

Appendix H: **Traffic Impact Assessment**

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May 2018

Final
Transportation Impact Assessment

Lassen Road Residential Project

Prepared for:
WestGate Ventures

Final

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FEHR  PEERS

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Executive Summary

Overview

This report presents the analysis and findings of a Transportation Impact Assessment (TIA) prepared for the Lassen Road Residential Project (project) located in the City of Livermore. The approximately 35-acre site, currently vacant, is located to the west of Springtown Boulevard with access via Lassen Road. The project would develop the site to provide 196 for-sale townhomes including two-bedroom, three-bedroom, and four-bedroom floor plans. All vehicular access to the site would occur via Lassen Road.

The TIA was conducted according to City of Livermore direction, with assumptions regarding project trip generation and distribution, background traffic growth, and thresholds of significance reviewed and confirmed by City staff. Six intersections and two roadway segments were studied.

Summary of Findings

The project is estimated to generate 1,139 daily vehicle trips, 87 AM peak hour vehicle trips, and 102 PM peak hour vehicle trips. Project-generated trips are expected to travel primarily to/from the west on I-580 (35 percent of project trips) and to/from central Livermore (48 percent of project trips) during the peak hours. No significant impacts to peak hour intersection operations or roadway segment capacity are identified in the analysis. Key findings of the analysis include the following:

- For all analysis cases, the intersection of Springtown Boulevard/Lassen Road, which will serve all project trips, is projected to operate at LOS A/B.
- The project traffic will not cause peak hour left turn queues to exceed available storage on northbound Springtown at Lassen nor on southbound Springtown at Bluebell.
- The current peak hour left turn queue spillback that occurs on westbound Bluebell at Springtown is projected to continue in the future, with or without project traffic. It is noted that the current double left turn lane at this intersection could be increased by about 50 feet by using space in the center median.
- The current PM peak hour congestion on northbound Springtown between Bluebell and the I-580 interchange, which is primarily caused by weaving vehicles from the two off-ramps and the large volume of traffic that turns right onto Bluebell, would not be substantially worsened by project traffic, which will not need to make the left-to-right weaving movement.

- Under cumulative conditions, with or without the project, the intersection of Bluebell Drive/Larkspur Drive is projected to operate at LOS F in the PM peak hour for the worst movement (the southbound left turn). This is not a significant project impact. While the cumulative traffic forecasts do not meet the California Manual on Uniform Control Devices peak hour warrant for installation of a traffic signal, the City of Livermore may consider signalization in the future if a full signal warrant evaluation indicates a signal is appropriate.

Site Plan Recommendations

A site plan review was conducted, resulting in the following two recommendations for the site design:

Recommendation 1: Consider providing stop signs and striping stop bars at the following locations:

- The southbound approach of Court A at the intersection of Street A/Court A (east).
- The northbound approach of Street B at the intersection of Street A/Street B (west).
- The northbound approach of Street B at the intersection of Street A/Street B (east).

Recommendation 2: Provide ADA accessible sidewalks along roadways adjacent to residential townhomes and on-street parking. Sidewalks, which are contiguous to a street, should not exceed the grade established for the adjacent street; they are exempt from a 5% grade requirement. Additionally, provide ADA accessible pedestrian paths to the entryway of each residential townhome. Consider providing crosswalks at the intersections of Street A/Court A, Street A/Street B (west), and Street A/Street B (east).

Vehicle Miles Traveled

A preliminary assessment of the VMT generated by the proposed project was prepared for information and disclosure purposes only. No determination on the significance of VMT impacts is made in this document since none is legally required. The assessment indicates that the project has the potential to generate approximately 13,300 vehicle miles of travel per day. The project would generate VMT per capita (residents only) at a level approximately 30 percent more than the existing City-wide average.

1. Introduction

This report presents the analysis and findings of a Transportation Impact Assessment (TIA) prepared for the Lassen Road Residential Project (project) located in the City of Livermore. This chapter discusses the TIA purpose, analysis locations and scenarios, analysis methods, criteria used to identify significant impacts, and report organization.

Study Purpose

The study's purpose is to evaluate the transportation impacts of the Lassen Road Residential Project. The approximately 35-acre site is located to the west of Springtown Boulevard with access via Lassen Road as shown on **Figure 1**. The site is currently vacant. The current General Plan designation for the site includes light industrial, service commercial, and low-intensity agriculture uses. The project would redevelop the site to provide 196 for-sale townhomes including two-bedroom, three-bedroom, and four-bedroom floor plans. All vehicular access to the site would occur via Lassen Road, as shown on **Figure 2**. The internal site circulation would consist of two loop roadways and several connecting roadways and courts.

