Stage 1	-	-	945
Stage 2	-	-	797

Approach	EB	WB	SB
HCM Control Delay, s	2.6	0	9.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1472	-	-	-	711	988
HCM Lane V/C Ratio	0.031	-	-	-	0.035	0.018
HCM Control Delay (s)	7.5	-	-	-	10.2	8.7
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	0.1

HCM Unsignalized Intersection Capacity Analysis

Background PM

1: River Dr/SB US 101 Ramps & Broadway Cir

																		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR						
Lane Configurations																		
Sign Control	Stop			Stop			Stop			Stop								
Traffic Volume (vph)	78	34	83	4	32	9	81	11	2	22	33	489						
Future Volume (vph)	78	34	83	4	32	9	81	11	2	22	33	489						
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)	80	35	86	4	33	9	84	11	2	23	34	504						
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1	SB 2												
Volume Total (vph)	80	121	46	97	57	504												
Volume Left (vph)	80	0	4	84	23	0												
Volume Right (vph)	0	86	9	2	0	504												
Hadj (s)	0.53	-0.46	0.02	0.19	0.11	-0.57												
Departure Headway (s)	5.5	4.5	4.6	4.7	4.7	3.2												
Degree Utilization, x	0.12	0.15	0.06	0.13	0.07	0.45												
Capacity (veh/h)	638	777	734	720	715	1115												
Control Delay (s)	8.0	7.0	7.9	8.4	8.1	8.8												
Approach Delay (s)	7.4		7.9	8.4	8.7													
Approach LOS	A		A	A	A													
Intersection Summary																		
Delay	8.4																	
Level of Service	A																	
Intersection Capacity Utilization	50.9%			ICU Level of Service				A										
Analysis Period (min)	15																	

HCM 2010 Signalized Intersection Summary

2: Broadway Cir/San Antonio Dr & Broadway St

Background PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	18	21	251	19	246	22	346	302	180	259	10
Future Volume (veh/h)	4	18	21	251	19	246	22	346	302	180	259	10
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	4	20	24	282	21	276	25	389	339	202	291	11
Adj No. of Lanes	0	1	0	1	1	1	1	2	1	1	2	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	6	32	39	385	405	343	50	1071	823	249	1441	54
Arrive On Green	0.05	0.05	0.05	0.22	0.22	0.22	0.03	0.30	0.30	0.14	0.41	0.41
Sat Flow, veh/h	142	710	853	1774	1863	1581	1774	3539	1583	1774	3478	131
Grp Volume(v), veh/h	48	0	0	282	21	276	25	389	339	202	148	154
Grp Sat Flow(s),veh/h/ln	1705	0	0	1774	1863	1581	1774	1770	1583	1774	1770	1839
Q Serve(g_s), s	1.7	0.0	0.0	9.0	0.5	10.1	0.8	5.3	8.0	6.8	3.3	3.3
Cycle Q Clear(g_c), s	1.7	0.0	0.0	9.0	0.5	10.1	0.8	5.3	8.0	6.8	3.3	3.3
Prop In Lane	0.08		0.50	1.00		1.00	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	78	0	0	385	405	343	50	1071	823	249	733	762
V/C Ratio(X)	0.62	0.00	0.00	0.73	0.05	0.80	0.50	0.36	0.41	0.81	0.20	0.20
Avail Cap(c_a), veh/h	139	0	0	522	549	466	145	1071	823	305	733	762
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.6	0.0	0.0	22.3	18.9	22.7	29.3	16.7	9.0	25.5	11.4	11.4
Incr Delay (d2), s/veh	7.7	0.0	0.0	3.5	0.1	7.2	7.4	1.0	1.5	12.8	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	4.8	0.3	5.0	0.5	2.7	5.4	4.2	1.7	1.8
LnGrp Delay(d),s/veh	36.4	0.0	0.0	25.7	19.0	29.9	36.7	17.7	10.5	38.3	12.0	12.0
LnGrp LOS	D			C	B	C	D	B	B	D	B	B
Approach Vol, veh/h		48			579			753			504	
Approach Delay, s/veh		36.4			27.5			15.1			22.6	
Approach LOS		D			C			B			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.1	23.0		7.3	6.2	29.8		17.8				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.5	18.5		5.0	5.0	24.0		18.0				
Max Q Clear Time (g_c+I1), s	8.8	10.0		3.7	2.8	5.3		12.1				
Green Ext Time (p_c), s	0.1	3.6		0.0	0.0	5.5		1.1				
Intersection Summary												
HCM 2010 Ctrl Delay				21.4								
HCM 2010 LOS				C								

HCM 2010 TWSC
3: First St & SB US 101 Ramps

Background PM

Intersection												
Int Delay, s/veh	8.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	136	0	12	0	0	0	0	69	0	119	24	0
Future Vol, veh/h	136	0	12	0	0	0	0	69	0	119	24	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	15	15	15	2	2	2	9	9	9	12	12	12
Mvmt Flow	174	0	15	0	0	0	0	88	0	153	31	0
Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	424	424	31				-	0	0	88	0	0
Stage 1	336	336	-				-	-	-	-	-	-
Stage 2	88	88	-				-	-	-	-	-	-
Critical Hdwy	6.55	6.65	6.35				-	-	-	4.22	-	-
Critical Hdwy Stg 1	5.55	5.65	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.55	5.65	-				-	-	-	-	-	-
Follow-up Hdwy	3.635	4.135	3.435				-	-	-	2.308	-	-
Pot Cap-1 Maneuver	563	503	1007				0	-	-	1447	-	0
Stage 1	696	619	-				0	-	-	-	-	0
Stage 2	904	797	-				0	-	-	-	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	502	0	1007				-	-	-	1447	-	-
Mov Cap-2 Maneuver	502	0	-				-	-	-	-	-	-
Stage 1	621	0	-				-	-	-	-	-	-
Stage 2	904	0	-				-	-	-	-	-	-
Approach	EB			NB			SB					
HCM Control Delay, s	15.3			0			6.5					
HCM LOS	C											
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT						
Capacity (veh/h)	-	-	502	1007	1447	-						
HCM Lane V/C Ratio	-	-	0.347	0.015	0.105	-						
HCM Control Delay (s)	-	-	15.9	8.6	7.8	0						
HCM Lane LOS	-	-	C	A	A	A						
HCM 95th %tile Q(veh)	-	-	1.5	0	0.4	-						

HCM 2010 TWSC
4: First St & NB US 101 Ramps

Background PM

Intersection												
Int Delay, s/veh	3.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↰	↱		↰			↱	
Traffic Vol, veh/h	0	0	0	1	1	224	21	184	0	0	143	281
Future Vol, veh/h	0	0	0	1	1	224	21	184	0	0	143	281
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	50	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	4	4	4	13	13	13	8	8	8
Mvmt Flow	0	0	0	1	1	273	26	224	0	0	174	343
Major/Minor				Minor1			Major1			Major2		
Conflicting Flow All				622	793	224	517	0	-	-	-	0
Stage 1				276	276	-	-	-	-	-	-	-
Stage 2				346	517	-	-	-	-	-	-	-
Critical Hdwy				6.44	6.54	6.24	4.23	-	-	-	-	-
Critical Hdwy Stg 1				5.44	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2				5.44	5.54	-	-	-	-	-	-	-
Follow-up Hdwy				3.536	4.036	3.336	2.317	-	-	-	-	-
Pot Cap-1 Maneuver				447	319	810	995	-	0	0	-	-
Stage 1				766	678	-	-	-	0	0	-	-
Stage 2				712	530	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver				434	0	810	995	-	-	-	-	-
Mov Cap-2 Maneuver				434	0	-	-	-	-	-	-	-
Stage 1				743	0	-	-	-	-	-	-	-
Stage 2				712	0	-	-	-	-	-	-	-
Approach				WB			NB			SB		
HCM Control Delay, s				11.7			0.9			0		
HCM LOS				B								
Minor Lane/Major Mvmt	NBL	NBT	WBLn1	WBLn2	SBT	SBR						
Capacity (veh/h)	995	-	434	810	-	-						
HCM Lane V/C Ratio	0.026	-	0.006	0.337	-	-						
HCM Control Delay (s)	8.7	0	13.3	11.7	-	-						
HCM Lane LOS	A	A	B	B	-	-						
HCM 95th %tile Q(veh)	0.1	-	0	1.5	-	-						

Intersection												
Int Delay, s/veh	3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	0	0	1	37	0	84	3	378	14	19	371	2
Future Vol, veh/h	0	0	1	37	0	84	3	378	14	19	371	2
Conflicting Peds, #/hr	1	0	0	0	0	1	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	6	6	6	9	9	9	7	7	7
Mvmt Flow	0	0	1	46	0	105	4	473	18	24	464	3
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1056	1012	466	1002	1004	482	467	0	0	490	0	0
Stage 1	514	514	-	489	489	-	-	-	-	-	-	-
Stage 2	542	498	-	513	515	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.16	6.56	6.26	4.19	-	-	4.17	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.16	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.16	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.554	4.054	3.354	2.281	-	-	2.263	-	-
Pot Cap-1 Maneuver	203	239	597	217	238	576	1059	-	-	1048	-	-
Stage 1	543	535	-	553	543	-	-	-	-	-	-	-
Stage 2	525	544	-	537	528	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	161	230	596	211	229	575	1059	-	-	1047	-	-
Mov Cap-2 Maneuver	161	230	-	211	229	-	-	-	-	-	-	-
Stage 1	540	518	-	550	540	-	-	-	-	-	-	-
Stage 2	427	541	-	519	511	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	11.1			20.9			0.1			0.4		
HCM LOS	B			C								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1059	-	-	596	376	1047	-	-				
HCM Lane V/C Ratio	0.004	-	-	0.002	0.402	0.023	-	-				
HCM Control Delay (s)	8.4	0	-	11.1	20.9	8.5	0	-				
HCM Lane LOS	A	A	-	B	C	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0	1.9	0.1	-	-				

Intersection

Intersection Delay, s/veh 28.4
Intersection LOS D

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations		↰	↱		↰	↱		↰	
Traffic Vol, veh/h	0	58	73	0	120	289	0	382	108
Future Vol, veh/h	0	58	73	0	120	289	0	382	108
Peak Hour Factor	0.92	0.80	0.80	0.92	0.80	0.80	0.92	0.80	0.80
Heavy Vehicles, %	2	4	4	2	8	8	2	5	5
Mvmt Flow	0	73	91	0	150	361	0	478	135
Number of Lanes	0	1	1	0	1	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	2
HCM Control Delay	11.3	15.3	43.9
HCM LOS	B	C	E

Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	78%
Vol Right, %	0%	0%	0%	100%	22%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	120	289	58	73	490
LT Vol	120	0	58	0	0
Through Vol	0	289	0	0	382
RT Vol	0	0	0	73	108
Lane Flow Rate	150	361	72	91	612
Geometry Grp	7	7	7	7	4
Degree of Util (X)	0.267	0.593	0.158	0.167	0.933
Departure Headway (Hd)	6.414	5.907	7.824	6.596	5.484
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	561	611	458	543	662
Service Time	4.15	3.642	5.573	4.344	3.514
HCM Lane V/C Ratio	0.267	0.591	0.157	0.168	0.924
HCM Control Delay	11.5	16.9	12	10.7	43.9
HCM Lane LOS	B	C	B	B	E
HCM 95th-tile Q	1.1	3.9	0.6	0.6	12.6

Intersection

Int Delay, s/veh 7.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↗		↖	↗
Traffic Vol, veh/h	152	90	223	29	8	332
Future Vol, veh/h	152	90	223	29	8	332
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	16	16	8	8	7	7
Mvmt Flow	183	108	269	35	10	400

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	305	0	762
Stage 1	-	-	287
Stage 2	-	-	475
Critical Hdwy	4.26	-	6.47
Critical Hdwy Stg 1	-	-	5.47
Critical Hdwy Stg 2	-	-	5.47
Follow-up Hdwy	2.344	-	3.563
Pot Cap-1 Maneuver	1180	-	366
Stage 1	-	-	750
Stage 2	-	-	615
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1180	-	305
Mov Cap-2 Maneuver	-	-	305
Stage 1	-	-	749
Stage 2	-	-	513

Approach	EB	WB	SB
HCM Control Delay, s	5.4	0	15.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1180	-	-	-	305	739
HCM Lane V/C Ratio	0.155	-	-	-	0.032	0.541
HCM Control Delay (s)	8.6	0	-	-	17.2	15.5
HCM Lane LOS	A	A	-	-	C	C
HCM 95th %tile Q(veh)	0.5	-	-	-	0.1	3.3

Intersection												
Int Delay, s/veh	10.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱	↱	↰	↱	↱
Traffic Vol, veh/h	35	37	43	53	101	10	97	60	20	3	108	128
Future Vol, veh/h	35	37	43	53	101	10	97	60	20	3	108	128
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	3	3	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	100	-	-	90	-	90	60	-	110
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	79	79	79	79	79	79	79	79	79
Heavy Vehicles, %	5	5	5	3	3	3	7	7	7	3	3	3
Mvmt Flow	44	47	54	67	128	13	123	76	25	4	137	162
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	141	0	0	104	0	0	503	441	80	472	461	134
Stage 1	-	-	-	-	-	-	166	166	-	268	268	-
Stage 2	-	-	-	-	-	-	337	275	-	204	193	-
Critical Hdwy	4.15	-	-	4.13	-	-	7.17	6.57	6.27	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.17	5.57	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.17	5.57	-	6.13	5.53	-
Follow-up Hdwy	2.245	-	-	2.227	-	-	3.563	4.063	3.363	3.527	4.027	3.327
Pot Cap-1 Maneuver	1424	-	-	1481	-	-	471	503	966	501	496	912
Stage 1	-	-	-	-	-	-	824	752	-	735	685	-
Stage 2	-	-	-	-	-	-	667	673	-	796	739	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1424	-	-	1477	-	-	281	464	960	402	458	912
Mov Cap-2 Maneuver	-	-	-	-	-	-	281	464	-	402	458	-
Stage 1	-	-	-	-	-	-	796	727	-	712	654	-
Stage 2	-	-	-	-	-	-	414	642	-	671	714	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	2.3			2.4			20.9			12.7		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	281	464	960	1424	-	-	1477	-	-	402	458	912
HCM Lane V/C Ratio	0.437	0.164	0.026	0.031	-	-	0.045	-	-	0.009	0.298	0.178
HCM Control Delay (s)	27.4	14.3	8.9	7.6	-	-	7.6	-	-	14	16.2	9.8
HCM Lane LOS	D	B	A	A	-	-	A	-	-	B	C	A
HCM 95th %tile Q(veh)	2.1	0.6	0.1	0.1	-	-	0.1	-	-	0	1.2	0.6

Intersection

Int Delay, s/veh 2.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	22	49	147	41	8	37
Future Vol, veh/h	22	49	147	41	8	37
Conflicting Peds, #/hr	3	0	0	3	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	105	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	60	60	60	60	60	60
Heavy Vehicles, %	26	26	7	7	6	6
Mvmt Flow	37	82	245	68	13	62

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	316	0	437
Stage 1	-	-	282
Stage 2	-	-	155
Critical Hdwy	4.36	-	6.46
Critical Hdwy Stg 1	-	-	5.46
Critical Hdwy Stg 2	-	-	5.46
Follow-up Hdwy	2.434	-	3.554
Pot Cap-1 Maneuver	1120	-	569
Stage 1	-	-	757
Stage 2	-	-	864
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1120	-	547
Mov Cap-2 Maneuver	-	-	547
Stage 1	-	-	755
Stage 2	-	-	833

Approach	EB	WB	SB
HCM Control Delay, s	2.6	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1120	-	-	-	547	745
HCM Lane V/C Ratio	0.033	-	-	-	0.024	0.083
HCM Control Delay (s)	8.3	-	-	-	11.7	10.3
HCM Lane LOS	A	-	-	-	B	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	0.3

Appendix G

Intersection
Level of Service
Calculations

Background Plus Project
Conditions

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HCM Unsignalized Intersection Capacity Analysis

1: River Dr/SB US 101 Ramps & Broadway Cir

Background Plus Project AM

																		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR						
Lane Configurations																		
Sign Control	Stop			Stop			Stop			Stop								
Traffic Volume (vph)	77	21	29	2	17	2	52	1	4	7	3	431						
Future Volume (vph)	77	21	29	2	17	2	52	1	4	7	3	431						
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81						
Hourly flow rate (vph)	95	26	36	2	21	2	64	1	5	9	4	532						
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1	SB 2												
Volume Total (vph)	95	62	25	70	13	532												
Volume Left (vph)	95	0	2	64	9	0												
Volume Right (vph)	0	36	2	5	0	532												
Hadj (s)	0.55	-0.36	0.05	0.17	0.22	-0.52												
Departure Headway (s)	5.3	4.4	4.4	4.5	4.6	3.2												
Degree Utilization, x	0.14	0.08	0.03	0.09	0.02	0.47												
Capacity (veh/h)	666	801	791	761	733	1116												
Control Delay (s)	7.9	6.5	7.6	8.0	7.7	9.0												
Approach Delay (s)	7.4		7.6	8.0	9.0													
Approach LOS	A		A	A	A													
Intersection Summary																		
Delay	8.5																	
Level of Service	A																	
Intersection Capacity Utilization	43.4%			ICU Level of Service			A											
Analysis Period (min)	15																	

HCM 2010 Signalized Intersection Summary

2: Broadway Cir/San Antonio Dr & Broadway St

Background Plus Project AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	3	13	153	4	100	5	246	255	190	298	1
Future Volume (veh/h)	0	3	13	153	4	100	5	246	255	190	298	1
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1681	1900	1845	1845	1845	1810	1810	1810	1863	1863	1900
Adj Flow Rate, veh/h	0	4	16	191	5	125	6	308	319	238	372	1
Adj No. of Lanes	0	1	0	1	1	1	1	2	1	1	2	0
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	13	13	13	3	3	3	5	5	5	2	2	2
Cap, veh/h	0	7	28	281	295	247	14	1139	755	289	1760	5
Arrive On Green	0.00	0.02	0.02	0.16	0.16	0.16	0.01	0.33	0.33	0.16	0.49	0.49
Sat Flow, veh/h	0	295	1179	1757	1845	1547	1723	3438	1538	1774	3621	10
Grp Volume(v), veh/h	0	0	20	191	5	125	6	308	319	238	182	191
Grp Sat Flow(s),veh/h/ln	0	0	1473	1757	1845	1547	1723	1719	1538	1774	1770	1861
Q Serve(g_s), s	0.0	0.0	0.8	5.7	0.1	4.1	0.2	3.7	7.4	7.2	3.3	3.3
Cycle Q Clear(g_c), s	0.0	0.0	0.8	5.7	0.1	4.1	0.2	3.7	7.4	7.2	3.3	3.3
Prop In Lane	0.00		0.80	1.00		1.00	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	0	0	35	281	295	247	14	1139	755	289	860	905
V/C Ratio(X)	0.00	0.00	0.57	0.68	0.02	0.51	0.44	0.27	0.42	0.82	0.21	0.21
Avail Cap(c_a), veh/h	0	0	132	566	594	499	154	1139	755	333	860	905
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	27.0	22.1	19.8	21.5	27.6	13.7	9.1	22.6	8.2	8.2
Incr Delay (d2), s/veh	0.0	0.0	13.6	2.9	0.0	1.6	20.4	0.6	1.7	13.6	0.6	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.4	3.0	0.1	1.9	0.2	1.8	4.4	4.6	1.7	1.8
LnGrp Delay(d),s/veh	0.0	0.0	40.6	25.0	19.8	23.1	48.0	14.3	10.9	36.2	8.8	8.8
LnGrp LOS			D	C	B	C	D	B	B	D	A	A
Approach Vol, veh/h	20			321			633			611		
Approach Delay, s/veh	40.6			24.2			12.9			19.5		
Approach LOS	D			C			B			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.6	23.0		5.8	4.9	31.7		13.4				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.5	18.5		5.0	5.0	24.0		18.0				
Max Q Clear Time (g_c+I1), s	9.2	9.4		2.8	2.2	5.3		7.7				
Green Ext Time (p_c), s	0.1	3.7		0.0	0.0	5.3		0.7				
Intersection Summary												
HCM 2010 Ctrl Delay	18.1											
HCM 2010 LOS	B											

Intersection												
Int Delay, s/veh	15.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	244	0	7	0	0	0	0	40	0	74	33	0
Future Vol, veh/h	244	0	7	0	0	0	0	40	0	74	33	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	64	64	64	64	64	64	64	64	64	64	64	64
Heavy Vehicles, %	10	10	10	2	2	2	15	15	15	23	23	23
Mvmt Flow	381	0	11	0	0	0	0	63	0	116	52	0
Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	346	346	52				-	0	0	63	0	0
Stage 1	283	283	-				-	-	-	-	-	-
Stage 2	63	63	-				-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3				-	-	-	4.33	-	-
Critical Hdwy Stg 1	5.5	5.6	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-				-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39				-	-	-	2.407	-	-
Pot Cap-1 Maneuver	635	564	994				0	-	-	1416	-	0
Stage 1	747	663	-				0	-	-	-	-	0
Stage 2	940	827	-				0	-	-	-	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	582	0	994				-	-	-	1416	-	-
Mov Cap-2 Maneuver	582	0	-				-	-	-	-	-	-
Stage 1	684	0	-				-	-	-	-	-	-
Stage 2	940	0	-				-	-	-	-	-	-
Approach	EB			NB			SB					
HCM Control Delay, s	21.8			0			5.4					
HCM LOS	C											
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT						
Capacity (veh/h)	-	-	582	994	1416	-						
HCM Lane V/C Ratio	-	-	0.655	0.011	0.082	-						
HCM Control Delay (s)	-	-	22.2	8.7	7.8	0						
HCM Lane LOS	-	-	C	A	A	A						
HCM 95th %tile Q(veh)	-	-	4.8	0	0.3	-						

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕	↗		↕			↗	
Traffic Vol, veh/h	0	0	0	1	1	135	5	279	0	0	106	107
Future Vol, veh/h	0	0	0	1	1	135	5	279	0	0	106	107
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	50	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	71	71	71	71	71	71	71	71	71	71	71	71
Heavy Vehicles, %	2	2	2	8	8	8	13	13	13	28	28	28
Mvmt Flow	0	0	0	1	1	190	7	393	0	0	149	151
Major/Minor				Minor1			Major1			Major2		
Conflicting Flow All				632	707	393	300	0	-	-	-	0
Stage 1				407	407	-	-	-	-	-	-	-
Stage 2				225	300	-	-	-	-	-	-	-
Critical Hdwy				6.48	6.58	6.28	4.23	-	-	-	-	-
Critical Hdwy Stg 1				5.48	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2				5.48	5.58	-	-	-	-	-	-	-
Follow-up Hdwy				3.572	4.072	3.372	2.317	-	-	-	-	-
Pot Cap-1 Maneuver				435	353	643	1201	-	0	0	-	-
Stage 1				659	587	-	-	-	0	0	-	-
Stage 2				798	655	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver				432	0	643	1201	-	-	-	-	-
Mov Cap-2 Maneuver				432	0	-	-	-	-	-	-	-
Stage 1				654	0	-	-	-	-	-	-	-
Stage 2				798	0	-	-	-	-	-	-	-
Approach				WB			NB			SB		
HCM Control Delay, s				12.9			0.1			0		
HCM LOS				B								
Minor Lane/Major Mvmt	NBL	NBT	WBLn1	WBLn2	SBT	SBR						
Capacity (veh/h)	1201	-	432	643	-	-						
HCM Lane V/C Ratio	0.006	-	0.007	0.296	-	-						
HCM Control Delay (s)	8	0	13.4	12.9	-	-						
HCM Lane LOS	A	A	B	B	-	-						
HCM 95th %tile Q(veh)	0	-	0	1.2	-	-						