Analysis Locations and Scenarios

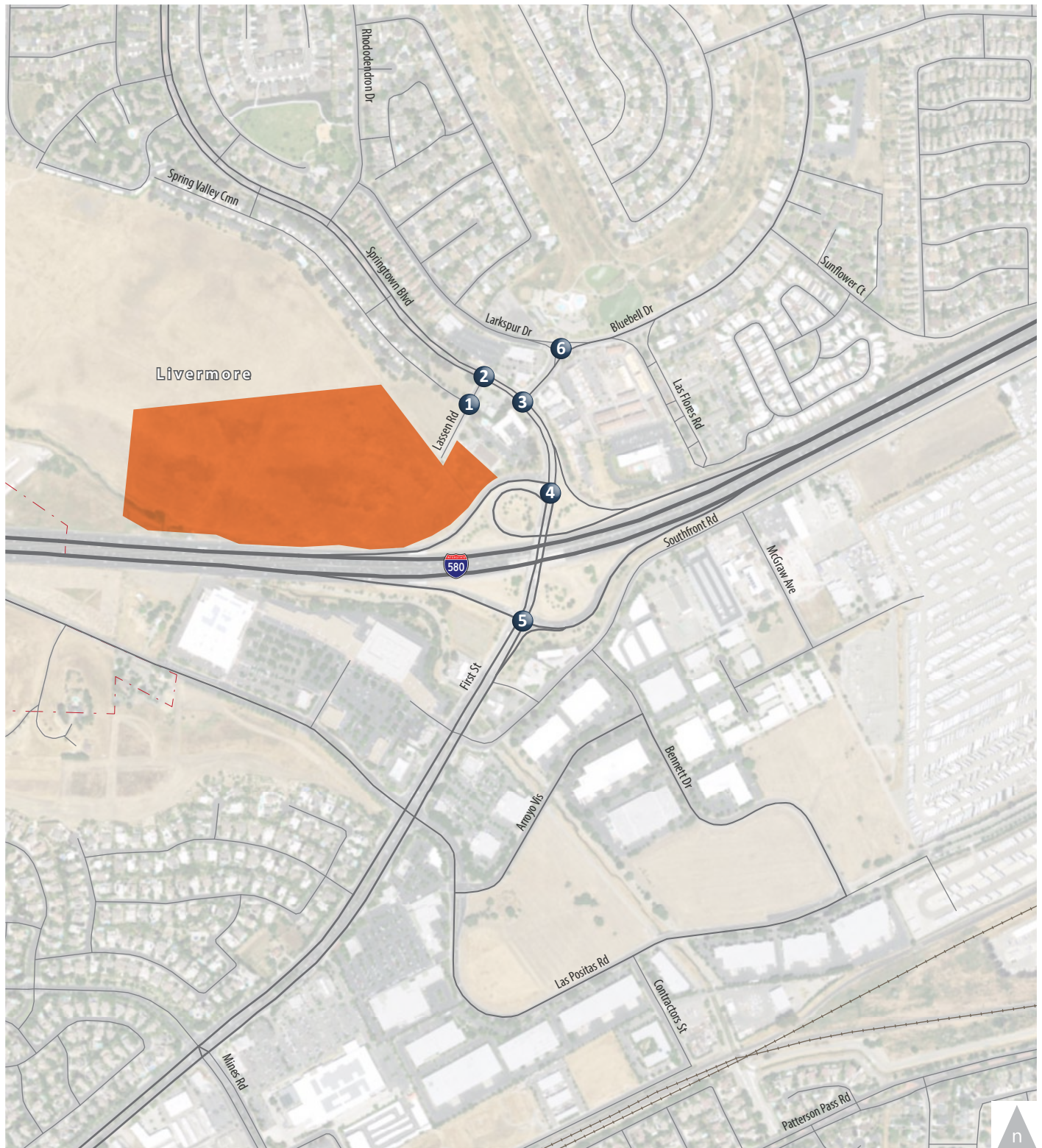
Project impacts on study area roadway facilities were determined by measuring the effect project traffic would have on intersections in the vicinity of the site during the morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak periods, and on roadway segments during a typical 24-hour period. As shown on Figure 1, the following intersections and roadway segments were selected based on a review of the Project location, estimates of the added traffic from the Project, and locations of planned roadways in the area:

Study Intersections

1. Lassen Road/Spring Valley Common
2. Springtown Boulevard/Lassen Road
3. Springtown Boulevard/Bluebell Drive
4. Springtown Boulevard/I-580 Westbound Ramps
5. Springtown Boulevard/I-580 Eastbound Ramps
6. Bluebell Drive/Larkspur Drive

Roadway Segments

1. Springtown Boulevard between Bluebell Drive and I-580 Westbound Ramps
2. Springtown Boulevard between I-580 Westbound Ramps and I-580 Eastbound Ramps