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Vol, veh/h	0	0	0	31	0	18	0	385	47	42	173	0
Future Vol, veh/h	0	0	0	31	0	18	0	385	47	42	173	0
Conflicting Peds, #/hr	0	0	1	1	0	0	2	0	21	21	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	73	73	73	73	73	73	73	73	73
Heavy Vehicles, %	2	2	2	29	29	29	12	12	12	17	17	17
Mvmt Flow	0	0	0	42	0	25	0	527	64	58	237	0
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	926	967	240	934	935	581	239	0	0	613	0	0
Stage 1	354	354	-	581	581	-	-	-	-	-	-	-
Stage 2	572	613	-	353	354	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.39	6.79	6.49	4.22	-	-	4.27	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.39	5.79	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.39	5.79	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.761	4.261	3.561	2.308	-	-	2.353	-	-
Pot Cap-1 Maneuver	249	254	799	220	239	466	1271	-	-	897	-	-
Stage 1	663	630	-	455	459	-	-	-	-	-	-	-
Stage 2	505	483	-	612	585	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	222	230	797	203	216	457	1270	-	-	897	-	-
Mov Cap-2 Maneuver	222	230	-	203	216	-	-	-	-	-	-	-
Stage 1	662	582	-	446	450	-	-	-	-	-	-	-
Stage 2	478	473	-	566	541	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			24.1			0			1.8		
HCM LOS	A			C								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1270	-	-	-	255	897	-	-				
HCM Lane V/C Ratio	-	-	-	-	0.263	0.064	-	-				
HCM Control Delay (s)	0	-	-	0	24.1	9.3	0	-				
HCM Lane LOS	A	-	-	A	C	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	-	1	0.2	-	-				

Intersection

Intersection Delay, s/veh	22.4
Intersection LOS	C

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations		↰	↱		↰	↱		↰	
Traffic Vol, veh/h	0	95	49	0	49	361	0	195	31
Future Vol, veh/h	0	95	49	0	49	361	0	195	31
Peak Hour Factor	0.92	0.69	0.69	0.92	0.69	0.69	0.92	0.69	0.69
Heavy Vehicles, %	2	5	5	2	8	8	2	13	13
Mvmt Flow	0	138	71	0	71	523	0	283	45
Number of Lanes	0	1	1	0	1	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	2
HCM Control Delay	12.2	29.5	16.1
HCM LOS	B	D	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	86%
Vol Right, %	0%	0%	0%	100%	14%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	49	361	95	49	226
LT Vol	49	0	95	0	0
Through Vol	0	361	0	0	195
RT Vol	0	0	0	49	31
Lane Flow Rate	71	523	138	71	328
Geometry Grp	7	7	7	7	4
Degree of Util (X)	0.125	0.844	0.288	0.124	0.546
Departure Headway (Hd)	6.315	5.808	7.528	6.305	6.005
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	568	623	478	567	599
Service Time	4.046	3.54	5.278	4.054	4.043
HCM Lane V/C Ratio	0.125	0.839	0.289	0.125	0.548
HCM Control Delay	10	32.2	13.3	10	16.1
HCM Lane LOS	A	D	B	A	C
HCM 95th-tile Q	0.4	9.2	1.2	0.4	3.3

Intersection

Int Delay, s/veh 5.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↱	↱		↱	↱
Traffic Vol, veh/h	260	143	61	13	4	148
Future Vol, veh/h	260	143	61	13	4	148
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	72	72	72	72	72	72
Heavy Vehicles, %	8	8	23	23	11	11
Mvmt Flow	361	199	85	18	6	206

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	104	0	1016
Stage 1	-	-	95
Stage 2	-	-	921
Critical Hdwy	4.18	-	6.51
Critical Hdwy Stg 1	-	-	5.51
Critical Hdwy Stg 2	-	-	5.51
Follow-up Hdwy	2.272	-	3.599
Pot Cap-1 Maneuver	1451	-	254
Stage 1	-	-	907
Stage 2	-	-	374
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1451	-	183
Mov Cap-2 Maneuver	-	-	183
Stage 1	-	-	906
Stage 2	-	-	269

Approach	EB	WB	SB
HCM Control Delay, s	5.4	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1451	-	-	-	183	936
HCM Lane V/C Ratio	0.249	-	-	-	0.03	0.22
HCM Control Delay (s)	8.3	0	-	-	25.3	9.9
HCM Lane LOS	A	A	-	-	D	A
HCM 95th %tile Q(veh)	1	-	-	-	0.1	0.8

Intersection												
Int Delay, s/veh	13.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱	↱	↰	↱	↱
Traffic Vol, veh/h	119	83	99	22	28	1	79	101	55	9	30	29
Future Vol, veh/h	119	83	99	22	28	1	79	101	55	9	30	29
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	100	-	-	90	-	90	60	-	110
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	61	61	61	61	61	61	61	61	61	61	61	61
Heavy Vehicles, %	3	3	3	14	14	14	5	5	5	5	5	5
Mvmt Flow	195	136	162	36	46	2	130	166	90	15	49	48
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	48	0	0	299	0	0	751	728	218	809	809	47
Stage 1	-	-	-	-	-	-	608	608	-	119	119	-
Stage 2	-	-	-	-	-	-	143	120	-	690	690	-
Critical Hdwy	4.13	-	-	4.24	-	-	7.15	6.55	6.25	7.15	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Follow-up Hdwy	2.227	-	-	2.326	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	1553	-	-	1197	-	-	323	347	814	295	311	1014
Stage 1	-	-	-	-	-	-	478	481	-	878	791	-
Stage 2	-	-	-	-	-	-	853	791	-	431	442	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1553	-	-	1197	-	-	234	294	813	130	264	1014
Mov Cap-2 Maneuver	-	-	-	-	-	-	234	294	-	130	264	-
Stage 1	-	-	-	-	-	-	418	420	-	768	767	-
Stage 2	-	-	-	-	-	-	738	767	-	203	386	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	3			3.5			28.8			18.1		
HCM LOS							D			C		
Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	234	294	813	1553	-	-	1197	-	-	130	264	1014
HCM Lane V/C Ratio	0.553	0.563	0.111	0.126	-	-	0.03	-	-	0.113	0.186	0.047
HCM Control Delay (s)	37.9	31.9	10	7.7	-	-	8.1	-	-	36.2	21.7	8.7
HCM Lane LOS	E	D	B	A	-	-	A	-	-	E	C	A
HCM 95th %tile Q(veh)	3	3.2	0.4	0.4	-	-	0.1	-	-	0.4	0.7	0.1

Intersection

Int Delay, s/veh 3.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	39	75	34	11	21	15
Future Vol, veh/h	39	75	34	11	21	15
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	105	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	15	15	32	32	14	14
Mvmt Flow	46	88	40	13	25	18

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	54	0	227
Stage 1	-	-	47
Stage 2	-	-	180
Critical Hdwy	4.25	-	6.54
Critical Hdwy Stg 1	-	-	5.54
Critical Hdwy Stg 2	-	-	5.54
Follow-up Hdwy	2.335	-	3.626
Pot Cap-1 Maneuver	1472	-	735
Stage 1	-	-	946
Stage 2	-	-	823
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1472	-	711
Mov Cap-2 Maneuver	-	-	711
Stage 1	-	-	945
Stage 2	-	-	797

Approach	EB	WB	SB
HCM Control Delay, s	2.6	0	9.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1472	-	-	-	711	988
HCM Lane V/C Ratio	0.031	-	-	-	0.035	0.018
HCM Control Delay (s)	7.5	-	-	-	10.2	8.7
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	0.1

HCM Unsignalized Intersection Capacity Analysis

1: River Dr/SB US 101 Ramps & Broadway Cir

Background Plus Project PM

																		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR						
Lane Configurations																		
Sign Control	Stop			Stop			Stop			Stop								
Traffic Volume (vph)	78	34	83	4	32	9	81	11	2	22	33	490						
Future Volume (vph)	78	34	83	4	32	9	81	11	2	22	33	490						
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)	80	35	86	4	33	9	84	11	2	23	34	505						
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1	SB 2												
Volume Total (vph)	80	121	46	97	57	505												
Volume Left (vph)	80	0	4	84	23	0												
Volume Right (vph)	0	86	9	2	0	505												
Hadj (s)	0.53	-0.46	0.02	0.19	0.11	-0.57												
Departure Headway (s)	5.5	4.5	4.6	4.7	4.7	3.2												
Degree Utilization, x	0.12	0.15	0.06	0.13	0.07	0.45												
Capacity (veh/h)	638	777	734	720	715	1115												
Control Delay (s)	8.0	7.0	7.9	8.4	8.1	8.8												
Approach Delay (s)	7.4		7.9	8.4	8.7													
Approach LOS	A		A	A	A													
Intersection Summary																		
Delay	8.4																	
Level of Service	A																	
Intersection Capacity Utilization	50.9%			ICU Level of Service				A										
Analysis Period (min)	15																	

HCM 2010 Signalized Intersection Summary

2: Broadway Cir/San Antonio Dr & Broadway St

Background Plus Project PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	18	21	251	19	246	22	347	302	180	260	10
Future Volume (veh/h)	4	18	21	251	19	246	22	347	302	180	260	10
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	4	20	24	282	21	276	25	390	339	202	292	11
Adj No. of Lanes	0	1	0	1	1	1	1	2	1	1	2	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	6	32	39	385	405	343	50	1071	823	249	1442	54
Arrive On Green	0.05	0.05	0.05	0.22	0.22	0.22	0.03	0.30	0.30	0.14	0.41	0.41
Sat Flow, veh/h	142	710	853	1774	1863	1581	1774	3539	1583	1774	3478	131
Grp Volume(v), veh/h	48	0	0	282	21	276	25	390	339	202	148	155
Grp Sat Flow(s),veh/h/ln	1705	0	0	1774	1863	1581	1774	1770	1583	1774	1770	1839
Q Serve(g_s), s	1.7	0.0	0.0	9.0	0.5	10.1	0.8	5.3	8.0	6.8	3.3	3.3
Cycle Q Clear(g_c), s	1.7	0.0	0.0	9.0	0.5	10.1	0.8	5.3	8.0	6.8	3.3	3.3
Prop In Lane	0.08		0.50	1.00		1.00	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	78	0	0	385	405	343	50	1071	823	249	733	762
V/C Ratio(X)	0.62	0.00	0.00	0.73	0.05	0.80	0.50	0.36	0.41	0.81	0.20	0.20
Avail Cap(c_a), veh/h	139	0	0	522	549	466	145	1071	823	305	733	762
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.6	0.0	0.0	22.3	18.9	22.7	29.3	16.7	9.0	25.5	11.4	11.4
Incr Delay (d2), s/veh	7.7	0.0	0.0	3.5	0.1	7.2	7.4	1.0	1.5	12.8	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.0	4.8	0.3	5.0	0.5	2.7	5.4	4.2	1.7	1.8
LnGrp Delay(d),s/veh	36.4	0.0	0.0	25.7	19.0	29.9	36.7	17.7	10.5	38.3	12.1	12.0
LnGrp LOS	D			C	B	C	D	B	B	D	B	B
Approach Vol, veh/h		48			579			754			505	
Approach Delay, s/veh		36.4			27.5			15.1			22.6	
Approach LOS		D			C			B			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.1	23.0		7.3	6.2	29.8		17.8				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.5	18.5		5.0	5.0	24.0		18.0				
Max Q Clear Time (g_c+I1), s	8.8	10.0		3.7	2.8	5.3		12.1				
Green Ext Time (p_c), s	0.1	3.6		0.0	0.0	5.5		1.1				
Intersection Summary												
HCM 2010 Ctrl Delay				21.4								
HCM 2010 LOS				C								

Intersection												
Int Delay, s/veh	8.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	136	0	12	0	0	0	0	69	0	120	24	0
Future Vol, veh/h	136	0	12	0	0	0	0	69	0	120	24	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	78	78	78	78	78	78	78	78	78
Heavy Vehicles, %	15	15	15	2	2	2	9	9	9	12	12	12
Mvmt Flow	174	0	15	0	0	0	0	88	0	154	31	0
Major/Minor	Minor2						Major1			Major2		
Conflicting Flow All	426	426	31				-	0	0	88	0	0
Stage 1	338	338	-				-	-	-	-	-	-
Stage 2	88	88	-				-	-	-	-	-	-
Critical Hdwy	6.55	6.65	6.35				-	-	-	4.22	-	-
Critical Hdwy Stg 1	5.55	5.65	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.55	5.65	-				-	-	-	-	-	-
Follow-up Hdwy	3.635	4.135	3.435				-	-	-	2.308	-	-
Pot Cap-1 Maneuver	561	501	1007				0	-	-	1447	-	0
Stage 1	694	618	-				0	-	-	-	-	0
Stage 2	904	797	-				0	-	-	-	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	500	0	1007				-	-	-	1447	-	-
Mov Cap-2 Maneuver	500	0	-				-	-	-	-	-	
Stage 1	619	0	-				-	-	-	-	-	
Stage 2	904	0	-				-	-	-	-	-	
Approach	EB						NB			SB		
HCM Control Delay, s	15.4						0			6.5		
HCM LOS	C											
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT						
Capacity (veh/h)	-	-	500	1007	1447	-						
HCM Lane V/C Ratio	-	-	0.349	0.015	0.106	-						
HCM Control Delay (s)	-	-	16	8.6	7.8	0						
HCM Lane LOS	-	-	C	A	A	A						
HCM 95th %tile Q(veh)	-	-	1.5	0	0.4	-						

HCM 2010 TWSC
4: First St & NB US 101 Ramps

Background Plus Project PM

Intersection												
Int Delay, s/veh	3.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕	↗		↕			↗	
Traffic Vol, veh/h	0	0	0	1	1	225	21	184	0	0	144	281
Future Vol, veh/h	0	0	0	1	1	225	21	184	0	0	144	281
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	50	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	4	4	4	13	13	13	8	8	8
Mvmt Flow	0	0	0	1	1	274	26	224	0	0	176	343
Major/Minor				Minor1			Major1			Major2		
Conflicting Flow All				623	794	224	518	0	-	-	-	0
Stage 1				276	276	-	-	-	-	-	-	-
Stage 2				347	518	-	-	-	-	-	-	-
Critical Hdwy				6.44	6.54	6.24	4.23	-	-	-	-	-
Critical Hdwy Stg 1				5.44	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2				5.44	5.54	-	-	-	-	-	-	-
Follow-up Hdwy				3.536	4.036	3.336	2.317	-	-	-	-	-
Pot Cap-1 Maneuver				447	318	810	994	-	0	0	-	-
Stage 1				766	678	-	-	-	0	0	-	-
Stage 2				711	530	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver				434	0	810	994	-	-	-	-	-
Mov Cap-2 Maneuver				434	0	-	-	-	-	-	-	-
Stage 1				743	0	-	-	-	-	-	-	-
Stage 2				711	0	-	-	-	-	-	-	-
Approach				WB			NB			SB		
HCM Control Delay, s				11.7			0.9			0		
HCM LOS				B								
Minor Lane/Major Mvmt	NBL	NBT	WBLn1	WBLn2	SBT	SBR						
Capacity (veh/h)	994	-	434	810	-	-						
HCM Lane V/C Ratio	0.026	-	0.006	0.339	-	-						
HCM Control Delay (s)	8.7	0	13.3	11.7	-	-						
HCM Lane LOS	A	A	B	B	-	-						
HCM 95th %tile Q(veh)	0.1	-	0	1.5	-	-						

Intersection												
Int Delay, s/veh	3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	1	37	0	84	3	379	14	19	372	2
Future Vol, veh/h	0	0	1	37	0	84	3	379	14	19	372	2
Conflicting Peds, #/hr	1	0	0	0	0	1	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	6	6	6	9	9	9	7	7	7
Mvmt Flow	0	0	1	46	0	105	4	474	18	24	465	3
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1059	1014	467	1004	1006	484	469	0	0	491	0	0
Stage 1	515	515	-	490	490	-	-	-	-	-	-	-
Stage 2	544	499	-	514	516	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.16	6.56	6.26	4.19	-	-	4.17	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.16	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.16	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.554	4.054	3.354	2.281	-	-	2.263	-	-
Pot Cap-1 Maneuver	202	239	596	217	237	575	1057	-	-	1047	-	-
Stage 1	543	535	-	552	542	-	-	-	-	-	-	-
Stage 2	523	544	-	536	528	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	160	230	595	211	228	574	1057	-	-	1046	-	-
Mov Cap-2 Maneuver	160	230	-	211	228	-	-	-	-	-	-	-
Stage 1	540	518	-	549	539	-	-	-	-	-	-	-
Stage 2	425	541	-	518	511	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	11.1			20.9			0.1			0.4		
HCM LOS	B			C								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1057	-	-	595	376	1046	-	-				
HCM Lane V/C Ratio	0.004	-	-	0.002	0.402	0.023	-	-				
HCM Control Delay (s)	8.4	0	-	11.1	20.9	8.5	0	-				
HCM Lane LOS	A	A	-	B	C	A	A	-				
HCM 95th %tile Q(veh)	0	-	-	0	1.9	0.1	-	-				

Intersection

Intersection Delay, s/veh 28.7
Intersection LOS D

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Lane Configurations		↰	↱		↰	↱		↰	
Traffic Vol, veh/h	0	58	73	0	120	290	0	383	108
Future Vol, veh/h	0	58	73	0	120	290	0	383	108
Peak Hour Factor	0.92	0.80	0.80	0.92	0.80	0.80	0.92	0.80	0.80
Heavy Vehicles, %	2	4	4	2	8	8	2	5	5
Mvmt Flow	0	73	91	0	150	363	0	479	135
Number of Lanes	0	1	1	0	1	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	2
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	2	0	2
HCM Control Delay	11.3	15.4	44.4
HCM LOS	B	C	E

Lane	NBLn1	NBLn2	EBLn1	EBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	0%	78%
Vol Right, %	0%	0%	0%	100%	22%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	120	290	58	73	491
LT Vol	120	0	58	0	0
Through Vol	0	290	0	0	383
RT Vol	0	0	0	73	108
Lane Flow Rate	150	362	72	91	614
Geometry Grp	7	7	7	7	4
Degree of Util (X)	0.267	0.595	0.158	0.167	0.936
Departure Headway (Hd)	6.419	5.911	7.831	6.602	5.488
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	560	613	458	543	663
Service Time	4.152	3.644	5.579	4.35	3.516
HCM Lane V/C Ratio	0.268	0.591	0.157	0.168	0.926
HCM Control Delay	11.5	17	12.1	10.7	44.4
HCM Lane LOS	B	C	B	B	E
HCM 95th-tile Q	1.1	3.9	0.6	0.6	12.7

Intersection

Int Delay, s/veh 7.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↗		↙	↖
Traffic Vol, veh/h	153	90	223	29	8	323
Future Vol, veh/h	153	90	223	29	8	323
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	16	16	8	8	7	7
Mvmt Flow	184	108	269	35	10	389

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	305	0	764
Stage 1	-	-	287
Stage 2	-	-	477
Critical Hdwy	4.26	-	6.47
Critical Hdwy Stg 1	-	-	5.47
Critical Hdwy Stg 2	-	-	5.47
Follow-up Hdwy	2.344	-	3.563
Pot Cap-1 Maneuver	1180	-	365
Stage 1	-	-	750
Stage 2	-	-	614
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1180	-	304
Mov Cap-2 Maneuver	-	-	304
Stage 1	-	-	749
Stage 2	-	-	512

Approach	EB	WB	SB
HCM Control Delay, s	5.4	0	15.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1180	-	-	-	304	739
HCM Lane V/C Ratio	0.156	-	-	-	0.032	0.527
HCM Control Delay (s)	8.6	0	-	-	17.2	15.2
HCM Lane LOS	A	A	-	-	C	C
HCM 95th %tile Q(veh)	0.6	-	-	-	0.1	3.1

Intersection												
Int Delay, s/veh	10.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	38	43	54	102	10	97	60	21	3	108	128
Future Vol, veh/h	35	38	43	54	102	10	97	60	21	3	108	128
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	3	3	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	100	-	-	90	-	90	60	-	110
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	79	79	79	79	79	79	79	79	79
Heavy Vehicles, %	5	5	5	3	3	3	7	7	7	3	3	3
Mvmt Flow	44	48	54	68	129	13	123	76	27	4	137	162
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	142	0	0	106	0	0	508	445	81	477	466	135
Stage 1	-	-	-	-	-	-	167	167	-	272	272	-
Stage 2	-	-	-	-	-	-	341	278	-	205	194	-
Critical Hdwy	4.15	-	-	4.13	-	-	7.17	6.57	6.27	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.17	5.57	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.17	5.57	-	6.13	5.53	-
Follow-up Hdwy	2.245	-	-	2.227	-	-	3.563	4.063	3.363	3.527	4.027	3.327
Pot Cap-1 Maneuver	1423	-	-	1479	-	-	467	500	965	497	493	911
Stage 1	-	-	-	-	-	-	823	751	-	732	683	-
Stage 2	-	-	-	-	-	-	664	671	-	795	738	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1423	-	-	1475	-	-	278	461	959	397	454	911
Mov Cap-2 Maneuver	-	-	-	-	-	-	278	461	-	397	454	-
Stage 1	-	-	-	-	-	-	795	726	-	709	652	-
Stage 2	-	-	-	-	-	-	412	640	-	669	713	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	2.3			2.5			21			12.8		
HCM LOS							C			B		
Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	278	461	959	1423	-	-	1475	-	-	397	454	911
HCM Lane V/C Ratio	0.442	0.165	0.028	0.031	-	-	0.046	-	-	0.01	0.301	0.178
HCM Control Delay (s)	27.8	14.3	8.9	7.6	-	-	7.6	-	-	14.2	16.3	9.8
HCM Lane LOS	D	B	A	A	-	-	A	-	-	B	C	A
HCM 95th %tile Q(veh)	2.1	0.6	0.1	0.1	-	-	0.1	-	-	0	1.3	0.6

Intersection

Int Delay, s/veh 2.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	22	49	147	41	8	37
Future Vol, veh/h	22	49	147	41	8	37
Conflicting Peds, #/hr	3	0	0	3	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	105	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	60	60	60	60	60	60
Heavy Vehicles, %	26	26	7	7	6	6
Mvmt Flow	37	82	245	68	13	62

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	316	0	437
Stage 1	-	-	282
Stage 2	-	-	155
Critical Hdwy	4.36	-	6.46
Critical Hdwy Stg 1	-	-	5.46
Critical Hdwy Stg 2	-	-	5.46
Follow-up Hdwy	2.434	-	3.554
Pot Cap-1 Maneuver	1120	-	569
Stage 1	-	-	757
Stage 2	-	-	864
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1120	-	547
Mov Cap-2 Maneuver	-	-	547
Stage 1	-	-	755
Stage 2	-	-	833

Approach	EB	WB	SB
HCM Control Delay, s	2.6	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1120	-	-	-	547	745
HCM Lane V/C Ratio	0.033	-	-	-	0.024	0.083
HCM Control Delay (s)	8.3	-	-	-	11.7	10.3
HCM Lane LOS	A	-	-	-	B	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	0.3

HCM 2010 Signalized Intersection Summary

6: First St & Broadway St

Background Plus Project AM
With Improvement

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	95	49	49	361	195	31		
Future Volume (veh/h)	95	49	49	361	195	31		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1810	1810	1759	1759	1681	1900		
Adj Flow Rate, veh/h	138	0	71	523	283	45		
Adj No. of Lanes	1	1	1	1	1	0		
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69		
Percent Heavy Veh, %	5	5	8	8	13	13		
Cap, veh/h	195	174	124	1039	522	83		
Arrive On Green	0.11	0.00	0.07	0.59	0.37	0.37		
Sat Flow, veh/h	1723	1538	1675	1759	1416	225		
Grp Volume(v), veh/h	138	0	71	523	0	328		
Grp Sat Flow(s),veh/h/ln	1723	1538	1675	1759	0	1641		
Q Serve(g_s), s	2.3	0.0	1.2	5.3	0.0	4.8		
Cycle Q Clear(g_c), s	2.3	0.0	1.2	5.3	0.0	4.8		
Prop In Lane	1.00	1.00	1.00			0.14		
Lane Grp Cap(c), veh/h	195	174	124	1039	0	605		
V/C Ratio(X)	0.71	0.00	0.57	0.50	0.00	0.54		
Avail Cap(c_a), veh/h	1021	911	281	1621	0	993		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00		
Uniform Delay (d), s/veh	13.0	0.0	13.6	3.6	0.0	7.6		
Incr Delay (d2), s/veh	4.7	0.0	4.1	0.4	0.0	0.8		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.7	2.6	0.0	2.2		
LnGrp Delay(d),s/veh	17.6	0.0	17.7	4.0	0.0	8.3		
LnGrp LOS	B		B	A		A		
Approach Vol, veh/h	138			594	328			
Approach Delay, s/veh	17.6			5.6	8.3			
Approach LOS	B			A	A			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		22.5		7.9	6.8	15.7		
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5		
Max Green Setting (Gmax), s		28.0		18.0	5.1	18.4		
Max Q Clear Time (g_c+I1), s		7.3		4.3	3.2	6.8		
Green Ext Time (p_c), s		5.7		0.3	0.0	4.3		
Intersection Summary								
HCM 2010 Ctrl Delay			8.0					
HCM 2010 LOS			A					

HCM 2010 Signalized Intersection Summary

6: First St & Broadway St

Background Plus Project PM
With Improvements

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	58	73	120	290	383	108		
Future Volume (veh/h)	58	73	120	290	383	108		
Number	7	14	5	2	6	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1827	1827	1759	1759	1810	1900		
Adj Flow Rate, veh/h	72	0	150	362	479	135		
Adj No. of Lanes	1	1	1	1	1	0		
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80		
Percent Heavy Veh, %	4	4	8	8	5	5		
Cap, veh/h	119	107	190	1246	656	185		
Arrive On Green	0.07	0.00	0.11	0.71	0.48	0.48		
Sat Flow, veh/h	1740	1553	1675	1759	1358	383		
Grp Volume(v), veh/h	72	0	150	362	0	614		
Grp Sat Flow(s),veh/h/ln	1740	1553	1675	1759	0	1741		
Q Serve(g_s), s	1.6	0.0	3.5	3.0	0.0	11.4		
Cycle Q Clear(g_c), s	1.6	0.0	3.5	3.0	0.0	11.4		
Prop In Lane	1.00	1.00	1.00			0.22		
Lane Grp Cap(c), veh/h	119	107	190	1246	0	841		
V/C Ratio(X)	0.60	0.00	0.79	0.29	0.00	0.73		
Avail Cap(c_a), veh/h	781	697	353	1872	0	1291		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00		
Uniform Delay (d), s/veh	18.2	0.0	17.4	2.2	0.0	8.3		
Incr Delay (d2), s/veh	4.8	0.0	7.2	0.1	0.0	1.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.9	0.0	2.0	1.5	0.0	5.6		
LnGrp Delay(d),s/veh	23.1	0.0	24.6	2.3	0.0	9.6		
LnGrp LOS	C		C	A		A		
Approach Vol, veh/h	72			512	614			
Approach Delay, s/veh	23.1			8.8	9.6			
Approach LOS	C			A	A			
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		33.1		7.3	9.1	24.0		
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5		
Max Green Setting (Gmax), s		42.9		18.1	8.5	29.9		
Max Q Clear Time (g_c+I1), s		5.0		3.6	5.5	13.4		
Green Ext Time (p_c), s		8.1		0.1	0.1	6.1		
Intersection Summary								
HCM 2010 Ctrl Delay			10.1					
HCM 2010 LOS			B					

Appendix H

Intersection
Level of Service
Calculations

Cumulative Without Project
Conditions

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HCM Unsignalized Intersection Capacity Analysis

Cumulative Without Project AM

1: River Dr/SB US 101 Ramps & Broadway Cir

																		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR						
Lane Configurations																		
Sign Control	Stop			Stop			Stop			Stop								
Traffic Volume (vph)	82	25	33	2	18	7	60	2	4	9	3	806						
Future Volume (vph)	82	25	33	2	18	7	60	2	4	9	3	806						
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)	95	29	38	2	21	8	70	2	5	10	3	937						
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1	SB 2												
Volume Total (vph)	95	67	31	77	13	937												
Volume Left (vph)	95	0	2	70	10	0												
Volume Right (vph)	0	38	8	5	0	937												
Hadj (s)	0.55	-0.35	-0.06	0.18	0.24	-0.52												
Departure Headway (s)	5.3	4.4	4.3	4.6	4.7	3.2												
Degree Utilization, x	0.14	0.08	0.04	0.10	0.02	0.83												
Capacity (veh/h)	663	795	804	756	724	1113												
Control Delay (s)	8.0	6.6	7.5	8.0	7.8	19.7												
Approach Delay (s)	7.4		7.5	8.0	19.6													
Approach LOS	A		A	A	C													
Intersection Summary																		
Delay	16.9																	
Level of Service	C																	
Intersection Capacity Utilization	66.9%			ICU Level of Service			C											
Analysis Period (min)	15																	

HCM 2010 Signalized Intersection Summary
2: Broadway Cir/San Antonio Dr & Broadway St

Cumulative Without Project AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	25	15	250	40	241	30	453	466	255	384	30
Future Volume (veh/h)	5	25	15	250	40	241	30	453	466	255	384	30
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1681	1900	1845	1845	1845	1810	1810	1810	1863	1863	1900
Adj Flow Rate, veh/h	6	29	18	294	47	284	35	533	548	300	452	35
Adj No. of Lanes	0	1	0	1	1	1	1	2	1	1	2	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
Percent Heavy Veh, %	13	13	13	3	3	3	5	5	5	2	2	2
Cap, veh/h	8	41	25	395	415	349	62	985	786	288	1375	106
Arrive On Green	0.05	0.05	0.05	0.22	0.22	0.22	0.04	0.29	0.29	0.16	0.41	0.41
Sat Flow, veh/h	179	863	536	1757	1845	1553	1723	3438	1538	1774	3330	257
Grp Volume(v), veh/h	53	0	0	294	47	284	35	533	548	300	240	247
Grp Sat Flow(s),veh/h/ln	1578	0	0	1757	1845	1553	1723	1719	1538	1774	1770	1817
Q Serve(g_s), s	2.1	0.0	0.0	10.1	1.3	11.2	1.3	8.5	17.5	10.5	5.9	6.0
Cycle Q Clear(g_c), s	2.1	0.0	0.0	10.1	1.3	11.2	1.3	8.5	17.5	10.5	5.9	6.0
Prop In Lane	0.11		0.34	1.00		1.00	1.00		1.00	1.00		0.14
Lane Grp Cap(c), veh/h	75	0	0	395	415	349	62	985	786	288	731	750
V/C Ratio(X)	0.71	0.00	0.00	0.74	0.11	0.81	0.56	0.54	0.70	1.04	0.33	0.33
Avail Cap(c_a), veh/h	122	0	0	490	514	433	133	985	786	288	731	750
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.3	0.0	0.0	23.3	19.9	23.7	30.6	19.5	12.0	27.0	12.9	12.9
Incr Delay (d2), s/veh	11.5	0.0	0.0	4.8	0.1	9.3	7.7	2.1	5.1	63.8	1.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.0	5.3	0.7	5.6	0.7	4.3	10.7	10.2	3.1	3.2
LnGrp Delay(d),s/veh	41.8	0.0	0.0	28.1	20.0	33.1	38.4	21.6	17.1	90.9	14.1	14.1
LnGrp LOS	D			C	C	C	D	C	B	F	B	B
Approach Vol, veh/h	53			625			1116			787		
Approach Delay, s/veh	41.8			29.7			19.9			43.3		
Approach LOS	D			C			B			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.0	23.0		7.6	6.8	31.2		19.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.5	18.5		5.0	5.0	24.0		18.0				
Max Q Clear Time (g_c+I1), s	12.5	19.5		4.1	3.3	8.0		13.2				
Green Ext Time (p_c), s	0.0	0.0		0.0	0.0	8.1		1.1				
Intersection Summary												
HCM 2010 Ctrl Delay				29.9								
HCM 2010 LOS				C								

HCM 2010 TWSC
3: First St & SB US 101 Ramps

Cumulative Without Project AM

Intersection												
Int Delay, s/veh	247.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	453	1	20	0	0	0	0	50	15	238	39	0
Future Vol, veh/h	453	1	20	0	0	0	0	50	15	238	39	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	10	10	10	2	2	2	15	15	15	23	23	23
Mvmt Flow	566	1	25	0	0	0	0	63	19	298	49	0
Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	716	725	49				-	0	0	81	0	0
Stage 1	644	644	-				-	-	-	-	-	-
Stage 2	72	81	-				-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3				-	-	-	4.33	-	-
Critical Hdwy Stg 1	5.5	5.6	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-				-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39				-	-	-	2.407	-	-
Pot Cap-1 Maneuver	~ 385	342	997				0	-	-	1394	-	0
Stage 1	~ 508	456	-				0	-	-	-	-	0
Stage 2	931	812	-				0	-	-	-	-	0
Platoon blocked, %								-	-			
Mov Cap-1 Maneuver	~ 300	0	997				-	-	-	1394	-	-
Mov Cap-2 Maneuver	~ 300	0	-				-	-	-	-	-	-
Stage 1	~ 396	0	-				-	-	-	-	-	-
Stage 2	931	0	-				-	-	-	-	-	-
Approach	EB			NB			SB					
HCM Control Delay, s	\$ 421.3			0			7.1					
HCM LOS	F											
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT						
Capacity (veh/h)	-	-	300	997	1394	-						
HCM Lane V/C Ratio	-	-	1.888	0.026	0.213	-						
HCM Control Delay (s)	-		\$ 440.4	8.7	8.3	0						
HCM Lane LOS	-	-	F	A	A	A						
HCM 95th %tile Q(veh)	-	-	38.8	0.1	0.8	-						
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

HCM 2010 TWSC
4: First St & NB US 101 Ramps

Cumulative Without Project AM

Intersection												
Int Delay, s/veh		10.3										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕	↗		↕			↗	
Traffic Vol, veh/h	0	0	0	20	1	349	30	473	0	0	257	296
Future Vol, veh/h	0	0	0	20	1	349	30	473	0	0	257	296
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	50	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	8	8	8	13	13	13	28	28	28
Mvmt Flow	0	0	0	24	1	426	37	577	0	0	313	361
Major/Minor				Minor1			Major1			Major2		
Conflicting Flow All				1144	1324	577	674	0	-	-	-	0
Stage 1				650	650	-	-	-	-	-	-	-
Stage 2				494	674	-	-	-	-	-	-	-
Critical Hdwy				6.48	6.58	6.28	4.23	-	-	-	-	-
Critical Hdwy Stg 1				5.48	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2				5.48	5.58	-	-	-	-	-	-	-
Follow-up Hdwy				3.572	4.072	3.372	2.317	-	-	-	-	-
Pot Cap-1 Maneuver				215	152	505	867	-	0	0	-	-
Stage 1				508	456	-	-	-	0	0	-	-
Stage 2				601	444	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver				201	0	505	867	-	-	-	-	-
Mov Cap-2 Maneuver				201	0	-	-	-	-	-	-	-
Stage 1				476	0	-	-	-	-	-	-	-
Stage 2				601	0	-	-	-	-	-	-	-
Approach				WB			NB			SB		
HCM Control Delay, s				38.8			0.6			0		
HCM LOS				E								
Minor Lane/Major Mvmt	NBL	NBT	WBLn1	WBLn2	SBT	SBR						
Capacity (veh/h)	867	-	201	505	-	-						
HCM Lane V/C Ratio	0.042	-	0.127	0.843	-	-						
HCM Control Delay (s)	9.3	0	25.5	39.6	-	-						
HCM Lane LOS	A	A	D	E	-	-						
HCM 95th %tile Q(veh)	0.1	-	0.4	8.6	-	-						

Intersection												
Int Delay, s/veh		110.6										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	1	1	201	1	35	1	368	347	51	364	1
Future Vol, veh/h	1	1	1	201	1	35	1	368	347	51	364	1
Conflicting Peds, #/hr	0	0	1	1	0	0	2	0	21	21	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	29	29	29	12	12	12	17	17	17
Mvmt Flow	1	1	1	245	1	43	1	449	423	62	444	1
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1256	1466	448	1255	1256	681	447	0	0	893	0	0
Stage 1	571	571	-	684	684	-	-	-	-	-	-	-
Stage 2	685	895	-	571	572	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.39	6.79	6.49	4.22	-	-	4.27	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.39	5.79	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.39	5.79	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.761	4.261	3.561	2.308	-	-	2.353	-	-
Pot Cap-1 Maneuver	148	128	611	~ 131	152	407	1062	-	-	700	-	-
Stage 1	506	505	-	398	410	-	-	-	-	-	-	-
Stage 2	438	359	-	461	463	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	119	110	609	~ 115	131	399	1061	-	-	700	-	-
Mov Cap-2 Maneuver	119	110	-	~ 115	131	-	-	-	-	-	-	-
Stage 1	504	445	-	389	401	-	-	-	-	-	-	-
Stage 2	389	351	-	404	408	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	28.5			\$ 637.7			0			1.3		
HCM LOS	D			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1061	-	-	157	129	700	-	-				
HCM Lane V/C Ratio	0.001	-	-	0.023	2.24	0.089	-	-				
HCM Control Delay (s)	8.4	0	-	28.5	\$ 637.7	10.6	0	-				
HCM Lane LOS	A	A	-	D	F	B	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	24.4	0.3	-	-				
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined			*: All major volume in platoon				

Intersection

Intersection Delay, s/veh 108.3
Intersection LOS F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			↔	↔			↔			↔	↔	
Traffic Vol, veh/h	0	197	86	85	0	62	131	14	0	95	356	32
Future Vol, veh/h	0	197	86	85	0	62	131	14	0	95	356	32
Peak Hour Factor	0.92	0.80	0.80	0.80	0.92	0.80	0.80	0.80	0.92	0.80	0.80	0.80
Heavy Vehicles, %	2	5	2	5	2	2	2	2	2	8	8	2
Mvmt Flow	0	246	108	106	0	78	164	18	0	119	445	40
Number of Lanes	0	0	1	1	0	0	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	2	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	1	1
HCM Control Delay	55.5	39.8	125.4
HCM LOS	F	E	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	70%	0%	30%	3%
Vol Thru, %	0%	92%	30%	0%	63%	68%
Vol Right, %	0%	8%	0%	100%	7%	29%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	95	388	283	85	207	399
LT Vol	95	0	197	0	62	10
Through Vol	0	356	86	0	131	272
RT Vol	0	32	0	85	14	117
Lane Flow Rate	119	485	354	106	259	499
Geometry Grp	7	7	7	7	6	6
Degree of Util (X)	0.318	1.223	0.938	0.249	0.725	1.275
Departure Headway (Hd)	10.408	9.823	10.584	9.428	11.537	9.798
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	348	373	347	384	316	374
Service Time	8.108	7.523	8.284	7.128	9.537	7.798
HCM Lane V/C Ratio	0.342	1.3	1.02	0.276	0.82	1.334
HCM Control Delay	17.9	151.7	67.6	15.2	39.8	171.9
HCM Lane LOS	C	F	F	C	E	F
HCM 95th-tile Q	1.3	19	9.7	1	5.3	21

Intersection

Intersection Delay, s/veh

Intersection LOS

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↔	
Traffic Vol, veh/h	0	10	272	117
Future Vol, veh/h	0	10	272	117
Peak Hour Factor	0.92	0.80	0.80	0.80
Heavy Vehicles, %	2	2	13	13
Mvmt Flow	0	13	340	146
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	171.9
HCM LOS	F

Intersection

Int Delay, s/veh 46.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Vol, veh/h	141	377	196	87	207	194
Future Vol, veh/h	141	377	196	87	207	194
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	8	8	23	23	11	11
Mvmt Flow	172	460	239	106	252	237

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	346	0	1097
Stage 1	-	-	293
Stage 2	-	-	804
Critical Hdwy	4.18	-	6.51
Critical Hdwy Stg 1	-	-	5.51
Critical Hdwy Stg 2	-	-	5.51
Follow-up Hdwy	2.272	-	3.599
Pot Cap-1 Maneuver	1180	-	~ 227
Stage 1	-	-	737
Stage 2	-	-	425
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1180	-	~ 182
Mov Cap-2 Maneuver	-	-	~ 182
Stage 1	-	-	736
Stage 2	-	-	341

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	136.6
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1180	-	-	-	182	724
HCM Lane V/C Ratio	0.146	-	-	-	1.387	0.327
HCM Control Delay (s)	8.6	0	-	-	253	12.4
HCM Lane LOS	A	A	-	-	F	B
HCM 95th %tile Q(veh)	0.5	-	-	-	15.1	1.4

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection												
Int Delay, s/veh	42.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱	↱	↰	↱	↱
Traffic Vol, veh/h	121	218	259	74	55	38	127	109	61	36	43	32
Future Vol, veh/h	121	218	259	74	55	38	127	109	61	36	43	32
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	100	-	-	90	-	90	60	-	110
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	3	3	3	14	14	14	5	5	5	5	5	5
Mvmt Flow	151	273	324	93	69	48	159	136	76	45	54	40
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	116	0	0	597	0	0	1042	1039	435	1083	1178	93
Stage 1	-	-	-	-	-	-	738	738	-	278	278	-
Stage 2	-	-	-	-	-	-	304	301	-	805	900	-
Critical Hdwy	4.13	-	-	4.24	-	-	7.15	6.55	6.25	7.15	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Follow-up Hdwy	2.227	-	-	2.326	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	1466	-	-	923	-	-	205	228	615	192	188	956
Stage 1	-	-	-	-	-	-	405	420	-	722	675	-
Stage 2	-	-	-	-	-	-	699	660	-	372	353	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1466	-	-	923	-	-	~ 122	184	614	58	151	956
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 122	184	-	58	151	-
Stage 1	-	-	-	-	-	-	363	376	-	648	607	-
Stage 2	-	-	-	-	-	-	549	593	-	186	316	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.6			4.1			133.5			74.5		
HCM LOS							F			F		
Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	122	184	614	1466	-	-	923	-	-	58	151	956
HCM Lane V/C Ratio	1.301	0.74	0.124	0.103	-	-	0.1	-	-	0.776	0.356	0.042
HCM Control Delay (s)	250.2	65.8	11.7	7.7	-	-	9.3	-	-	172.2	41.5	8.9
HCM Lane LOS	F	F	B	A	-	-	A	-	-	F	E	A
HCM 95th %tile Q(veh)	10.3	4.8	0.4	0.3	-	-	0.3	-	-	3.4	1.5	0.1
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Intersection												
Int Delay, s/veh	31.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	443	12	66	143	17	21	98	239	25	42	4
Future Vol, veh/h	35	443	12	66	143	17	21	98	239	25	42	4
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	105	-	-	-	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	15	15	2	2	32	32	2	2	2	14	2	14
Mvmt Flow	39	492	13	73	159	19	23	109	266	28	47	4
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	179	0	0	506	0	0	915	902	499	1080	899	169
Stage 1	-	-	-	-	-	-	577	577	-	316	316	-
Stage 2	-	-	-	-	-	-	338	325	-	764	583	-
Critical Hdwy	4.25	-	-	4.12	-	-	7.12	6.52	6.22	7.24	6.52	6.34
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.24	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.24	5.52	-
Follow-up Hdwy	2.335	-	-	2.218	-	-	3.518	4.018	3.318	3.626	4.018	3.426
Pot Cap-1 Maneuver	1322	-	-	1059	-	-	253	277	572	186	279	845
Stage 1	-	-	-	-	-	-	502	502	-	670	655	-
Stage 2	-	-	-	-	-	-	676	649	-	379	499	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1322	-	-	1059	-	-	199	248	572	61	250	844
Mov Cap-2 Maneuver	-	-	-	-	-	-	199	248	-	61	250	-
Stage 1	-	-	-	-	-	-	487	487	-	650	604	-
Stage 2	-	-	-	-	-	-	573	598	-	153	484	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			2.5			84			75.8		
HCM LOS							F			F		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2			
Capacity (veh/h)	390	1322	-	-	1059	-	-	116	844			
HCM Lane V/C Ratio	1.02	0.029	-	-	0.069	-	-	0.642	0.005			
HCM Control Delay (s)	84	7.8	-	-	8.7	0	-	79.8	9.3			
HCM Lane LOS	F	A	-	-	A	A	-	F	A			
HCM 95th %tile Q(veh)	12.7	0.1	-	-	0.2	-	-	3.3	0			

HCM Unsignalized Intersection Capacity Analysis

1: River Dr/SB US 101 Ramps & Broadway Cir

Cumulative Plus Project PM

																		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR						
Lane Configurations																		
Sign Control	Stop			Stop			Stop			Stop								
Traffic Volume (vph)	91	36	88	5	35	14	88	13	3	25	35	621						
Future Volume (vph)	91	36	88	5	35	14	88	13	3	25	35	621						
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)	94	37	91	5	36	14	91	13	3	26	36	640						
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1	SB 2												
Volume Total (vph)	94	128	55	107	62	640												
Volume Left (vph)	94	0	5	91	26	0												
Volume Right (vph)	0	91	14	3	0	640												
Hadj (s)	0.53	-0.46	-0.02	0.19	0.12	-0.57												
Departure Headway (s)	5.5	4.5	4.7	4.8	4.8	3.2												
Degree Utilization, x	0.14	0.16	0.07	0.14	0.08	0.57												
Capacity (veh/h)	630	766	726	707	699	1117												
Control Delay (s)	8.2	7.2	8.0	8.6	8.2	10.3												
Approach Delay (s)	7.6		8.0	8.6	10.1													
Approach LOS	A		A	A	B													
Intersection Summary																		
Delay	9.4																	
Level of Service	A																	
Intersection Capacity Utilization	59.6%			ICU Level of Service			B											
Analysis Period (min)	15																	

HCM 2010 Signalized Intersection Summary

2: Broadway Cir/San Antonio Dr & Broadway St

Cumulative Plus Project PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	40	22	475	30	260	40	500	382	241	537	60
Future Volume (veh/h)	10	40	22	475	30	260	40	500	382	241	537	60
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	11	43	24	516	33	283	43	543	415	262	584	65
Adj No. of Lanes	0	1	0	1	1	1	1	2	1	1	2	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	14	55	31	464	487	413	72	950	839	270	1221	136
Arrive On Green	0.06	0.06	0.06	0.26	0.26	0.26	0.04	0.27	0.27	0.15	0.38	0.38
Sat Flow, veh/h	248	968	540	1774	1863	1582	1774	3539	1583	1774	3212	357
Grp Volume(v), veh/h	78	0	0	516	33	283	43	543	415	262	321	328
Grp Sat Flow(s),veh/h/ln	1755	0	0	1774	1863	1582	1774	1770	1583	1774	1770	1799
Q Serve(g_s), s	3.0	0.0	0.0	18.0	0.9	11.1	1.6	9.1	11.5	10.1	9.5	9.5
Cycle Q Clear(g_c), s	3.0	0.0	0.0	18.0	0.9	11.1	1.6	9.1	11.5	10.1	9.5	9.5
Prop In Lane	0.14		0.31	1.00		1.00	1.00		1.00	1.00		0.20
Lane Grp Cap(c), veh/h	99	0	0	464	487	413	72	950	839	270	673	684
V/C Ratio(X)	0.79	0.00	0.00	1.11	0.07	0.68	0.60	0.57	0.49	0.97	0.48	0.48
Avail Cap(c_a), veh/h	127	0	0	464	487	413	129	950	839	270	673	684
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.1	0.0	0.0	25.4	19.1	22.9	32.5	21.8	10.3	29.0	16.2	16.2
Incr Delay (d2), s/veh	21.4	0.0	0.0	76.4	0.1	4.6	7.6	2.5	2.1	46.0	2.4	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	0.0	18.5	0.5	5.3	1.0	4.8	8.2	8.3	5.0	5.1
LnGrp Delay(d),s/veh	53.5	0.0	0.0	101.9	19.2	27.5	40.1	24.3	12.4	75.1	18.6	18.6
LnGrp LOS	D			F	B	C	D	C	B	E	B	B
Approach Vol, veh/h	78			832			1001			911		
Approach Delay, s/veh	53.5			73.3			20.0			34.8		
Approach LOS	D			E			C			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.0	23.0		8.4	7.3	30.7		22.5				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.5	18.5		5.0	5.0	24.0		18.0				
Max Q Clear Time (g_c+I1), s	12.1	13.5		5.0	3.6	11.5		20.0				
Green Ext Time (p_c), s	0.0	3.6		0.0	0.0	7.3		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay				41.4								
HCM 2010 LOS				D								

HCM 2010 TWSC
3: First St & SB US 101 Ramps

Cumulative Plus Project PM

Intersection												
Int Delay, s/veh	951.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	504	1	50	0	0	0	0	90	20	468	49	0
Future Vol, veh/h	504	1	50	0	0	0	0	90	20	468	49	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	15	15	15	2	2	2	9	9	9	12	12	12
Mvmt Flow	593	1	59	0	0	0	0	106	24	551	58	0
Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	1277	1288	58				-	0	0	129	0	0
Stage 1	1159	1159	-				-	-	-	-	-	-
Stage 2	118	129	-				-	-	-	-	-	-
Critical Hdwy	6.55	6.65	6.35				-	-	-	4.22	-	-
Critical Hdwy Stg 1	5.55	5.65	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.55	5.65	-				-	-	-	-	-	-
Follow-up Hdwy	3.635	4.135	3.435				-	-	-	2.308	-	-
Pot Cap-1 Maneuver	~ 173	154	973				0	-	-	1397	-	0
Stage 1	~ 281	255	-				0	-	-	-	-	0
Stage 2	876	765	-				0	-	-	-	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	~ 103	0	973				-	-	-	1397	-	-
Mov Cap-2 Maneuver	~ 103	0	-				-	-	-	-	-	-
Stage 1	~ 167	0	-				-	-	-	-	-	-
Stage 2	876	0	-				-	-	-	-	-	-
Approach	EB			NB			SB					
HCM Control Delay, s	\$ 2018.6			0			8.4					
HCM LOS	F											
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT						
Capacity (veh/h)	-	-	103	973	1397	-						
HCM Lane V/C Ratio	-	-	5.757	0.062	0.394	-						
HCM Control Delay (s)	-	-	\$ 2222	8.9	9.2	0						
HCM Lane LOS	-	-	F	A	A	A						
HCM 95th %tile Q(veh)	-	-	64.7	0.2	1.9	-						
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

HCM 2010 TWSC
4: First St & NB US 101 Ramps

Cumulative Plus Project PM

Intersection												
Int Delay, s/veh		14.7										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations						↰	↰	↰	↰			
Traffic Vol, veh/h	0	0	0	20	1	426	40	554	0	0	498	739
Future Vol, veh/h	0	0	0	20	1	426	40	554	0	0	498	739
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	50	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	4	4	4	13	13	13	8	8	8
Mvmt Flow	0	0	0	23	1	484	45	630	0	0	566	840
Major/Minor				Minor1			Major1			Major2		
Conflicting Flow All				1706	2126	630	1406	0	-	-	-	0
Stage 1				720	720	-	-	-	-	-	-	-
Stage 2				986	1406	-	-	-	-	-	-	-
Critical Hdwy				6.44	6.54	6.24	4.23	-	-	-	-	-
Critical Hdwy Stg 1				5.44	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2				5.44	5.54	-	-	-	-	-	-	-
Follow-up Hdwy				3.536	4.036	3.336	2.317	-	-	-	-	-
Pot Cap-1 Maneuver				99	49 ~ 478		453	-	0	0	-	-
Stage 1				478	429	-	-	-	0	0	-	-
Stage 2				358	204	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver				84	0 ~ 478		453	-	-	-	-	-
Mov Cap-2 Maneuver				84	0	-	-	-	-	-	-	-
Stage 1				405	0	-	-	-	-	-	-	-
Stage 2				358	0	-	-	-	-	-	-	-
Approach				WB			NB			SB		
HCM Control Delay, s				73.6			0.9			0		
HCM LOS				F								
Minor Lane/Major Mvmt	NBL	NBT	WBLn1	WBLn2	SBT	SBR						
Capacity (veh/h)	453	-	84	478	-	-						
HCM Lane V/C Ratio	0.1	-	0.284	1.013	-	-						
HCM Control Delay (s)	13.8	0	64.1	74.1	-	-						
HCM Lane LOS	B	A	F	F	-	-						
HCM 95th %tile Q(veh)	0.3	-	1	13.9	-	-						
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined			*: All major volume in platoon				

Intersection												
Int Delay, s/veh	914.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	1	1	1	457	1	117	3	610	297	26	598	2
Future Vol, veh/h	1	1	1	457	1	117	3	610	297	26	598	2
Conflicting Peds, #/hr	1	0	0	0	0	1	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	6	6	6	9	9	9	7	7	7
Mvmt Flow	1	1	1	538	1	138	4	718	349	31	704	2
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1737	1841	706	1666	1667	893	707	0	0	1067	0	0
Stage 1	767	767	-	899	899	-	-	-	-	-	-	-
Stage 2	970	1074	-	767	768	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.16	6.56	6.26	4.19	-	-	4.17	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.16	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.16	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.554	4.054	3.354	2.281	-	-	2.263	-	-
Pot Cap-1 Maneuver	68	75	436	~ 75	94	335	860	-	-	634	-	-
Stage 1	395	411	-	~ 328	352	-	-	-	-	-	-	-
Stage 2	304	296	-	~ 389	405	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	37	68	436	~ 69	85	335	860	-	-	633	-	-
Mov Cap-2 Maneuver	37	68	-	~ 69	85	-	-	-	-	-	-	-
Stage 1	389	377	-	~ 324	347	-	-	-	-	-	-	-
Stage 2	176	292	-	~ 355	372	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	60.8			\$ 3360.5			0			0.5		
HCM LOS	F			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	860	-	-	68	82	633	-	-				
HCM Lane V/C Ratio	0.004	-	-	0.052	8.25	0.048	-	-				
HCM Control Delay (s)	9.2	0	-	60.8	\$ 3360.5	11	0	-				
HCM Lane LOS	A	A	-	F	F	B	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.2	77.6	0.2	-	-				
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Intersection

Intersection Delay, s/veh 336.2
Intersection LOS F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			↶	↷			↶↷			↶	↷	
Traffic Vol, veh/h	0	140	197	160	0	82	180	22	0	158	412	107
Future Vol, veh/h	0	140	197	160	0	82	180	22	0	158	412	107
Peak Hour Factor	0.92	0.85	0.85	0.85	0.92	0.85	0.85	0.85	0.92	0.85	0.85	0.85
Heavy Vehicles, %	2	4	2	4	2	2	2	2	2	8	8	2
Mvmt Flow	0	165	232	188	0	96	212	26	0	186	485	126
Number of Lanes	0	0	1	1	0	0	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	2	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	1	1
HCM Control Delay	87.4	89.4	255.5
HCM LOS	F	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	42%	0%	29%	3%
Vol Thru, %	0%	79%	58%	0%	63%	63%
Vol Right, %	0%	21%	0%	100%	8%	34%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	158	519	337	160	284	750
LT Vol	158	0	140	0	82	25
Through Vol	0	412	197	0	180	473
RT Vol	0	107	0	160	22	252
Lane Flow Rate	186	611	396	188	334	882
Geometry Grp	7	7	7	7	6	6
Degree of Util (X)	0.526	1.618	1.082	0.464	0.95	2.411
Departure Headway (Hd)	13.533	12.842	13.301	12.289	15.499	11.069
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	270	287	278	296	237	335
Service Time	11.233	10.542	11.001	9.989	13.499	9.069
HCM Lane V/C Ratio	0.689	2.129	1.424	0.635	1.409	2.633
HCM Control Delay	30.3	324	117	25.2	89.4	667.4
HCM Lane LOS	D	F	F	D	F	F
HCM 95th-tile Q	2.8	27.8	12	2.3	8.4	62.1

Intersection

Intersection Delay, s/veh

Intersection LOS

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	25	473	252
Future Vol, veh/h	0	25	473	252
Peak Hour Factor	0.92	0.85	0.85	0.85
Heavy Vehicles, %	2	2	5	5
Mvmt Flow	0	29	556	296
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	667.4
HCM LOS	F

Intersection							
Int Delay, s/veh	33.1						
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		↱	↱		↱	↱	
Traffic Vol, veh/h	191	323	488	230	116	219	
Future Vol, veh/h	191	323	488	230	116	219	
Conflicting Peds, #/hr	1	0	0	1	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	None	-	None	
Storage Length	-	-	-	-	100	0	
Veh in Median Storage, #	-	0	0	-	0	-	
Grade, %	-	0	0	-	0	-	
Peak Hour Factor	88	88	88	88	88	88	
Heavy Vehicles, %	16	16	8	8	7	7	
Mvmt Flow	217	367	555	261	132	249	
Major/Minor	Major1		Major2		Minor2		
Conflicting Flow All	817	0	-	0	1487	686	
Stage 1	-	-	-	-	686	-	
Stage 2	-	-	-	-	801	-	
Critical Hdwy	4.26	-	-	-	6.47	6.27	
Critical Hdwy Stg 1	-	-	-	-	5.47	-	
Critical Hdwy Stg 2	-	-	-	-	5.47	-	
Follow-up Hdwy	2.344	-	-	-	3.563	3.363	
Pot Cap-1 Maneuver	753	-	-	-	133	439	
Stage 1	-	-	-	-	491	-	
Stage 2	-	-	-	-	433	-	
Platoon blocked, %		-	-	-			
Mov Cap-1 Maneuver	753	-	-	-	~ 85	439	
Mov Cap-2 Maneuver	-	-	-	-	~ 85	-	
Stage 1	-	-	-	-	491	-	
Stage 2	-	-	-	-	276	-	
Approach	EB		WB		SB		
HCM Control Delay, s	4.3		0		148		
HCM LOS					F		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2	
Capacity (veh/h)	753	-	-	-	85	439	
HCM Lane V/C Ratio	0.288	-	-	-	1.551	0.567	
HCM Control Delay (s)	11.7	0	-	-	\$ 383.2	23.4	
HCM Lane LOS	B	A	-	-	F	C	
HCM 95th %tile Q(veh)	1.2	-	-	-	10.5	3.4	
Notes							
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon							

Intersection												
Int Delay, s/veh		365										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱	↱	↰	↱	↱
Traffic Vol, veh/h	40	254	155	68	243	42	284	62	32	42	115	137
Future Vol, veh/h	40	254	155	68	243	42	284	62	32	42	115	137
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	3	3	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	100	-	-	90	-	90	60	-	110
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	5	5	5	3	3	3	7	7	7	3	3	3
Mvmt Flow	47	299	182	80	286	49	334	73	38	49	135	161
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	335	0	0	484	0	0	1025	982	396	995	1049	311
Stage 1	-	-	-	-	-	-	487	487	-	471	471	-
Stage 2	-	-	-	-	-	-	538	495	-	524	578	-
Critical Hdwy	4.15	-	-	4.13	-	-	7.17	6.57	6.27	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.17	5.57	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.17	5.57	-	6.13	5.53	-
Follow-up Hdwy	2.245	-	-	2.227	-	-	3.563	4.063	3.363	3.527	4.027	3.327
Pot Cap-1 Maneuver	1208	-	-	1074	-	-	~ 209	244	643	223	227	727
Stage 1	-	-	-	-	-	-	553	542	-	571	558	-
Stage 2	-	-	-	-	-	-	518	538	-	535	500	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1208	-	-	1071	-	-	~ 69	216	639	142	201	727
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 69	216	-	142	201	-
Stage 1	-	-	-	-	-	-	530	519	-	549	516	-
Stage 2	-	-	-	-	-	-	~ 275	498	-	415	479	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			1.7			\$ 1395.5			32.4		
HCM LOS							F			D		
Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	69	216	639	1208	-	-	1071	-	-	142	201	727
HCM Lane V/C Ratio	4.842	0.338	0.059	0.039	-	-	0.075	-	-	0.348	0.673	0.222
HCM Control Delay (s)	\$ 1849.6	29.9	11	8.1	-	-	8.6	-	-	43.3	53.5	11.4
HCM Lane LOS	F	D	B	A	-	-	A	-	-	E	F	B
HCM 95th %tile Q(veh)	36.6	1.4	0.2	0.1	-	-	0.2	-	-	1.4	4.1	0.8
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined				*: All major volume in platoon				

Intersection												
Int Delay, s/veh	1.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	230	33	254	519	45	27	82	91	22	134	41
Future Vol, veh/h	18	230	33	254	519	45	27	82	91	22	134	41
Conflicting Peds, #/hr	3	0	0	0	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	105	-	-	-	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	26	26	2	2	7	7	2	2	2	6	2	6
Mvmt Flow	23	288	41	318	649	56	34	103	114	28	168	51
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	708	0	0	329	0	0	1749	1696	308	1776	1689	680
Stage 1	-	-	-	-	-	-	353	353	-	1315	1315	-
Stage 2	-	-	-	-	-	-	1396	1343	-	461	374	-
Critical Hdwy	4.36	-	-	4.12	-	-	7.12	6.52	6.22	7.16	6.52	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.16	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.16	5.52	-
Follow-up Hdwy	2.434	-	-	2.218	-	-	3.518	4.018	3.318	3.554	4.018	3.354
Pot Cap-1 Maneuver	790	-	-	1231	-	-	67	~ 93	732	63	~ 93	444
Stage 1	-	-	-	-	-	-	664	631	-	191	228	-
Stage 2	-	-	-	-	-	-	175	221	-	573	618	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	790	-	-	1231	-	-	-	~ 51	732	-	~ 51	443
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	~ 51	-	-	~ 51	-
Stage 1	-	-	-	-	-	-	645	613	-	185	~ 130	-
Stage 2	-	-	-	-	-	-	-	126	-	391	600	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			2.8								
HCM LOS							-			-		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2			
Capacity (veh/h)	-	790	-	-	1231	-	-	-	443			
HCM Lane V/C Ratio	-	0.028	-	-	0.258	-	-	-	0.116			
HCM Control Delay (s)	-	9.7	-	-	8.9	0	-	-	14.2			
HCM Lane LOS	-	A	-	-	A	A	-	-	B			
HCM 95th %tile Q(veh)	-	0.1	-	-	1	-	-	-	0.4			
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined			*: All major volume in platoon				

Appendix I

Intersection
Level of Service
Calculations

Cumulative Plus Project
Conditions

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HCM Unsignalized Intersection Capacity Analysis

1: River Dr/SB US 101 Ramps & Broadway Cir

Cumulative Plus Project AM

																		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR						
Lane Configurations																		
Sign Control	Stop			Stop			Stop			Stop								
Traffic Volume (vph)	82	25	33	2	18	7	60	2	4	9	3	807						
Future Volume (vph)	82	25	33	2	18	7	60	2	4	9	3	807						
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)	95	29	38	2	21	8	70	2	5	10	3	938						
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1	SB 2												
Volume Total (vph)	95	67	31	77	13	938												
Volume Left (vph)	95	0	2	70	10	0												
Volume Right (vph)	0	38	8	5	0	938												
Hadj (s)	0.55	-0.35	-0.06	0.18	0.24	-0.52												
Departure Headway (s)	5.3	4.4	4.3	4.6	4.7	3.2												
Degree Utilization, x	0.14	0.08	0.04	0.10	0.02	0.83												
Capacity (veh/h)	663	795	804	756	724	1113												
Control Delay (s)	8.0	6.6	7.5	8.0	7.8	19.8												
Approach Delay (s)	7.4		7.5	8.0	19.6													
Approach LOS	A		A	A	C													
Intersection Summary																		
Delay	17.0																	
Level of Service	C																	
Intersection Capacity Utilization	67.0%			ICU Level of Service			C											
Analysis Period (min)	15																	

HCM 2010 Signalized Intersection Summary
2: Broadway Cir/San Antonio Dr & Broadway St

Cumulative Plus Project AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	25	15	250	40	241	30	454	466	255	385	30
Future Volume (veh/h)	5	25	15	250	40	241	30	454	466	255	385	30
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1681	1900	1845	1845	1845	1810	1810	1810	1863	1863	1900
Adj Flow Rate, veh/h	6	29	18	294	47	284	35	534	548	300	453	35
Adj No. of Lanes	0	1	0	1	1	1	1	2	1	1	2	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
Percent Heavy Veh, %	13	13	13	3	3	3	5	5	5	2	2	2
Cap, veh/h	8	41	25	395	415	349	62	985	786	288	1375	106
Arrive On Green	0.05	0.05	0.05	0.22	0.22	0.22	0.04	0.29	0.29	0.16	0.41	0.41
Sat Flow, veh/h	179	863	536	1757	1845	1553	1723	3438	1538	1774	3330	256
Grp Volume(v), veh/h	53	0	0	294	47	284	35	534	548	300	240	248
Grp Sat Flow(s),veh/h/ln	1578	0	0	1757	1845	1553	1723	1719	1538	1774	1770	1817
Q Serve(g_s), s	2.1	0.0	0.0	10.1	1.3	11.2	1.3	8.5	17.5	10.5	5.9	6.0
Cycle Q Clear(g_c), s	2.1	0.0	0.0	10.1	1.3	11.2	1.3	8.5	17.5	10.5	5.9	6.0
Prop In Lane	0.11		0.34	1.00		1.00	1.00		1.00	1.00		0.14
Lane Grp Cap(c), veh/h	75	0	0	395	415	349	62	985	786	288	731	750
V/C Ratio(X)	0.71	0.00	0.00	0.74	0.11	0.81	0.56	0.54	0.70	1.04	0.33	0.33
Avail Cap(c_a), veh/h	122	0	0	490	514	433	133	985	786	288	731	750
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.3	0.0	0.0	23.3	19.9	23.7	30.6	19.5	12.0	27.0	12.9	12.9
Incr Delay (d2), s/veh	11.5	0.0	0.0	4.8	0.1	9.3	7.7	2.1	5.1	63.8	1.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.0	5.3	0.7	5.6	0.7	4.3	10.7	10.2	3.1	3.2
LnGrp Delay(d),s/veh	41.8	0.0	0.0	28.1	20.0	33.1	38.4	21.6	17.1	90.9	14.1	14.1
LnGrp LOS	D			C	C	C	D	C	B	F	B	B
Approach Vol, veh/h	53			625			1117			788		
Approach Delay, s/veh	41.8			29.7			19.9			43.3		
Approach LOS	D			C			B			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.0	23.0		7.6	6.8	31.2		19.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.5	18.5		5.0	5.0	24.0		18.0				
Max Q Clear Time (g_c+I1), s	12.5	19.5		4.1	3.3	8.0		13.2				
Green Ext Time (p_c), s	0.0	0.0		0.0	0.0	8.1		1.1				
Intersection Summary												
HCM 2010 Ctrl Delay				29.9								
HCM 2010 LOS				C								

HCM 2010 TWSC
3: First St & SB US 101 Ramps

Cumulative Plus Project AM

Intersection												
Int Delay, s/veh	246.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	453	1	20	0	0	0	0	50	15	239	39	0
Future Vol, veh/h	453	1	20	0	0	0	0	50	15	239	39	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	10	10	10	2	2	2	15	15	15	23	23	23
Mvmt Flow	566	1	25	0	0	0	0	63	19	299	49	0
Major/Minor	Minor2						Major1			Major2		
Conflicting Flow All	718	727	49				-	0	0	81	0	0
Stage 1	646	646	-				-	-	-	-	-	-
Stage 2	72	81	-				-	-	-	-	-	-
Critical Hdwy	6.5	6.6	6.3				-	-	-	4.33	-	-
Critical Hdwy Stg 1	5.5	5.6	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.5	5.6	-				-	-	-	-	-	-
Follow-up Hdwy	3.59	4.09	3.39				-	-	-	2.407	-	-
Pot Cap-1 Maneuver	~ 384	341	997				0	-	-	1394	-	0
Stage 1	~ 507	455	-				0	-	-	-	-	0
Stage 2	931	812	-				0	-	-	-	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	~ 300	0	997				-	-	-	1394	-	-
Mov Cap-2 Maneuver	~ 300	0	-				-	-	-	-	-	-
Stage 1	~ 395	0	-				-	-	-	-	-	-
Stage 2	931	0	-				-	-	-	-	-	-
Approach	EB						NB			SB		
HCM Control Delay, s	\$ 421.3						0			7.1		
HCM LOS	F											
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT						
Capacity (veh/h)	-	-	300	997	1394	-						
HCM Lane V/C Ratio	-	-	1.888	0.026	0.214	-						
HCM Control Delay (s)	-	-	\$ 440.4	8.7	8.3	0						
HCM Lane LOS	-	-	F	A	A	A						
HCM 95th %tile Q(veh)	-	-	38.8	0.1	0.8	-						
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

HCM 2010 TWSC
4: First St & NB US 101 Ramps

Cumulative Plus Project AM

Intersection												
Int Delay, s/veh		10.4										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations						↔	↔	↔	↔			
Traffic Vol, veh/h	0	0	0	20	1	350	30	473	0	0	258	296
Future Vol, veh/h	0	0	0	20	1	350	30	473	0	0	258	296
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	50	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	8	8	8	13	13	13	28	28	28
Mvmt Flow	0	0	0	24	1	427	37	577	0	0	315	361
Major/Minor				Minor1		Major1			Major2			
Conflicting Flow All				1145	1326	577	676	0	-	-	-	0
Stage 1				650	650	-	-	-	-	-	-	-
Stage 2				495	676	-	-	-	-	-	-	-
Critical Hdwy				7.18	6.58	6.28	4.23	-	-	-	-	-
Critical Hdwy Stg 1				6.18	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2				6.18	5.58	-	-	-	-	-	-	-
Follow-up Hdwy				3.572	4.072	3.372	2.317	-	-	-	-	-
Pot Cap-1 Maneuver				172	151	505	866	-	0	0	-	-
Stage 1				448	456	-	-	-	0	0	-	-
Stage 2				545	444	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver				164	141	505	866	-	-	-	-	-
Mov Cap-2 Maneuver				164	141	-	-	-	-	-	-	-
Stage 1				420	427	-	-	-	-	-	-	-
Stage 2				545	444	-	-	-	-	-	-	-
Approach				WB		NB			SB			
HCM Control Delay, s				39.4		0.6			0			
HCM LOS				E								
Minor Lane/Major Mvmt	NBL	NBT	WBLn1	WBLn2	SBT	SBR						
Capacity (veh/h)	866	-	163	505	-	-						
HCM Lane V/C Ratio	0.042	-	0.157	0.845	-	-						
HCM Control Delay (s)	9.3	0	31.2	39.9	-	-						
HCM Lane LOS	A	A	D	E	-	-						
HCM 95th %tile O(veh)	0.1	-	0.5	8.7	-	-						

Intersection												
Int Delay, s/veh	111.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	1	1	202	1	35	1	368	348	51	364	1
Future Vol, veh/h	1	1	1	202	1	35	1	368	348	51	364	1
Conflicting Peds, #/hr	0	0	1	1	0	0	2	0	21	21	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	29	29	29	12	12	12	17	17	17
Mvmt Flow	1	1	1	246	1	43	1	449	424	62	444	1
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1256	1468	448	1255	1256	682	447	0	0	894	0	0
Stage 1	571	571	-	684	684	-	-	-	-	-	-	-
Stage 2	685	897	-	571	572	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.39	6.79	6.49	4.22	-	-	4.27	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.39	5.79	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.39	5.79	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.761	4.261	3.561	2.308	-	-	2.353	-	-
Pot Cap-1 Maneuver	148	128	611	~ 131	152	406	1062	-	-	700	-	-
Stage 1	506	505	-	398	410	-	-	-	-	-	-	-
Stage 2	438	358	-	461	463	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	119	110	609	~ 115	131	398	1061	-	-	700	-	-
Mov Cap-2 Maneuver	119	110	-	~ 115	131	-	-	-	-	-	-	-
Stage 1	504	445	-	389	401	-	-	-	-	-	-	-
Stage 2	389	350	-	404	408	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	28.5			\$ 641.8			0			1.3		
HCM LOS	D			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1061	-	-	157	129	700	-	-				
HCM Lane V/C Ratio	0.001	-	-	0.023	2.25	0.089	-	-				
HCM Control Delay (s)	8.4	0	-	28.5	\$ 641.8	10.6	0	-				
HCM Lane LOS	A	A	-	D	F	B	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.1	24.6	0.3	-	-				
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Intersection

Intersection Delay, s/veh 107.8

Intersection LOS F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			↔	↔			↔			↔	↔	
Traffic Vol, veh/h	0	197	86	85	0	62	131	14	0	95	356	32
Future Vol, veh/h	0	197	86	85	0	62	131	14	0	95	356	32
Peak Hour Factor	0.92	0.80	0.80	0.80	0.92	0.80	0.80	0.92	0.92	0.80	0.80	0.80
Heavy Vehicles, %	2	5	2	5	2	2	2	2	2	8	8	2
Mvmt Flow	0	246	108	106	0	78	164	15	0	119	445	40
Number of Lanes	0	0	1	1	0	0	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	2	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	1	1
HCM Control Delay	55.3	39.2	124.7
HCM LOS	F	E	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	70%	0%	30%	3%
Vol Thru, %	0%	92%	30%	0%	63%	68%
Vol Right, %	0%	8%	0%	100%	7%	29%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	95	388	283	85	207	399
LT Vol	95	0	197	0	62	10
Through Vol	0	356	86	0	131	272
RT Vol	0	32	0	85	14	117
Lane Flow Rate	119	485	354	106	256	499
Geometry Grp	7	7	7	7	6	6
Degree of Util (X)	0.317	1.221	0.937	0.249	0.719	1.273
Departure Headway (Hd)	10.388	9.803	10.564	9.407	11.526	9.776
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	348	373	347	385	315	374
Service Time	8.088	7.503	8.264	7.107	9.526	7.776
HCM Lane V/C Ratio	0.342	1.3	1.02	0.275	0.813	1.334
HCM Control Delay	17.8	150.9	67.3	15.2	39.2	171
HCM Lane LOS	C	F	F	C	E	F
HCM 95th-tile Q	1.3	19	9.7	1	5.2	21

Intersection

Intersection Delay, s/veh

Intersection LOS

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↔	
Traffic Vol, veh/h	0	10	272	117
Future Vol, veh/h	0	10	272	117
Peak Hour Factor	0.92	0.80	0.80	0.80
Heavy Vehicles, %	2	2	13	13
Mvmt Flow	0	13	340	146
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	171
HCM LOS	F

Intersection

Int Delay, s/veh 46.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Vol, veh/h	141	377	196	87	207	194
Future Vol, veh/h	141	377	196	87	207	194
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	8	8	23	23	11	11
Mvmt Flow	172	460	239	106	252	237

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	346	0	1097
Stage 1	-	-	293
Stage 2	-	-	804
Critical Hdwy	4.18	-	6.51
Critical Hdwy Stg 1	-	-	5.51
Critical Hdwy Stg 2	-	-	5.51
Follow-up Hdwy	2.272	-	3.599
Pot Cap-1 Maneuver	1180	-	~ 227
Stage 1	-	-	737
Stage 2	-	-	425
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1180	-	~ 182
Mov Cap-2 Maneuver	-	-	~ 182
Stage 1	-	-	736
Stage 2	-	-	341

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	136.6
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1180	-	-	-	182	724
HCM Lane V/C Ratio	0.146	-	-	-	1.387	0.327
HCM Control Delay (s)	8.6	0	-	-	253	12.4
HCM Lane LOS	A	A	-	-	F	B
HCM 95th %tile Q(veh)	0.5	-	-	-	15.1	1.4

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection

Int Delay, s/veh 43.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	121	219	259	75	56	38	127	109	62	36	43	32
Future Vol, veh/h	121	219	259	75	56	38	127	109	62	36	43	32
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	100	-	-	90	-	90	60	-	110
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	3	3	3	14	14	14	5	5	5	5	5	5
Mvmt Flow	151	274	324	94	70	48	159	136	78	45	54	40

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	118	0	0	599	0	0	1047	1044	437	1087	1182	94
Stage 1	-	-	-	-	-	-	739	739	-	281	281	-
Stage 2	-	-	-	-	-	-	308	305	-	806	901	-
Critical Hdwy	4.13	-	-	4.24	-	-	7.15	6.55	6.25	7.15	6.55	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.15	5.55	-	6.15	5.55	-
Follow-up Hdwy	2.227	-	-	2.326	-	-	3.545	4.045	3.345	3.545	4.045	3.345
Pot Cap-1 Maneuver	1464	-	-	922	-	-	203	226	613	191	187	955
Stage 1	-	-	-	-	-	-	404	419	-	719	673	-
Stage 2	-	-	-	-	-	-	696	657	-	371	353	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1464	-	-	922	-	-	~ 121	182	612	56	150	955
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 121	182	-	56	150	-
Stage 1	-	-	-	-	-	-	362	375	-	645	604	-
Stage 2	-	-	-	-	-	-	546	590	-	185	316	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.6	4.1	135.8	78.4
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	121	182	612	1464	-	-	922	-	-	56	150	955
HCM Lane V/C Ratio	1.312	0.749	0.127	0.103	-	-	0.102	-	-	0.804	0.358	0.042
HCM Control Delay (s)	254.9	67.5	11.7	7.7	-	-	9.3	-	-	183.8	41.8	8.9
HCM Lane LOS	F	F	B	A	-	-	A	-	-	F	E	A
HCM 95th %tile Q(veh)	10.4	4.8	0.4	0.3	-	-	0.3	-	-	3.5	1.5	0.1

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection												
Int Delay, s/veh	32.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	443	12	66	143	17	21	99	239	25	43	4
Future Vol, veh/h	35	443	12	66	143	17	21	99	239	25	43	4
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	105	-	-	-	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	15	15	2	2	32	32	2	2	2	14	2	14
Mvmt Flow	39	492	13	73	159	19	23	110	266	28	48	4
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	179	0	0	506	0	0	916	902	499	1080	899	169
Stage 1	-	-	-	-	-	-	577	577	-	316	316	-
Stage 2	-	-	-	-	-	-	339	325	-	764	583	-
Critical Hdwy	4.25	-	-	4.12	-	-	7.12	6.52	6.22	7.24	6.52	6.34
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.24	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.24	5.52	-
Follow-up Hdwy	2.335	-	-	2.218	-	-	3.518	4.018	3.318	3.626	4.018	3.426
Pot Cap-1 Maneuver	1322	-	-	1059	-	-	253	277	572	186	279	845
Stage 1	-	-	-	-	-	-	502	502	-	670	655	-
Stage 2	-	-	-	-	-	-	676	649	-	379	499	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1322	-	-	1059	-	-	198	248	572	60	250	844
Mov Cap-2 Maneuver	-	-	-	-	-	-	198	248	-	60	250	-
Stage 1	-	-	-	-	-	-	487	487	-	650	604	-
Stage 2	-	-	-	-	-	-	572	598	-	153	484	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			2.5			85.6			77.1		
HCM LOS							F			F		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2			
Capacity (veh/h)	389	1322	-	-	1059	-	-	116	844			
HCM Lane V/C Ratio	1.025	0.029	-	-	0.069	-	-	0.651	0.005			
HCM Control Delay (s)	85.6	7.8	-	-	8.7	0	-	81.1	9.3			
HCM Lane LOS	F	A	-	-	A	A	-	F	A			
HCM 95th %tile Q(veh)	12.9	0.1	-	-	0.2	-	-	3.4	0			

HCM Unsignalized Intersection Capacity Analysis

1: River Dr/SB US 101 Ramps & Broadway Cir

Cumulative Plus Project PM

																		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR						
Lane Configurations																		
Sign Control	Stop			Stop			Stop			Stop								
Traffic Volume (vph)	91	36	88	5	35	14	88	13	3	25	35	621						
Future Volume (vph)	91	36	88	5	35	14	88	13	3	25	35	621						
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)	94	37	91	5	36	14	91	13	3	26	36	640						
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1	SB 2												
Volume Total (vph)	94	128	55	107	62	640												
Volume Left (vph)	94	0	5	91	26	0												
Volume Right (vph)	0	91	14	3	0	640												
Hadj (s)	0.53	-0.46	-0.02	0.19	0.12	-0.57												
Departure Headway (s)	5.5	4.5	4.7	4.8	4.8	3.2												
Degree Utilization, x	0.14	0.16	0.07	0.14	0.08	0.57												
Capacity (veh/h)	630	766	726	707	699	1117												
Control Delay (s)	8.2	7.2	8.0	8.6	8.2	10.3												
Approach Delay (s)	7.6		8.0	8.6	10.1													
Approach LOS	A		A	A	B													
Intersection Summary																		
Delay	9.4																	
Level of Service	A																	
Intersection Capacity Utilization	59.6%			ICU Level of Service			B											
Analysis Period (min)	15																	

HCM 2010 Signalized Intersection Summary
2: Broadway Cir/San Antonio Dr & Broadway St

Cumulative Plus Project PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	40	22	475	30	260	40	500	382	241	536	60
Future Volume (veh/h)	10	40	22	475	30	260	40	500	382	241	536	60
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1863	1863	1863	1863	1863	1863	1863	1863	1900
Adj Flow Rate, veh/h	11	43	24	516	33	283	43	543	415	262	583	65
Adj No. of Lanes	0	1	0	1	1	1	1	2	1	1	2	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
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	14	55	31	464	487	413	72	950	839	270	1221	136
Arrive On Green	0.06	0.06	0.06	0.26	0.26	0.26	0.04	0.27	0.27	0.15	0.38	0.38
Sat Flow, veh/h	248	968	540	1774	1863	1582	1774	3539	1583	1774	3211	357
Grp Volume(v), veh/h	78	0	0	516	33	283	43	543	415	262	321	327
Grp Sat Flow(s),veh/h/ln	1755	0	0	1774	1863	1582	1774	1770	1583	1774	1770	1799
Q Serve(g_s), s	3.0	0.0	0.0	18.0	0.9	11.1	1.6	9.1	11.5	10.1	9.5	9.5
Cycle Q Clear(g_c), s	3.0	0.0	0.0	18.0	0.9	11.1	1.6	9.1	11.5	10.1	9.5	9.5
Prop In Lane	0.14		0.31	1.00		1.00	1.00		1.00	1.00		0.20
Lane Grp Cap(c), veh/h	99	0	0	464	487	413	72	950	839	270	673	684
V/C Ratio(X)	0.79	0.00	0.00	1.11	0.07	0.68	0.60	0.57	0.49	0.97	0.48	0.48
Avail Cap(c_a), veh/h	127	0	0	464	487	413	129	950	839	270	673	684
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.1	0.0	0.0	25.4	19.1	22.9	32.5	21.8	10.3	29.0	16.2	16.2
Incr Delay (d2), s/veh	21.4	0.0	0.0	76.4	0.1	4.6	7.6	2.5	2.1	46.0	2.4	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	0.0	18.5	0.5	5.3	1.0	4.8	8.2	8.3	5.0	5.1
LnGrp Delay(d),s/veh	53.5	0.0	0.0	101.9	19.2	27.5	40.1	24.3	12.4	75.1	18.6	18.6
LnGrp LOS	D			F	B	C	D	C	B	E	B	B
Approach Vol, veh/h	78			832			1001			910		
Approach Delay, s/veh	53.5			73.3			20.0			34.8		
Approach LOS	D			E			C			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	15.0	23.0		8.4	7.3	30.7		22.5				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	10.5	18.5		5.0	5.0	24.0		18.0				
Max Q Clear Time (g_c+I1), s	12.1	13.5		5.0	3.6	11.5		20.0				
Green Ext Time (p_c), s	0.0	3.5		0.0	0.0	7.3		0.0				
Intersection Summary												
HCM 2010 Ctrl Delay				41.4								
HCM 2010 LOS				D								

HCM 2010 TWSC
3: First St & SB US 101 Ramps

Cumulative Plus Project PM

Intersection												
Int Delay, s/veh	926											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	499	1	50	0	0	0	0	90	20	466	49	0
Future Vol, veh/h	499	1	50	0	0	0	0	90	20	466	49	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	15	15	15	2	2	2	9	9	9	12	12	12
Mvmt Flow	587	1	59	0	0	0	0	106	24	548	58	0
Major/Minor	Minor2			Major1			Major2					
Conflicting Flow All	1272	1283	58				-	0	0	129	0	0
Stage 1	1154	1154	-				-	-	-	-	-	-
Stage 2	118	129	-				-	-	-	-	-	-
Critical Hdwy	6.55	6.65	6.35				-	-	-	4.22	-	-
Critical Hdwy Stg 1	5.55	5.65	-				-	-	-	-	-	-
Critical Hdwy Stg 2	5.55	5.65	-				-	-	-	-	-	-
Follow-up Hdwy	3.635	4.135	3.435				-	-	-	2.308	-	-
Pot Cap-1 Maneuver	~ 174	156	973				0	-	-	1397	-	0
Stage 1	~ 283	257	-				0	-	-	-	-	0
Stage 2	876	765	-				0	-	-	-	-	0
Platoon blocked, %								-	-		-	
Mov Cap-1 Maneuver	~ 104	0	973				-	-	-	1397	-	-
Mov Cap-2 Maneuver	~ 104	0	-				-	-	-	-	-	-
Stage 1	~ 168	0	-				-	-	-	-	-	-
Stage 2	876	0	-				-	-	-	-	-	-
Approach	EB			NB			SB					
HCM Control Delay, s	\$ 1970.5			0			8.4					
HCM LOS	F											
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	EBLn2	SBL	SBT						
Capacity (veh/h)	-	-	104	973	1397	-						
HCM Lane V/C Ratio	-	-	5.645	0.062	0.392	-						
HCM Control Delay (s)	-	-\$ 2171	8.9	9.2	0							
HCM Lane LOS	-	-	F	A	A	A						
HCM 95th %tile Q(veh)	-	-	63.8	0.2	1.9	-						
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

HCM 2010 TWSC
4: First St & NB US 101 Ramps

Cumulative Plus Project PM

Intersection												
Int Delay, s/veh		14.3										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕	↗		↖			↘	
Traffic Vol, veh/h	0	0	0	20	1	426	40	549	0	0	496	731
Future Vol, veh/h	0	0	0	20	1	426	40	549	0	0	496	731
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	50	-	-	-	-	-	-
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	4	4	4	13	13	13	8	8	8
Mvmt Flow	0	0	0	23	1	484	45	624	0	0	564	831
Major/Minor				Minor1		Major1			Major2			
Conflicting Flow All				1694	2109	624	1394	0	-	-	-	0
Stage 1				715	715	-	-	-	-	-	-	-
Stage 2				979	1394	-	-	-	-	-	-	-
Critical Hdwy				6.44	6.54	6.24	4.23	-	-	-	-	-
Critical Hdwy Stg 1				5.44	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2				5.44	5.54	-	-	-	-	-	-	-
Follow-up Hdwy				3.536	4.036	3.336	2.317	-	-	-	-	-
Pot Cap-1 Maneuver				101	50	~ 482	457	-	0	0	-	-
Stage 1				481	432	-	-	-	0	0	-	-
Stage 2				361	206	-	-	-	0	0	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver				86	0	~ 482	457	-	-	-	-	-
Mov Cap-2 Maneuver				86	0	-	-	-	-	-	-	-
Stage 1				408	0	-	-	-	-	-	-	-
Stage 2				361	0	-	-	-	-	-	-	-
Approach				WB		NB			SB			
HCM Control Delay, s				71.2		0.9			0			
HCM LOS				F								
Minor Lane/Major Mvmt	NBL	NBT	WBLn1	WBLn2	SBT	SBR						
Capacity (veh/h)	457	-	86	482	-	-						
HCM Lane V/C Ratio	0.099	-	0.277	1.004	-	-						
HCM Control Delay (s)	13.7	0	62.2	71.6	-	-						
HCM Lane LOS	B	A	F	F	-	-						
HCM 95th %tile Q(veh)	0.3	-	1	13.6	-	-						
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined			*: All major volume in platoon					

Intersection												
Int Delay, s/veh	870											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	1	1	449	1	117	3	609	293	26	596	2
Future Vol, veh/h	1	1	1	449	1	117	3	609	293	26	596	2
Conflicting Peds, #/hr	1	0	0	0	0	1	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	6	6	6	9	9	9	7	7	7
Mvmt Flow	1	1	1	528	1	138	4	716	345	31	701	2
Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1731	1833	703	1661	1662	890	705	0	0	1061	0	0
Stage 1	765	765	-	896	896	-	-	-	-	-	-	-
Stage 2	966	1068	-	765	766	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.16	6.56	6.26	4.19	-	-	4.17	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.16	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.16	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.554	4.054	3.354	2.281	-	-	2.263	-	-
Pot Cap-1 Maneuver	69	76	438	~ 76	95	336	861	-	-	638	-	-
Stage 1	396	412	-	~ 329	353	-	-	-	-	-	-	-
Stage 2	306	298	-	~ 390	406	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	37	69	438	~ 70	86	336	861	-	-	637	-	-
Mov Cap-2 Maneuver	37	69	-	~ 70	86	-	-	-	-	-	-	-
Stage 1	391	379	-	~ 325	349	-	-	-	-	-	-	-
Stage 2	178	294	-	~ 357	373	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	60.8			\$ 3219.7			0			0.5		
HCM LOS	F			F								
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	861	-	-	68	84	637	-	-				
HCM Lane V/C Ratio	0.004	-	-	0.052	7.941	0.048	-	-				
HCM Control Delay (s)	9.2	0	-	60.8	\$ 3219.7	10.9	0	-				
HCM Lane LOS	A	A	-	F	F	B	A	-				
HCM 95th %tile Q(veh)	0	-	-	0.2	76.2	0.2	-	-				
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Intersection

Intersection Delay, s/veh 333.1

Intersection LOS F

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations			↶	↷			↶↷			↶	↷	
Traffic Vol, veh/h	0	139	197	160	0	82	180	22	0	158	411	107
Future Vol, veh/h	0	139	197	160	0	82	180	22	0	158	411	107
Peak Hour Factor	0.92	0.85	0.85	0.85	0.92	0.85	0.85	0.85	0.92	0.85	0.85	0.85
Heavy Vehicles, %	2	4	2	4	2	2	2	2	2	8	8	2
Mvmt Flow	0	164	232	188	0	96	212	26	0	186	484	126
Number of Lanes	0	0	1	1	0	0	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	2	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	2	2
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	2	1	1
HCM Control Delay	86.5	89.2	253.9
HCM LOS	F	F	F

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	100%	0%	41%	0%	29%	3%
Vol Thru, %	0%	79%	59%	0%	63%	63%
Vol Right, %	0%	21%	0%	100%	8%	34%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	158	518	336	160	284	746
LT Vol	158	0	139	0	82	25
Through Vol	0	411	197	0	180	471
RT Vol	0	107	0	160	22	250
Lane Flow Rate	186	609	395	188	334	878
Geometry Grp	7	7	7	7	6	6
Degree of Util (X)	0.526	1.614	1.078	0.464	0.95	2.398
Departure Headway (Hd)	13.499	12.808	13.275	12.264	15.444	11.058
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	270	293	277	296	237	342
Service Time	11.199	10.508	10.975	9.964	13.444	9.058
HCM Lane V/C Ratio	0.689	2.078	1.426	0.635	1.409	2.567
HCM Control Delay	30.3	322.1	115.7	25.2	89.2	661.6
HCM Lane LOS	D	F	F	D	F	F
HCM 95th-tile Q	2.8	27.7	11.9	2.3	8.4	61.6

Intersection

Intersection Delay, s/veh

Intersection LOS

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↔	
Traffic Vol, veh/h	0	25	471	250
Future Vol, veh/h	0	25	471	250
Peak Hour Factor	0.92	0.85	0.85	0.85
Heavy Vehicles, %	2	2	5	5
Mvmt Flow	0	29	554	294
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	2
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	2
HCM Control Delay	661.6
HCM LOS	F

Intersection

Int Delay, s/veh 32.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	↕
Traffic Vol, veh/h	189	323	488	230	116	215
Future Vol, veh/h	189	323	488	230	116	215
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	16	16	8	8	7	7
Mvmt Flow	215	367	555	261	132	244

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	817	0	1483
Stage 1	-	-	686
Stage 2	-	-	797
Critical Hdwy	4.26	-	6.47
Critical Hdwy Stg 1	-	-	5.47
Critical Hdwy Stg 2	-	-	5.47
Follow-up Hdwy	2.344	-	3.563
Pot Cap-1 Maneuver	753	-	134
Stage 1	-	-	491
Stage 2	-	-	435
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	753	-	~ 86
Mov Cap-2 Maneuver	-	-	~ 86
Stage 1	-	-	491
Stage 2	-	-	279

Approach	EB	WB	SB
HCM Control Delay, s	4.3	0	146.3
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	753	-	-	-	86	439
HCM Lane V/C Ratio	0.285	-	-	-	1.533	0.557
HCM Control Delay (s)	11.7	0	-	-	\$ 374.7	23
HCM Lane LOS	B	A	-	-	F	C
HCM 95th %tile Q(veh)	1.2	-	-	-	10.5	3.3

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection												
Int Delay, s/veh	360.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱	↱	↰	↱	↱
Traffic Vol, veh/h	40	253	155	68	240	40	284	62	31	41	115	137
Future Vol, veh/h	40	253	155	68	240	40	284	62	31	41	115	137
Conflicting Peds, #/hr	0	0	3	3	0	0	0	0	3	3	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	100	-	-	90	-	90	60	-	110
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	5	5	5	3	3	3	7	7	7	3	3	3
Mvmt Flow	47	298	182	80	282	47	334	73	36	48	135	161
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	329	0	0	483	0	0	1020	975	395	988	1043	306
Stage 1	-	-	-	-	-	-	486	486	-	466	466	-
Stage 2	-	-	-	-	-	-	534	489	-	522	577	-
Critical Hdwy	4.15	-	-	4.13	-	-	7.17	6.57	6.27	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.17	5.57	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.17	5.57	-	6.13	5.53	-
Follow-up Hdwy	2.245	-	-	2.227	-	-	3.563	4.063	3.363	3.527	4.027	3.327
Pot Cap-1 Maneuver	1214	-	-	1074	-	-	~ 210	247	643	225	228	732
Stage 1	-	-	-	-	-	-	553	543	-	575	561	-
Stage 2	-	-	-	-	-	-	521	541	-	536	500	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1214	-	-	1071	-	-	~ 70	219	639	144	202	732
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 70	219	-	144	202	-
Stage 1	-	-	-	-	-	-	530	520	-	553	519	-
Stage 2	-	-	-	-	-	-	~ 278	501	-	416	479	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			1.7			\$ 1374.6			31.9		
HCM LOS							F			D		
Minor Lane/Major Mvmt	NBLn1	NBLn2	NBLn3	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3
Capacity (veh/h)	70	219	639	1214	-	-	1071	-	-	144	202	732
HCM Lane V/C Ratio	4.773	0.333	0.057	0.039	-	-	0.075	-	-	0.335	0.67	0.22
HCM Control Delay (s)	\$ 1817.1	29.4	11	8.1	-	-	8.6	-	-	42.1	52.9	11.3
HCM Lane LOS	F	D	B	A	-	-	A	-	-	E	F	B
HCM 95th %tile Q(veh)	36.5	1.4	0.2	0.1	-	-	0.2	-	-	1.4	4.1	0.8
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	230	33	254	519	45	27	78	91	22	126	41
Future Vol, veh/h	18	230	33	254	519	45	27	78	91	22	126	41
Conflicting Peds, #/hr	3	0	0	0	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	105	-	-	-	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	26	26	2	2	7	7	2	2	2	6	2	6
Mvmt Flow	23	288	41	318	649	56	34	98	114	28	158	51
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	708	0	0	329	0	0	1744	1696	308	1774	1689	680
Stage 1	-	-	-	-	-	-	353	353	-	1315	1315	-
Stage 2	-	-	-	-	-	-	1391	1343	-	459	374	-
Critical Hdwy	4.36	-	-	4.12	-	-	7.12	6.52	6.22	7.16	6.52	6.26
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.16	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.16	5.52	-
Follow-up Hdwy	2.434	-	-	2.218	-	-	3.518	4.018	3.318	3.554	4.018	3.354
Pot Cap-1 Maneuver	790	-	-	1231	-	-	68	~ 93	732	63	~ 93	444
Stage 1	-	-	-	-	-	-	664	631	-	191	228	-
Stage 2	-	-	-	-	-	-	176	221	-	574	618	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	790	-	-	1231	-	-	-	~ 51	732	-	~ 51	443
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	~ 51	-	-	~ 51	-
Stage 1	-	-	-	-	-	-	645	613	-	185	~ 130	-
Stage 2	-	-	-	-	-	-	-	126	-	396	600	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			2.8								
HCM LOS							-			-		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2			
Capacity (veh/h)	-	790	-	-	1231	-	-	-	443			
HCM Lane V/C Ratio	-	0.028	-	-	0.258	-	-	-	0.116			
HCM Control Delay (s)	-	9.7	-	-	8.9	0	-	-	14.2			
HCM Lane LOS	-	A	-	-	A	A	-	-	B			
HCM 95th %tile Q(veh)	-	0.1	-	-	1	-	-	-	0.4			
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s			+: Computation Not Defined			*: All major volume in platoon				

HCM 2010 Signalized Intersection Summary

3: First St & SB US 101 Ramps

Cumulative Plus Project AM
With Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	460	1	20	0	0	0	0	50	15	240	39	0
Future Volume (veh/h)	460	1	20	0	0	0	0	50	15	240	39	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1727	1727				0	1652	1900	1900	1545	0
Adj Flow Rate, veh/h	575	1	25				0	62	19	300	49	0
Adj No. of Lanes	0	1	1				0	1	0	0	1	0
Peak Hour Factor	0.80	0.80	0.80				0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	10	10	10				0	15	15	23	23	0
Cap, veh/h	620	1	554				0	114	35	351	57	0
Arrive On Green	0.38	0.38	0.38				0.00	0.09	0.09	0.28	0.28	0.00
Sat Flow, veh/h	1642	3	1468				0	1214	372	1273	208	0
Grp Volume(v), veh/h	576	0	25				0	0	81	349	0	0
Grp Sat Flow(s),veh/h/ln	1645	0	1468				0	0	1587	1481	0	0
Q Serve(g_s), s	17.9	0.0	0.6				0.0	0.0	2.6	11.9	0.0	0.0
Cycle Q Clear(g_c), s	17.9	0.0	0.6				0.0	0.0	2.6	11.9	0.0	0.0
Prop In Lane	1.00		1.00				0.00		0.23	0.86		0.00
Lane Grp Cap(c), veh/h	621	0	554				0	0	149	408	0	0
V/C Ratio(X)	0.93	0.00	0.05				0.00	0.00	0.54	0.85	0.00	0.00
Avail Cap(c_a), veh/h	632	0	564				0	0	535	500	0	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00				0.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	15.9	0.0	10.5				0.0	0.0	23.1	18.3	0.0	0.0
Incr Delay (d2), s/veh	19.8	0.0	0.0				0.0	0.0	3.1	11.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.4	0.0	0.2				0.0	0.0	1.3	6.2	0.0	0.0
LnGrp Delay(d),s/veh	35.7	0.0	10.5				0.0	0.0	26.2	29.9	0.0	0.0
LnGrp LOS	D		B						C	C		
Approach Vol, veh/h		601						81			349	
Approach Delay, s/veh		34.7						26.2			29.9	
Approach LOS		C						C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		9.5		24.6		19.2						
Change Period (Y+Rc), s		4.5		4.5		4.5						
Max Green Setting (Gmax), s		18.0		20.5		18.0						
Max Q Clear Time (g_c+I1), s		4.6		19.9		13.9						
Green Ext Time (p_c), s		0.3		0.3		0.8						
Intersection Summary												
HCM 2010 Ctrl Delay			32.4									
HCM 2010 LOS			C									

HCM 2010 TWSC
4: First St & NB US 101 Ramps

Cumulative Plus Project AM
With Improvements

Intersection												
Int Delay, s/veh		0.9										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations						↔↕	↕↔	↕↔		↕	↕	
Traffic Vol, veh/h	0	0	0	20	1	351	30	480	0	0	259	300
Future Vol, veh/h	0	0	0	20	1	351	30	480	0	0	259	300
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	Free
Storage Length	-	-	-	-	-	50	-	-	-	-	-	0
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	82	82	82	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	8	8	8	13	13	13	28	28	28
Mvmt Flow	0	0	0	24	1	428	37	585	0	0	316	366
Major/Minor				Minor1			Major1			Major2		
Conflicting Flow All				975	975	-	316	0	-	-	-	0
Stage 1				659	659	-	-	-	-	-	-	-
Stage 2				316	316	-	-	-	-	-	-	-
Critical Hdwy				6.48	6.58	-	4.23	-	-	-	-	-
Critical Hdwy Stg 1				5.48	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2				5.48	5.58	-	-	-	-	-	-	-
Follow-up Hdwy				3.572	4.072	-	2.317	-	-	-	-	-
Pot Cap-1 Maneuver				272	246	0	1185	-	0	0	-	0
Stage 1				504	452	0	-	-	0	0	-	0
Stage 2				726	644	0	-	-	0	0	-	0
Platoon blocked, %								-			-	
Mov Cap-1 Maneuver				259	0	-	1185	-	-	-	-	-
Mov Cap-2 Maneuver				259	0	-	-	-	-	-	-	-
Stage 1				481	0	-	-	-	-	-	-	-
Stage 2				726	0	-	-	-	-	-	-	-
Approach				WB			NB			SB		
HCM Control Delay, s				20.4			0.5			0		
HCM LOS				C								
Minor Lane/Major Mvmt	NBL	NBT	WBLn1	WBLn2	SBT							
Capacity (veh/h)	1185	-	259	-	-							
HCM Lane V/C Ratio	0.031	-	0.099	-	-							
HCM Control Delay (s)	8.1	0	20.4	0	-							
HCM Lane LOS	A	A	C	A	-							
HCM 95th %tile O(veh)	0.1	-	0.3	-	-							

HCM 2010 Signalized Intersection Summary
5: First St & Private Dwy/Lonoak Rd

Cumulative Plus Project AM
With Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	1	1	206	1	35	1	370	354	51	365	1
Future Volume (veh/h)	1	1	1	206	1	35	1	370	354	51	365	1
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		0.97	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1473	1473	1900	1696	1696	1696	1624	1624	1900
Adj Flow Rate, veh/h	1	1	1	292	0	0	1	451	432	62	445	1
Adj No. of Lanes	0	1	0	2	1	0	1	2	1	1	2	0
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Percent Heavy Veh, %	2	2	2	29	29	29	12	12	12	17	17	17
Cap, veh/h	2	2	2	446	234	0	4	1178	741	94	1341	3
Arrive On Green	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.37	0.37	0.06	0.42	0.42
Sat Flow, veh/h	577	577	577	2805	1473	0	1616	3223	1401	1547	3158	7
Grp Volume(v), veh/h	3	0	0	292	0	0	1	451	432	62	217	229
Grp Sat Flow(s),veh/h/ln	1730	0	0	1403	1473	0	1616	1612	1401	1547	1543	1622
Q Serve(g_s), s	0.1	0.0	0.0	4.3	0.0	0.0	0.0	4.5	9.3	1.7	4.1	4.1
Cycle Q Clear(g_c), s	0.1	0.0	0.0	4.3	0.0	0.0	0.0	4.5	9.3	1.7	4.1	4.1
Prop In Lane	0.33		0.33	1.00		0.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	7	0	0	446	234	0	4	1178	741	94	655	689
V/C Ratio(X)	0.42	0.00	0.00	0.65	0.00	0.00	0.27	0.38	0.58	0.66	0.33	0.33
Avail Cap(c_a), veh/h	197	0	0	1153	605	0	184	1361	821	194	669	704
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.8	0.0	0.0	17.3	0.0	0.0	21.8	10.3	7.2	20.1	8.4	8.4
Incr Delay (d2), s/veh	35.5	0.0	0.0	1.6	0.0	0.0	35.4	0.2	0.9	7.8	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	1.8	0.0	0.0	0.0	2.0	4.9	0.9	1.8	1.9
LnGrp Delay(d),s/veh	57.3	0.0	0.0	18.9	0.0	0.0	57.3	10.5	8.0	27.9	8.7	8.7
LnGrp LOS	E			B			E	B	A	C	A	A
Approach Vol, veh/h	3			292			884			508		
Approach Delay, s/veh	57.3			18.9			9.3			11.1		
Approach LOS	E			B			A			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	4		5	6	8					
Phs Duration (G+Y+Rc), s	7.1	20.5	4.7		4.6	23.1	11.5					
Change Period (Y+Rc), s	4.5	4.5	4.5		4.5	4.5	4.5					
Max Green Setting (Gmax), s	5.5	18.5	5.0		5.0	19.0	18.0					
Max Q Clear Time (g_c+I1), s	3.7	11.3	2.1		2.0	6.1	6.3					
Green Ext Time (p_c), s	0.0	4.1	0.0		0.0	6.1	0.8					
Intersection Summary												
HCM 2010 Ctrl Delay				11.6								
HCM 2010 LOS				B								
Notes												
User approved volume balancing among the lanes for turning movement.												

HCM 2010 Signalized Intersection Summary
6: First St & Broadway St

Cumulative Plus Project AM
With Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	199	86	85	62	161	14	95	358	32	10	273	117
Future Volume (veh/h)	199	86	85	62	161	14	95	358	32	10	273	117
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1836	1900	1863	1863	1900	1759	1759	1863	1863	1681	1681
Adj Flow Rate, veh/h	249	108	0	78	201	15	119	448	40	12	341	146
Adj No. of Lanes	1	1	0	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.92	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	5	2	2	2	2	2	8	8	2	2	13	13
Cap, veh/h	309	520	0	107	282	21	149	602	540	27	451	382
Arrive On Green	0.18	0.28	0.00	0.06	0.16	0.16	0.09	0.34	0.34	0.02	0.27	0.27
Sat Flow, veh/h	1723	1836	0	1774	1712	128	1675	1759	1579	1774	1681	1424
Grp Volume(v), veh/h	249	108	0	78	0	216	119	448	40	12	341	146
Grp Sat Flow(s),veh/h/ln	1723	1836	0	1774	0	1840	1675	1759	1579	1774	1681	1424
Q Serve(g_s), s	8.3	2.7	0.0	2.6	0.0	6.7	4.2	13.5	1.0	0.4	11.2	5.0
Cycle Q Clear(g_c), s	8.3	2.7	0.0	2.6	0.0	6.7	4.2	13.5	1.0	0.4	11.2	5.0
Prop In Lane	1.00		0.00	1.00		0.07	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	309	520	0	107	0	303	149	602	540	27	451	382
V/C Ratio(X)	0.81	0.21	0.00	0.73	0.00	0.71	0.80	0.74	0.07	0.45	0.76	0.38
Avail Cap(c_a), veh/h	516	821	0	268	0	551	187	614	551	147	539	457
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.7	16.4	0.0	27.8	0.0	23.8	26.9	17.5	13.4	29.4	20.2	17.9
Incr Delay (d2), s/veh	5.0	0.2	0.0	9.0	0.0	3.1	17.3	4.8	0.1	11.3	5.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	1.4	0.0	1.5	0.0	3.6	2.7	7.3	0.5	0.3	5.8	2.0
LnGrp Delay(d),s/veh	28.7	16.6	0.0	36.7	0.0	26.9	44.2	22.3	13.4	40.6	25.2	18.6
LnGrp LOS	C	B		D		C	D	C	B	D	C	B
Approach Vol, veh/h	357				294				607			
Approach Delay, s/veh	25.0				29.5				26.0		23.6	
Approach LOS	C				C				C		C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.4	25.1	8.1	21.5	9.9	20.6	15.3	14.4				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	21.0	9.1	26.9	6.7	19.3	18.0	18.0				
Max Q Clear Time (g_c+I1), s	2.4	15.5	4.6	4.7	6.2	13.2	10.3	8.7				
Green Ext Time (p_c), s	0.0	2.7	0.1	1.8	0.0	2.9	0.4	1.2				
Intersection Summary												
HCM 2010 Ctrl Delay			25.7									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary
7: Bitterwater Rd & Metz Rd

Cumulative Plus Project AM
With Improvements

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	147	377	196	87	207	196		
Future Volume (veh/h)	147	377	196	87	207	196		
Number	7	4	8	18	1	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1759	1759	1545	1545	1712	1712		
Adj Flow Rate, veh/h	179	460	239	106	252	239		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82		
Percent Heavy Veh, %	8	8	23	23	11	11		
Cap, veh/h	229	937	432	367	382	341		
Arrive On Green	0.14	0.53	0.28	0.28	0.23	0.23		
Sat Flow, veh/h	1675	1759	1545	1311	1630	1455		
Grp Volume(v), veh/h	179	460	239	106	252	239		
Grp Sat Flow(s),veh/h/ln	1675	1759	1545	1311	1630	1455		
Q Serve(g_s), s	4.0	6.4	5.1	2.4	5.4	5.8		
Cycle Q Clear(g_c), s	4.0	6.4	5.1	2.4	5.4	5.8		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	229	937	432	367	382	341		
V/C Ratio(X)	0.78	0.49	0.55	0.29	0.66	0.70		
Avail Cap(c_a), veh/h	455	1502	720	611	759	678		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	16.1	5.7	11.9	10.9	13.4	13.5		
Incr Delay (d2), s/veh	5.8	0.4	1.1	0.4	1.9	2.6		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	2.2	3.2	2.3	0.9	2.6	4.7		
LnGrp Delay(d),s/veh	21.9	6.1	13.0	11.3	15.3	16.2		
LnGrp LOS	C	A	B	B	B	B		
Approach Vol, veh/h		639	345		491			
Approach Delay, s/veh		10.5	12.5		15.7			
Approach LOS		B	B		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				25.1		13.6	9.8	15.3
Change Period (Y+Rc), s				4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s				33.0		18.0	10.5	18.0
Max Q Clear Time (g_c+I1), s				8.4		7.8	6.0	7.1
Green Ext Time (p_c), s				5.1		1.2	0.2	3.6
Intersection Summary								
HCM 2010 Ctrl Delay			12.7					
HCM 2010 LOS			B					

HCM 2010 Signalized Intersection Summary
8: Metz Rd & San Antonio Dr

Cumulative Plus Project AM
With Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	121	222	259	75	56	39	127	109	65	38	43	32
Future Volume (veh/h)	121	222	259	75	56	39	127	109	65	38	43	32
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1845	1667	1667	1900	1810	1810	1810	1810	1810	1810
Adj Flow Rate, veh/h	151	278	324	94	70	49	159	136	81	48	54	40
Adj No. of Lanes	1	1	1	1	1	0	1	1	1	1	1	1
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	3	3	3	14	14	14	5	5	5	5	5	5
Cap, veh/h	193	527	448	123	231	162	202	325	276	87	204	174
Arrive On Green	0.11	0.29	0.29	0.08	0.25	0.25	0.12	0.18	0.18	0.05	0.11	0.11
Sat Flow, veh/h	1757	1845	1565	1587	913	639	1723	1810	1538	1723	1810	1538
Grp Volume(v), veh/h	151	278	324	94	0	119	159	136	81	48	54	40
Grp Sat Flow(s),veh/h/ln	1757	1845	1565	1587	0	1552	1723	1810	1538	1723	1810	1538
Q Serve(g_s), s	3.7	5.6	8.2	2.6	0.0	2.7	4.0	3.0	2.0	1.2	1.2	1.0
Cycle Q Clear(g_c), s	3.7	5.6	8.2	2.6	0.0	2.7	4.0	3.0	2.0	1.2	1.2	1.0
Prop In Lane	1.00		1.00	1.00		0.41	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	193	527	448	123	0	393	202	325	276	87	204	174
V/C Ratio(X)	0.78	0.53	0.72	0.77	0.00	0.30	0.79	0.42	0.29	0.55	0.26	0.23
Avail Cap(c_a), veh/h	298	767	651	255	0	631	292	826	702	245	777	660
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.2	13.3	14.2	20.0	0.0	13.4	19.0	16.1	15.7	20.5	17.9	17.9
Incr Delay (d2), s/veh	7.1	0.8	2.2	9.5	0.0	0.4	8.7	0.9	0.6	5.4	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	3.0	3.8	1.4	0.0	1.2	2.3	1.6	0.9	0.7	0.6	0.5
LnGrp Delay(d),s/veh	26.2	14.1	16.5	29.5	0.0	13.8	27.7	17.0	16.3	25.9	18.6	18.5
LnGrp LOS	C	B	B	C		B	C	B	B	C	B	B
Approach Vol, veh/h	753			213			376			142		
Approach Delay, s/veh	17.6			20.7			21.4			21.1		
Approach LOS	B			C			C			C		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.7	12.4	7.9	17.2	9.7	9.5	9.4	15.7				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	6.3	20.2	7.1	18.4	7.5	19.0	7.5	18.0				
Max Q Clear Time (g_c+I1), s	3.2	5.0	4.6	10.2	6.0	3.2	5.7	4.7				
Green Ext Time (p_c), s	0.0	1.2	0.0	2.3	0.1	1.3	0.1	3.0				
Intersection Summary												
HCM 2010 Ctrl Delay	19.3											
HCM 2010 LOS	B											

HCM 2010 Signalized Intersection Summary
 9: Oak Avenue/San Antonio Dr & Bitterwater Rd

Cumulative Plus Project AM
 With Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	443	12	66	143	17	21	105	239	25	47	4
Future Volume (veh/h)	35	443	12	66	143	17	21	105	239	25	47	4
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1652	1657	1900	1863	1439	1900	1900	1863	1863	1900	1789	1667
Adj Flow Rate, veh/h	39	492	13	73	159	19	23	117	266	28	52	4
Adj No. of Lanes	1	1	0	1	1	0	0	1	1	0	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	15	15	15	2	32	32	2	2	2	2	2	14
Cap, veh/h	68	619	16	119	516	62	130	396	376	189	280	337
Arrive On Green	0.04	0.39	0.39	0.07	0.41	0.41	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	1573	1607	42	1774	1262	151	141	1667	1583	326	1179	1417
Grp Volume(v), veh/h	39	0	505	73	0	178	140	0	266	80	0	4
Grp Sat Flow(s),veh/h/ln	1573	0	1649	1774	0	1413	1808	0	1583	1505	0	1417
Q Serve(g_s), s	1.1	0.0	11.8	1.7	0.0	3.7	0.0	0.0	6.7	0.0	0.0	0.1
Cycle Q Clear(g_c), s	1.1	0.0	11.8	1.7	0.0	3.7	2.7	0.0	6.7	1.6	0.0	0.1
Prop In Lane	1.00		0.03	1.00		0.11	0.16		1.00	0.35		1.00
Lane Grp Cap(c), veh/h	68	0	635	119	0	578	526	0	376	469	0	337
V/C Ratio(X)	0.57	0.00	0.80	0.61	0.00	0.31	0.27	0.00	0.71	0.17	0.00	0.01
Avail Cap(c_a), veh/h	228	0	860	208	0	697	862	0	680	732	0	608
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.4	0.0	11.9	19.8	0.0	8.7	13.7	0.0	15.2	13.2	0.0	12.7
Incr Delay (d2), s/veh	7.4	0.0	3.7	5.0	0.0	0.3	0.3	0.0	2.4	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	6.0	1.0	0.0	1.5	1.4	0.0	3.2	0.8	0.0	0.0
LnGrp Delay(d),s/veh	27.9	0.0	15.6	24.7	0.0	9.0	14.0	0.0	17.7	13.4	0.0	12.7
LnGrp LOS	C		B	C		A	B		B	B		B
Approach Vol, veh/h	544		251				406				84	
Approach Delay, s/veh	16.5		13.6				16.4				13.4	
Approach LOS	B		B				B				B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2		3	4	6		7	8				
Phs Duration (G+Y+Rc), s	14.8		7.4	21.3	14.8		6.4	22.3				
Change Period (Y+Rc), s	4.5		4.5	4.5	4.5		4.5	4.5				
Max Green Setting (Gmax), s	18.7		5.1	22.7	18.7		6.3	21.5				
Max Q Clear Time (g_c+I1), s	8.7		3.7	13.8	3.6		3.1	5.7				
Green Ext Time (p_c), s	1.6		0.0	2.9	2.0		0.0	4.0				
Intersection Summary												
HCM 2010 Ctrl Delay	15.7											
HCM 2010 LOS	B											

HCM 2010 Signalized Intersection Summary
3: First St & SB US 101 Ramps

Cumulative Plus Project PM
With Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	499	1	50	0	0	0	0	90	20	469	49	0
Future Volume (veh/h)	499	1	50	0	0	0	0	90	20	469	49	0
Number	7	4	14				5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1792	1900				0	1792	1792	1900	1792	0
Adj Flow Rate, veh/h	542	1	54				0	98	22	510	53	0
Adj No. of Lanes	1	1	0				0	1	1	0	1	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	6	6				0	6	6	6	6	0
Cap, veh/h	596	10	524				0	157	133	570	59	0
Arrive On Green	0.35	0.35	0.35				0.00	0.09	0.09	0.37	0.37	0.00
Sat Flow, veh/h	1707	28	1500				0	1792	1524	1553	161	0
Grp Volume(v), veh/h	542	0	55				0	98	22	563	0	0
Grp Sat Flow(s),veh/h/ln	1707	0	1528				0	1792	1524	1715	0	0
Q Serve(g_s), s	20.8	0.0	1.7				0.0	3.6	0.9	21.3	0.0	0.0
Cycle Q Clear(g_c), s	20.8	0.0	1.7				0.0	3.6	0.9	21.3	0.0	0.0
Prop In Lane	1.00		0.98				0.00		1.00	0.91		0.00
Lane Grp Cap(c), veh/h	596	0	534				0	157	133	629	0	0
V/C Ratio(X)	0.91	0.00	0.10				0.00	0.63	0.17	0.89	0.00	0.00
Avail Cap(c_a), veh/h	707	0	633				0	482	410	735	0	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00				0.00	1.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	21.3	0.0	15.1				0.0	30.3	29.1	20.5	0.0	0.0
Incr Delay (d2), s/veh	14.2	0.0	0.1				0.0	4.0	0.6	12.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.1	0.0	0.7				0.0	2.0	0.4	12.1	0.0	0.0
LnGrp Delay(d),s/veh	35.5	0.0	15.2				0.0	34.3	29.6	32.7	0.0	0.0
LnGrp LOS	D		B					C	C	C		
Approach Vol, veh/h		597						120			563	
Approach Delay, s/veh		33.7						33.5			32.7	
Approach LOS		C						C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		10.5		28.5		29.8						
Change Period (Y+Rc), s		4.5		4.5		4.5						
Max Green Setting (Gmax), s		18.5		28.5		29.5						
Max Q Clear Time (g_c+l1), s		5.6		22.8		23.3						
Green Ext Time (p_c), s		0.4		1.2		2.0						
Intersection Summary												
HCM 2010 Ctrl Delay			33.2									
HCM 2010 LOS			C									

HCM 2010 TWSC
4: First St & NB US 101 Ramps

Cumulative Plus Project PM
With Improvements

Intersection												
Int Delay, s/veh		0.9										
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations						↔	↔	↑	↑			
Traffic Vol, veh/h	0	0	0	20	1	426	40	549	0	0	496	731
Future Vol, veh/h	0	0	0	20	1	426	40	549	0	0	496	731
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	Free
Storage Length	-	-	-	-	-	50	-	-	-	-	-	0
Veh in Median Storage, #	-	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	0	0	0	23	1	484	45	624	0	0	564	831
Major/Minor				Minor1			Major1			Major2		
Conflicting Flow All				1279	1279	-	564	0	-	-	-	0
Stage 1				715	715	-	-	-	-	-	-	-
Stage 2				564	564	-	-	-	-	-	-	-
Critical Hdwy				6.46	6.56	-	4.16	-	-	-	-	-
Critical Hdwy Stg 1				5.46	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2				5.46	5.56	-	-	-	-	-	-	-
Follow-up Hdwy				3.554	4.054	-	2.254	-	-	-	-	-
Pot Cap-1 Maneuver				180	163	0	988	-	0	0	-	0
Stage 1				477	429	0	-	-	0	0	-	0
Stage 2				562	502	0	-	-	0	0	-	0
Platoon blocked, %								-			-	
Mov Cap-1 Maneuver				167	0	-	988	-	-	-	-	-
Mov Cap-2 Maneuver				167	0	-	-	-	-	-	-	-
Stage 1				444	0	-	-	-	-	-	-	-
Stage 2				562	0	-	-	-	-	-	-	-
Approach				WB			NB			SB		
HCM Control Delay, s				30.1			0.6			0		
HCM LOS				D								
Minor Lane/Major Mvmt	NBL	NBT	WBLn1	WBLn2	SBT							
Capacity (veh/h)	988	-	167	-	-							
HCM Lane V/C Ratio	0.046	-	0.143	-	-							
HCM Control Delay (s)	8.8	-	30.1	0	-							
HCM Lane LOS	A	-	D	A	-							
HCM 95th %tile O(veh)	0.1	-	0.5	-	-							

HCM 2010 Signalized Intersection Summary

5: First St & Private Dwy/Lonoak Rd

Cumulative Plus Project PM
With Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	1	1	449	1	117	3	609	293	26	596	2
Future Volume (veh/h)	1	1	1	449	1	117	3	609	293	26	596	2
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1792	1792	1900	1743	1743	1743	1776	1776	1900
Adj Flow Rate, veh/h	1	1	1	334	273	138	4	716	345	31	701	2
Adj No. of Lanes	0	1	0	1	1	0	1	2	1	1	2	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
Percent Heavy Veh, %	2	2	2	6	6	6	9	9	9	7	7	7
Cap, veh/h	2	2	2	506	333	168	9	1062	913	59	1207	3
Arrive On Green	0.00	0.00	0.00	0.30	0.30	0.30	0.01	0.32	0.32	0.03	0.35	0.35
Sat Flow, veh/h	577	577	577	1707	1124	568	1660	3312	1479	1691	3451	10
Grp Volume(v), veh/h	3	0	0	334	0	411	4	716	345	31	343	360
Grp Sat Flow(s),veh/h/ln	1730	0	0	1707	0	1692	1660	1656	1479	1691	1687	1774
Q Serve(g_s), s	0.1	0.0	0.0	8.9	0.0	11.8	0.1	9.8	6.1	0.9	8.7	8.7
Cycle Q Clear(g_c), s	0.1	0.0	0.0	8.9	0.0	11.8	0.1	9.8	6.1	0.9	8.7	8.7
Prop In Lane	0.33		0.33	1.00		0.34	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	7	0	0	506	0	501	9	1062	913	59	590	621
V/C Ratio(X)	0.43	0.00	0.00	0.66	0.00	0.82	0.45	0.67	0.38	0.53	0.58	0.58
Avail Cap(c_a), veh/h	166	0	0	604	0	599	159	1172	963	162	597	628
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.0	0.0	0.0	16.1	0.0	17.1	25.9	15.4	5.0	24.8	13.9	13.9
Incr Delay (d2), s/veh	35.8	0.0	0.0	2.0	0.0	7.6	31.1	1.4	0.3	7.2	1.4	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	4.5	0.0	6.5	0.1	4.7	4.5	0.6	4.2	4.4
LnGrp Delay(d),s/veh	61.8	0.0	0.0	18.1	0.0	24.7	57.0	16.7	5.3	32.0	15.3	15.2
LnGrp LOS	E			B		C	E	B	A	C	B	B
Approach Vol, veh/h	3			745			1065			734		
Approach Delay, s/veh	61.8			21.8			13.2			15.9		
Approach LOS	E			C			B			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	4		5	6	8					
Phs Duration (G+Y+Rc), s	6.3	21.3	4.7		4.8	22.8	20.0					
Change Period (Y+Rc), s	4.5	4.5	4.5		4.5	4.5	4.5					
Max Green Setting (Gmax), s	5.0	18.5	5.0		5.0	18.5	18.5					
Max Q Clear Time (g_c+I1), s	2.9	11.8	2.1		2.1	10.7	13.8					
Green Ext Time (p_c), s	0.0	4.9	0.0		0.0	5.6	1.7					
Intersection Summary												
HCM 2010 Ctrl Delay	16.5											
HCM 2010 LOS	B											
Notes												
User approved volume balancing among the lanes for turning movement.												

HCM 2010 Signalized Intersection Summary
6: First St & Broadway St

Cumulative Plus Project PM
With Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	139	197	160	82	180	22	158	411	107	25	471	250
Future Volume (veh/h)	139	197	160	82	180	22	158	411	107	25	471	250
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1827	1847	1900	1863	1863	1900	1759	1759	1863	1863	1810	1810
Adj Flow Rate, veh/h	164	232	0	96	212	26	186	484	126	29	554	294
Adj No. of Lanes	1	1	0	1	1	0	1	1	1	1	1	1
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
Percent Heavy Veh, %	4	2	2	2	2	2	8	8	2	2	5	5
Cap, veh/h	212	414	0	123	280	34	222	765	686	54	602	510
Arrive On Green	0.12	0.22	0.00	0.07	0.17	0.17	0.13	0.43	0.43	0.03	0.33	0.33
Sat Flow, veh/h	1740	1847	0	1774	1628	200	1675	1759	1578	1774	1810	1531
Grp Volume(v), veh/h	164	232	0	96	0	238	186	484	126	29	554	294
Grp Sat Flow(s),veh/h/ln	1740	1847	0	1774	0	1828	1675	1759	1578	1774	1810	1531
Q Serve(g_s), s	6.8	8.3	0.0	4.0	0.0	9.3	8.1	16.0	3.7	1.2	22.0	11.8
Cycle Q Clear(g_c), s	6.8	8.3	0.0	4.0	0.0	9.3	8.1	16.0	3.7	1.2	22.0	11.8
Prop In Lane	1.00		0.00	1.00		0.11	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	212	414	0	123	0	314	222	765	686	54	602	510
V/C Ratio(X)	0.77	0.56	0.00	0.78	0.00	0.76	0.84	0.63	0.18	0.54	0.92	0.58
Avail Cap(c_a), veh/h	419	700	0	183	0	441	224	765	686	119	630	533
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.8	25.7	0.0	34.2	0.0	29.4	31.6	16.5	13.0	35.7	24.0	20.6
Incr Delay (d2), s/veh	5.9	1.2	0.0	11.8	0.0	4.8	23.4	1.7	0.1	8.2	18.4	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	4.4	0.0	2.3	0.0	5.1	5.2	8.0	1.6	0.7	14.0	5.2
LnGrp Delay(d),s/veh	37.7	26.9	0.0	45.9	0.0	34.2	55.1	18.2	13.1	43.9	42.4	22.0
LnGrp LOS	D	C		D		C	E	B	B	D	D	C
Approach Vol, veh/h	396				334				796			
Approach Delay, s/veh	31.4				37.6				26.0			
Approach LOS	C				D				C			
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.8	37.0	9.7	21.3	14.4	29.3	13.6	17.3				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	31.0	7.7	28.3	10.0	26.0	18.0	18.0				
Max Q Clear Time (g_c+I1), s	3.2	18.0	6.0	10.3	10.1	24.0	8.8	11.3				
Green Ext Time (p_c), s	0.0	6.8	0.0	2.6	0.0	0.9	0.3	1.5				
Intersection Summary												
HCM 2010 Ctrl Delay			32.0									
HCM 2010 LOS			C									

HCM 2010 Signalized Intersection Summary
7: Bitterwater Rd & Metz Rd

Cumulative Plus Project PM
With Improvements

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	189	323	488	230	116	215		
Future Volume (veh/h)	189	323	488	230	116	215		
Number	7	4	8	18	1	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1638	1638	1759	1759	1776	1776		
Adj Flow Rate, veh/h	215	367	555	261	132	244		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88		
Percent Heavy Veh, %	16	16	8	8	7	7		
Cap, veh/h	253	965	632	537	468	417		
Arrive On Green	0.16	0.59	0.36	0.36	0.28	0.28		
Sat Flow, veh/h	1560	1638	1759	1493	1691	1509		
Grp Volume(v), veh/h	215	367	555	261	132	244		
Grp Sat Flow(s),veh/h/ln	1560	1638	1759	1493	1691	1509		
Q Serve(g_s), s	9.0	7.9	19.7	9.1	4.1	9.3		
Cycle Q Clear(g_c), s	9.0	7.9	19.7	9.1	4.1	9.3		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	253	965	632	537	468	417		
V/C Ratio(X)	0.85	0.38	0.88	0.49	0.28	0.58		
Avail Cap(c_a), veh/h	292	1041	671	569	468	417		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	27.2	7.3	20.1	16.6	19.0	20.9		
Incr Delay (d2), s/veh	18.5	0.2	12.2	0.7	1.5	5.9		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	5.1	3.6	11.7	3.8	2.1	8.4		
LnGrp Delay(d),s/veh	45.8	7.5	32.3	17.3	20.5	26.8		
LnGrp LOS	D	A	C	B	C	C		
Approach Vol, veh/h		582	816		376			
Approach Delay, s/veh		21.7	27.5		24.6			
Approach LOS		C	C		C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				43.9		23.0	15.4	28.5
Change Period (Y+Rc), s				4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s				42.5		18.5	12.5	25.5
Max Q Clear Time (g_c+I1), s				9.9		11.3	11.0	21.7
Green Ext Time (p_c), s				8.4		0.8	0.1	2.3
Intersection Summary								
HCM 2010 Ctrl Delay			25.0					
HCM 2010 LOS			C					

HCM 2010 Signalized Intersection Summary
8: Metz Rd & San Antonio Dr

Cumulative Plus Project PM
With Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	253	155	68	240	40	284	62	31	41	115	137
Future Volume (veh/h)	40	253	155	68	240	40	284	62	31	41	115	137
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1810	1810	1810	1845	1845	1900	1776	1776	1776	1845	1845	1845
Adj Flow Rate, veh/h	47	298	182	80	282	47	334	73	36	48	135	161
Adj No. of Lanes	1	1	1	1	1	0	1	1	1	1	1	1
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
Percent Heavy Veh, %	5	5	5	3	3	3	7	7	7	3	3	3
Cap, veh/h	79	424	358	109	387	64	393	619	525	81	300	253
Arrive On Green	0.05	0.23	0.23	0.06	0.25	0.25	0.23	0.35	0.35	0.05	0.16	0.16
Sat Flow, veh/h	1723	1810	1528	1757	1541	257	1691	1776	1505	1757	1845	1554
Grp Volume(v), veh/h	47	298	182	80	0	329	334	73	36	48	135	161
Grp Sat Flow(s),veh/h/ln	1723	1810	1528	1757	0	1798	1691	1776	1505	1757	1845	1554
Q Serve(g_s), s	1.6	8.8	6.0	2.6	0.0	9.8	11.0	1.6	0.9	1.6	3.9	5.6
Cycle Q Clear(g_c), s	1.6	8.8	6.0	2.6	0.0	9.8	11.0	1.6	0.9	1.6	3.9	5.6
Prop In Lane	1.00		1.00	1.00		0.14	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	79	424	358	109	0	451	393	619	525	81	300	253
V/C Ratio(X)	0.60	0.70	0.51	0.73	0.00	0.73	0.85	0.12	0.07	0.59	0.45	0.64
Avail Cap(c_a), veh/h	148	558	471	166	0	570	565	974	826	196	601	506
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.3	20.5	19.4	26.9	0.0	20.0	21.4	12.9	12.7	27.3	22.1	22.8
Incr Delay (d2), s/veh	7.0	2.6	1.1	9.0	0.0	3.5	8.3	0.1	0.1	6.6	1.1	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	4.7	2.6	1.5	0.0	5.3	6.0	0.8	0.4	0.9	2.0	2.6
LnGrp Delay(d),s/veh	34.4	23.1	20.5	35.9	0.0	23.6	29.8	13.0	12.7	33.9	23.1	25.5
LnGrp LOS	C	C	C	D		C	C	B	B	C	C	C
Approach Vol, veh/h	527				409				443			
Approach Delay, s/veh	23.2				26.0				25.6			
Approach LOS	C				C				C			
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.2	24.8	8.1	18.2	18.1	14.0	7.2	19.1				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	6.5	32.0	5.5	18.0	19.5	19.0	5.0	18.5				
Max Q Clear Time (g_c+I1), s	3.6	3.6	4.6	10.8	13.0	7.6	3.6	11.8				
Green Ext Time (p_c), s	0.0	1.9	0.0	2.6	0.6	1.4	0.0	2.5				
Intersection Summary												
HCM 2010 Ctrl Delay	25.0											
HCM 2010 LOS	C											

HCM 2010 Signalized Intersection Summary
9: Oak Avenue/San Antonio Dr & Bitterwater Rd

Cumulative Plus Project PM
With Improvements

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	230	33	254	519	45	27	78	91	22	126	41
Future Volume (veh/h)	18	230	33	254	519	45	27	78	91	22	126	41
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1508	1545	1900	1863	1776	1900	1900	1863	1863	1900	1852	1792
Adj Flow Rate, veh/h	22	288	41	318	649	56	34	98	114	28	158	51
Adj No. of Lanes	1	1	0	1	1	0	0	1	1	0	1	1
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	26	26	26	2	7	7	2	2	2	2	2	6
Cap, veh/h	36	385	55	365	761	66	94	215	429	81	298	412
Arrive On Green	0.03	0.29	0.29	0.21	0.47	0.47	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1436	1322	188	1774	1612	139	61	793	1583	38	1101	1524
Grp Volume(v), veh/h	22	0	329	318	0	705	132	0	114	186	0	51
Grp Sat Flow(s),veh/h/ln	1436	0	1510	1774	0	1751	854	0	1583	1139	0	1524
Q Serve(g_s), s	0.9	0.0	11.5	10.1	0.0	20.7	0.7	0.0	3.3	0.7	0.0	1.5
Cycle Q Clear(g_c), s	0.9	0.0	11.5	10.1	0.0	20.7	14.2	0.0	3.3	14.2	0.0	1.5
Prop In Lane	1.00		0.12	1.00		0.08	0.26		1.00	0.15		1.00
Lane Grp Cap(c), veh/h	36	0	440	365	0	826	309	0	429	379	0	412
V/C Ratio(X)	0.61	0.00	0.75	0.87	0.00	0.85	0.43	0.00	0.27	0.49	0.00	0.12
Avail Cap(c_a), veh/h	123	0	519	412	0	857	371	0	490	445	0	471
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.1	0.0	18.7	22.4	0.0	13.6	17.3	0.0	16.7	17.5	0.0	16.0
Incr Delay (d2), s/veh	15.2	0.0	4.9	16.6	0.0	8.1	0.9	0.0	0.3	1.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	5.4	6.6	0.0	11.7	1.7	0.0	1.5	2.5	0.0	0.6
LnGrp Delay(d),s/veh	43.2	0.0	23.6	39.0	0.0	21.7	18.2	0.0	17.0	18.5	0.0	16.1
LnGrp LOS	D		C	D		C	B		B	B		B
Approach Vol, veh/h	351		1023				246			237		
Approach Delay, s/veh	24.8		27.1				17.7			18.0		
Approach LOS	C		C				B			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2		3	4	6		7	8				
Phs Duration (G+Y+Rc), s	20.7		16.6	21.5	20.7		6.0	32.1				
Change Period (Y+Rc), s	4.5		4.5	4.5	4.5		4.5	4.5				
Max Green Setting (Gmax), s	18.0		13.5	20.0	18.0		5.0	28.5				
Max Q Clear Time (g_c+I1), s	16.2		12.1	13.5	16.2		2.9	22.7				
Green Ext Time (p_c), s	0.5		0.2	3.6	0.5		0.0	3.3				
Intersection Summary												
HCM 2010 Ctrl Delay			24.2									
HCM 2010 LOS			C									

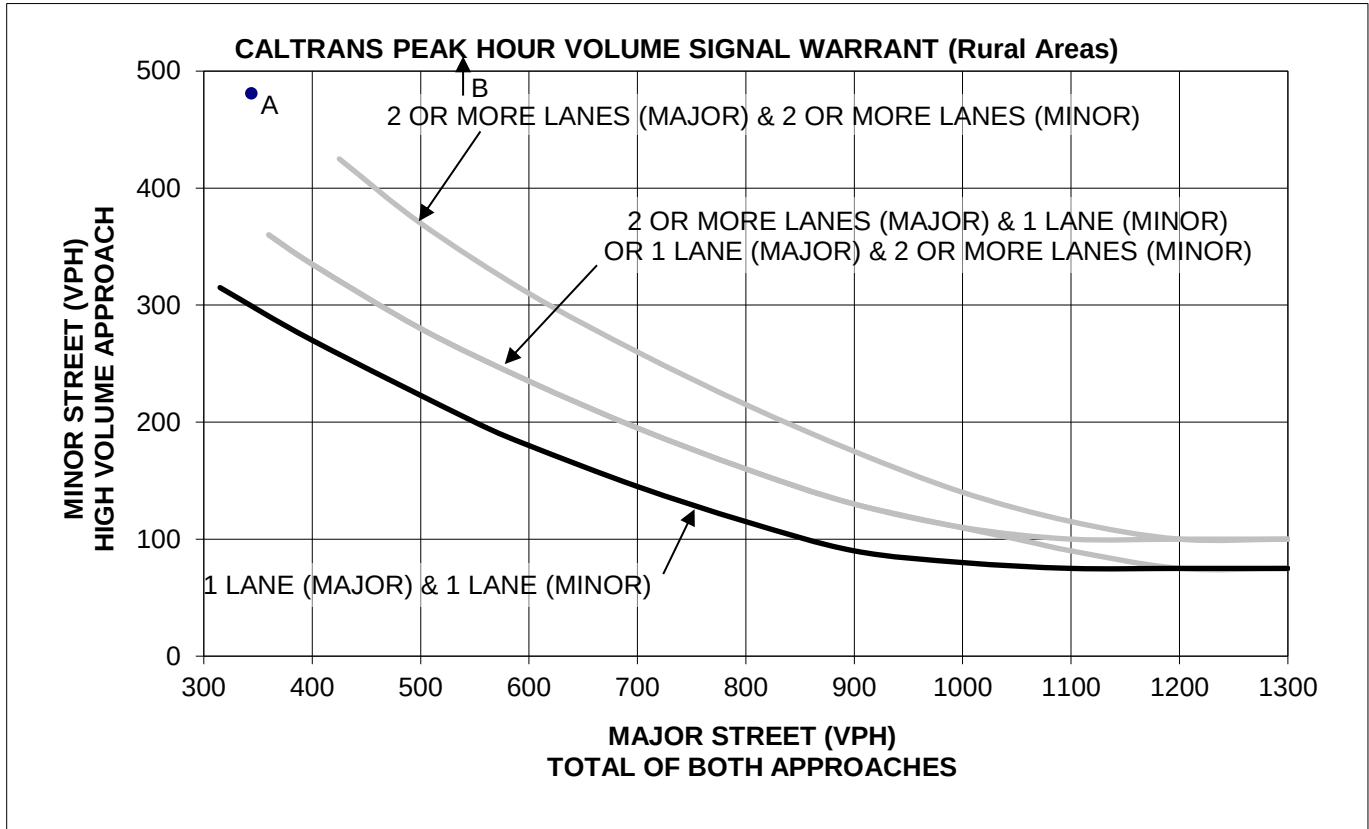
Appendix J

Warrant
Worksheets

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Warrant 3A - Peak Hour Warrant

Intersection #3 - First Street / US 101 Southbound Ramps



Scenario	First	SB US 101	Warrant
	North/South	East/West	Met?
A. Cum+Pro AM	344	481	Yes
B. Cum+Pro PM	627	555	Yes

Notes:

- 100 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 75 VPH applies as the lower threshold volume for a minor street approaching with one lane.
- Bold line applies to intersection geometry.
- Northbound and Westbound right turn movement have been excluded from this analysis, as they are free right turns and would not be controlled by a potential signal at this location.

**Warrant 3 (Part B) - Peak Hour Delay
#3 - First Street / US 101 Southbound Ramps**

Number of Approaches to Intersection:

Total Entering Volumes:

Minimum Entering Vehicles: 800

Cum+Pro AM
Cum+Pro PM
4 approaches
825 vehicles
1,182 vehicles

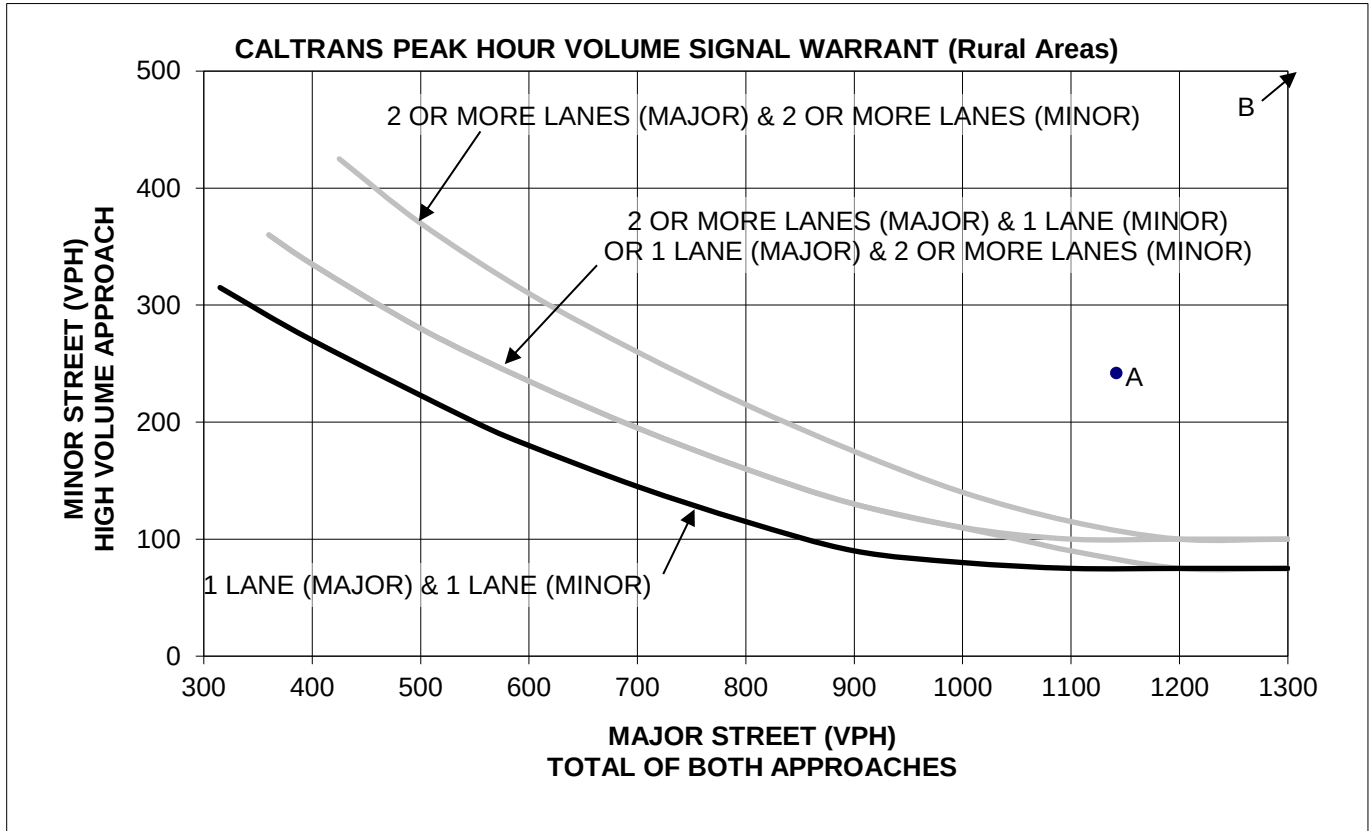
Street	Direction	Scenario	Peak Hour	No. of Stopped Vehicles	Average Vehicle Delay (sec)	Total Vehicle Delay (sec)	Total Delay (hours)	Min. 4 Veh-Hrs of Delay? (Approach)	At least 100 Veh? (Approach)	At least 800 Veh? (Intersection)	Warrant Met?
US 101 SB Ramps	EB	Cum+Pro	AM	481	439.4	211,351	58.71	Yes	Yes	Yes	Yes
US 101 SB Ramps	EB	Cum+Pro	PM	555	2018.6	1,120,323	311.20	Yes	Yes	Yes	Yes

Notes:

1. Warrant based on level of service calculations.
2. NB, SB, EB, WB = Northbound, Southbound, Eastbound, Westbound.
3. Cum+Pro = Cumulative Plus Project

Warrant 3A - Peak Hour Warrant

Intersection #5 - First Street / Lonoak Road



Scenario	First	Lonoak	Warrant
	North/South	East/West	Met?
A. Cum+Pro AM	1142	242	Yes
B. Cum+Pro PM	1536	575	Yes

Notes:

- 100 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 75 VPH applies as the lower threshold volume for a minor street approaching with one lane.
- Bold line applies to intersection geometry.
- Northbound and Westbound right turn movement have been excluded from this analysis, as they are free right turns and would not be controlled by a potential signal at this location.

**Warrant 3 (Part B) - Peak Hour Delay
#5 - First Street / Lonoak Road**

Number of Approaches to Intersection:
Total Entering Volumes:

Cum+Pro AM: 4 approaches
Cum+Pro PM: 1,387 vehicles
Minimum Entering Vehicles: 800
2,114 vehicles

Street	Direction	Scenario	Peak Hour	No. of Stopped Vehicles	Average Vehicle Delay (sec)	Total Vehicle Delay (sec)	Total Delay (hours)	Min. 4 Veh-Hrs of Delay? (Approach)	At least 100 Veh? (Approach)	At least 800 Veh? (Intersection)	Warrant Met?
Private Dwy	EB	Cum+Pro	AM	3	28.8	86	0.02	NO	NO	Yes	NO
Lonoak Road	WB	Cum+Pro	AM	242	683.9	165,504	45.97	Yes	Yes	Yes	Yes
Private Dwy	EB	Cum+Pro	PM	3	60.8	182	0.05	NO	NO	NO	NO
Lonoak Road	WB	Cum+Pro	PM	575	3360.5	1,932,288	536.75	Yes	Yes	NO	Yes

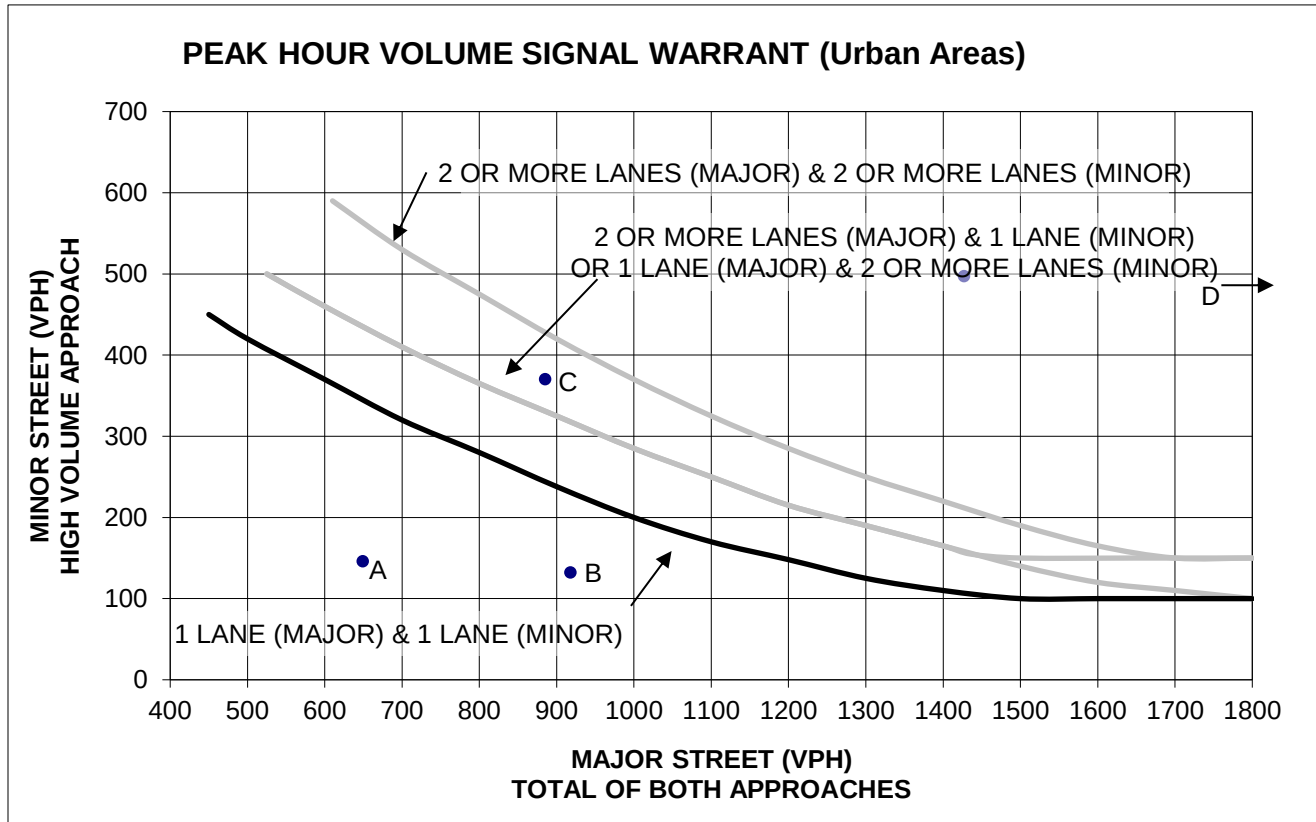
Notes:

1. Warrant based on level of service calculations.
2. NB, SB, EB, WB = Northbound, Southbound, Eastbound, Westbound.
3. Cum+Pro = Cumulative Plus Project

Warrant 3A - Peak Hour Warrant

Intersection #6 -

First Street / Broadway Street



Scenario	First	Broadway	Warrant
	North/South	East/West	Met?
A. Bkgnd+Pro AM	649	146	No
B. Bkgnd+Pro PM	918	132	No
C. Cum+Pro AM	885	370	Yes
D. Cum+Pro PM	1427	497	Yes

Notes:

1. 150 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 100 VPH applies as the lower threshold volume for a minor street approaching with one lane.
2. Bold line applies to intersection geometry.

**Warrant 3 (Part B) - Peak Hour Delay
#6 - First Street / Broadway Street**

Number of Approaches to Intersection:

Bkgnd+Pro AM:
Bkgnd+Pro PM:

3 approaches
795 vehicles
1,050 vehicles

Minimum Entering Vehicles:

650 vehicles

Total Entering Volumes:

Street	Direction	Scenario	Peak Hour	No. of Stopped Vehicles	Average Vehicle Delay (sec)	Total Vehicle Delay (sec)	Total Delay (hours)	Min. 4 Veh-Hrs of Delay? (Approach)	At least 100 Veh? (Approach)	At least 650 Veh? (Intersection)	Warrant Met?
First	NB	Bkgnd+Pro	AM	139	32.2	4,475.8	1.24	NO	Yes	Yes	NO
First	SB	Bkgnd+Pro	AM	231	16.6	3,834.6	1.07	NO	Yes	Yes	NO
Broadway	EB	Bkgnd+Pro	AM	146	12.3	1,795.8	0.50	NO	Yes	Yes	NO
First	NB	Bkgnd+Pro	PM	415	15.8	6,557.0	1.82	NO	Yes	Yes	NO
First	SB	Bkgnd+Pro	PM	503	49.7	24,999.1	6.94	Yes	Yes	Yes	Yes
Broadway	EB	Bkgnd+Pro	PM	132	11.4	1,504.8	0.42	NO	Yes	Yes	NO

Notes:

1. Warrant based on level of service calculations.
2. NB, SB, EB, WB = Northbound, Southbound, Eastbound, Westbound.
3. Cum+Pro = Cumulative Plus Project

**Warrant 3 (Part B) - Peak Hour Delay
#6 - First Street / Broadway Street**

Number of Approaches to Intersection:
Total Entering Volumes:

Cum+Pro AM:
Cum+Pro PM:

4 approaches
1,462 vehicles
2,208 vehicles

Minimum Entering Vehicles:

800 vehicles

Street	Direction	Scenario	Peak Hour	No. of Stopped Vehicles	Average Vehicle Delay (sec)	Total Vehicle Delay (sec)	Total Delay (hours)	Min. 4 Veh-Hrs of Delay? (Approach)	At least 100 Veh? (Approach)	At least 800 Veh? (Intersection)	Warrant Met?
First	NB	Cum+Pro	AM	485	139.5	67,657.5	18.79	Yes	Yes	Yes	Yes
First	SB	Cum+Pro	AM	400	192.7	77,080.0	21.41	Yes	Yes	Yes	Yes
Broadway	EB	Cum+Pro	AM	370	61.7	22,829.0	6.34	Yes	Yes	Yes	Yes
Broadway	WB	Cum+Pro	AM	207	52.9	10,950.3	3.04	NO	Yes	Yes	NO
First	NB	Cum+Pro	PM	677	255.5	172,973.5	48.05	Yes	Yes	Yes	Yes
First	SB	Cum+Pro	PM	750	667.4	500,550.0	139.04	Yes	Yes	Yes	Yes
Broadway	EB	Cum+Pro	PM	497	87.4	43,437.8	12.07	Yes	Yes	Yes	Yes
Broadway	WB	Cum+Pro	PM	284	89.4	25,389.6	7.05	Yes	Yes	Yes	Yes

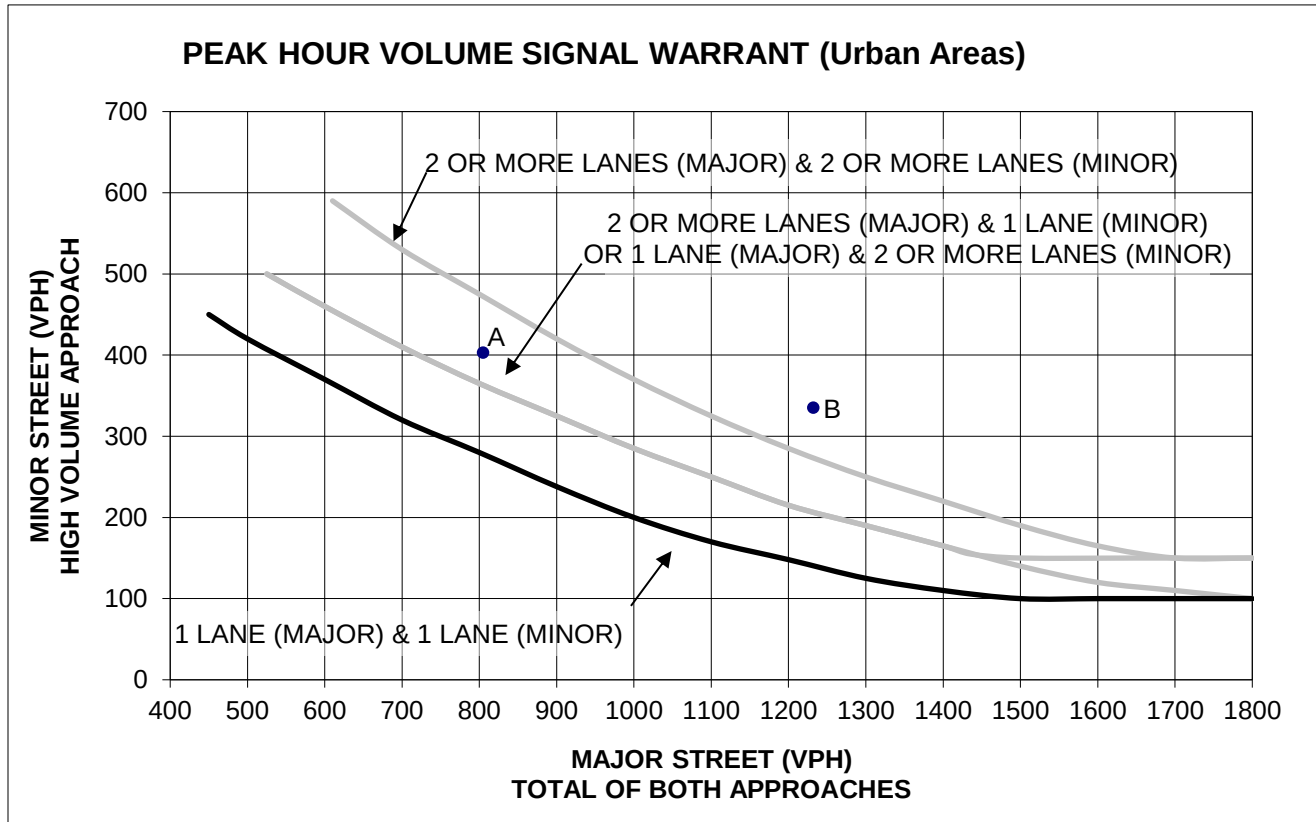
Notes:

1. Warrant based on level of service calculations.
2. NB, SB, EB, WB = Northbound, Southbound, Eastbound, Westbound.
3. Cum+Pro = Cumulative Plus Project

Warrant 3A - Peak Hour Warrant

Intersection #7 -

Metz Road / Bitterwater Road



Scenario	Bitterwater	Metz	Warrant
	East/West	North/South	Met?
A. Cum+Pro AM	805	403	Yes
B. Cum+Pro PM	1232	335	Yes

Notes:

- 150 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 100 VPH applies as the lower threshold volume for a minor street approaching with one lane.
- Bold line applies to intersection geometry.

**Warrant 3 (Part B) - Peak Hour Delay
#7 - Metz Road / Bitterwater Road**

Number of Approaches to Intersection:

Total Entering Volumes:

3 approaches Minimum Entering Vehicles: 650 vehicles
Cum+Pro AM 1,208 vehicles
Cum+Pro AM 1,567 vehicles

Street	Direction	Scenario	Peak Hour	No. of Stopped Vehicles	Average Vehicle Delay (sec)	Total Vehicle Delay (sec)	Total Delay (hours)	Min. 4 Veh-Hrs of Delay? (Approach)	At least 100 Veh? (Approach)	At least 650 Veh? (Intersection)	Warrant Met?
Metz	SB	Cum+Pro	AM	403	146.8	59,160.4	16.43	Yes	Yes	Yes	Yes
Metz	SB	Cum+Pro	PM	335	148.0	49,580.0	13.77	Yes	Yes	Yes	Yes

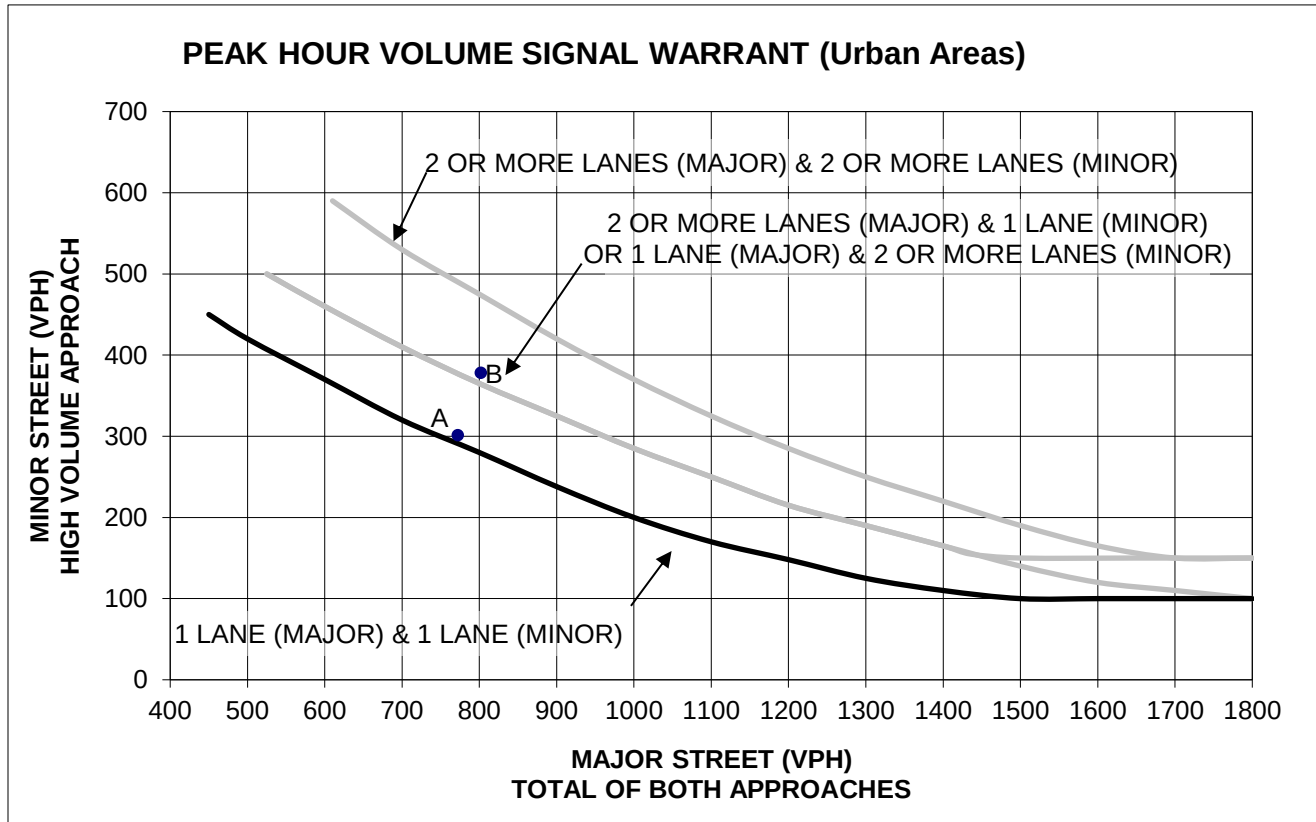
Notes:

1. Warrant based on level of service calculations.
2. NB, SB, EB, WB = Northbound, Southbound, Eastbound, Westbound.
3. Cum+Pro = Cumulative Plus Project

Warrant 3A - Peak Hour Warrant

Intersection #8 -

Metz Road / San Antonio Drive



Scenario	San Antonio	Metz	Warrant
	East/West	North/South	Met?
A. Cum+Pro AM	772	301	Yes
B. Cum+Pro PM	802	378	Yes

Notes:

- 150 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 100 VPH applies as the lower threshold volume for a minor street approaching with one lane.
- Bold line applies to intersection geometry.

**Warrant 3 (Part B) - Peak Hour Delay
#8 - Metz Road / San Antonio Drive**

Number of Approaches to Intersection:
Total Entering Volumes:

4 approaches Minimum Entering Vehicles: 800 vehicles
Cum+Pro AM: 1,186 vehicles
Cum+Pro PM: 1,474 vehicles

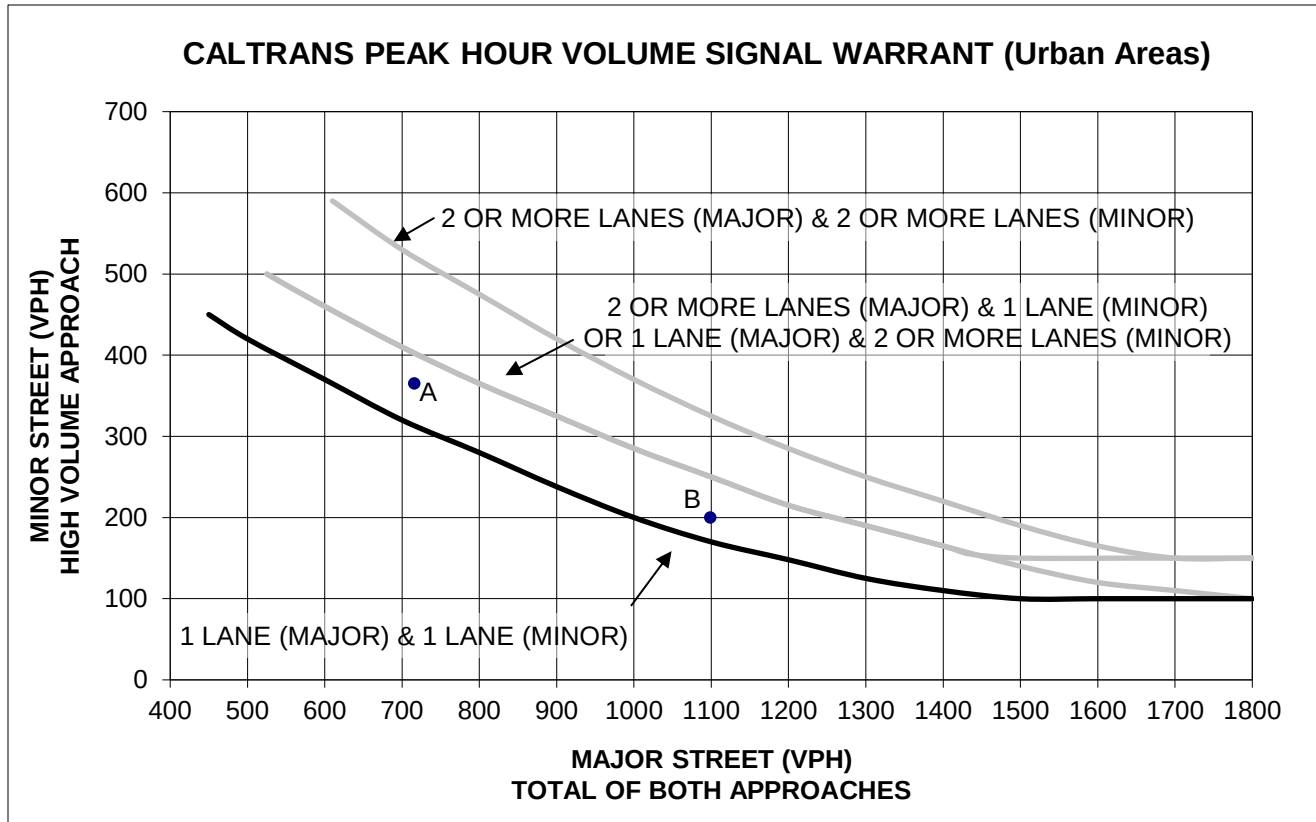
Street	Direction	Scenario	Peak Hour	No. of Stopped Vehicles	Average Vehicle Delay (sec)	Total Vehicle Delay (sec)	Total Delay (hours)	Min. 4 Veh-Hrs of Delay? (Approach)	At least 100 Veh? (Approach)	At least 800 Veh? (Intersection)	Warrant Met?
Metz	NB	Cum+Pro	AM	301	136.9	41,206.9	11.45	Yes	Yes	Yes	Yes
Metz	SB	Cum+Pro	AM	113	86.4	9,763.2	2.71	NO	Yes	Yes	NO
Metz	NB	Cum+Pro	PM	378	1395.5	527,499.0	146.53	Yes	Yes	Yes	Yes
Metz	SB	Cum+Pro	PM	294	32.4	9,525.6	2.65	NO	Yes	Yes	NO

Notes:

1. Warrant based on level of service calculations.
2. NB, SB, EB, WB = Northbound, Southbound, Eastbound, Westbound.
3. Cum+Pro = Cumulative Plus Project

Warrant 3A - Peak Hour Warrant

Intersection #9 - San Antonio Road / Bitterwater Road



Scenario	Bitterwater	San Antonio	Warrant
	East/West	North/South	Met?
A. Cum+Pro AM	716	365	Yes
B. Cum+Pro PM	1099	200	Yes

Notes:

- 150 VPH applies as the lower threshold volume for a minor street approach with two or more lanes and 100 VPH applies as the lower threshold volume for a minor street approaching with one lane.
- Bold line applies to intersection geometry.

**Warrant 3 (Part B) - Peak Hour Delay
#9 - San Antonio Drive / Bitterwater Road**

Number of Approaches to Intersection:

Cum+Pro AM:
Cum+Pro PM:

4 approaches
1,157 vehicles
1,496 vehicles

Minimum Entering Vehicles: 800

Street	Direction	Scenario	Peak Hour	No. of Stopped Vehicles	Average Vehicle Delay (sec)	Total Vehicle Delay (sec)	Total Delay (hours)	Min. 4 Veh-Hrs of Delay? (Approach)	At least 100 Veh? (Approach)	At least 800 Veh? (Intersection)	Warrant Met?
Oak	NB	Cum+Pro	AM	365	94.1	34,347	9.54	Yes	Yes	Yes	Yes
San Antonio	SB	Cum+Pro	PM	76	82.6	6,278	1.74	NO	NO	Yes	NO
Oak	SB	Cum+Pro	AM	200	2500	500,000	138.89	Yes	Yes	NO	Yes
San Antonio	SB	Cum+Pro	PM	197	2500	492,500	136.81	Yes	Yes	NO	Yes

Notes:

1. Warrant based on level of service calculations.
2. NB, SB, EB, WB = Northbound, Southbound, Eastbound, Westbound.
3. Cum+Pro = Cumulative Plus Project
4. Delay exceeds ability to be quantified by analysis software; therefore, delay is assumed to be 2,500 seconds.

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