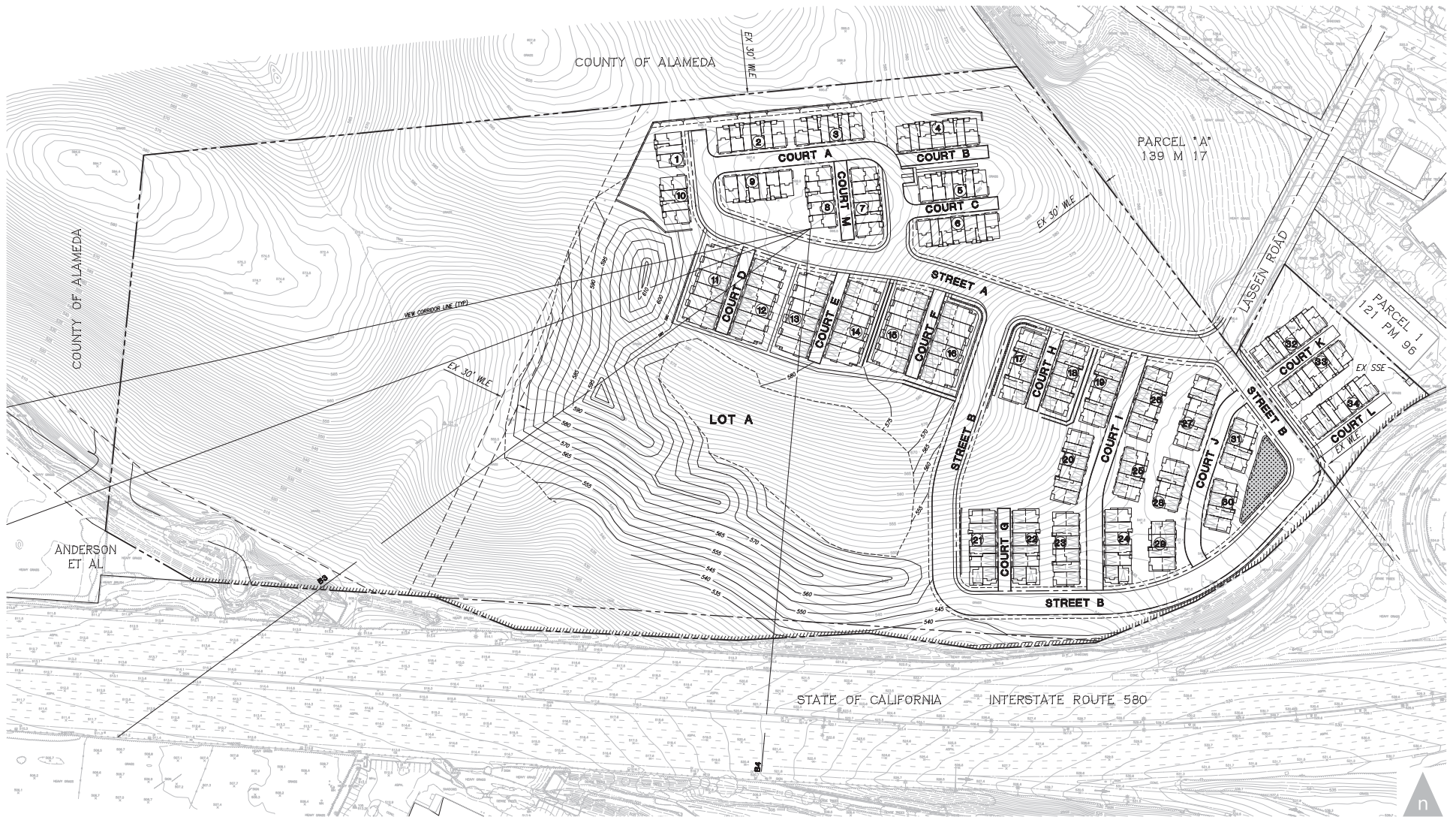
LEGEND

- Project Site
- # Study Intersection



Figure 1

Project Site and Analysis Locations



Site Plan Source: Ruggeri-Jensen-Azar, Nov. 27, 2017.



Figure 2

The following scenarios were evaluated:

- **Existing** – Existing (2017) conditions based on November 2017 traffic counts.
- **Existing Plus Project** – Existing (2017) conditions plus project-related traffic.
- **Existing Plus Approved** – Existing traffic counts plus traffic from approved projects expected to be developed in the next 5 years. Additional details are provided in Chapter 5.
- **Existing Plus Approved Plus Project** – Existing traffic counts plus traffic from approved projects plus project-related traffic.
- **Cumulative** – Forecasts for the cumulative scenario were based on traffic growth trends as described by traffic forecasts for the study area in the 2040 Alameda CTC travel demand model. Additional details are provided in Chapter 6.
- **Cumulative Plus Project** – Future forecast conditions plus project-related traffic.

Analysis Methods

The operations of roadway facilities are described with the term “level of service” (LOS). LOS is a qualitative description of traffic flow from a vehicle driver’s perspective based on factors such as speed, travel time, delay, and freedom to maneuver. Six levels of service are defined ranging from LOS A (free-flow conditions) to LOS F (over capacity conditions). LOS E corresponds to operations “at capacity.” When volumes exceed capacity, stop-and-go conditions result and operations are designated LOS F. The City of Livermore strives to maintain LOS D operations; however, LOS E or F conditions are permitted at select intersections near freeway interchanges.

Signalized Intersections

Traffic conditions at signalized intersections were evaluated using methods developed by the Transportation Research Board (TRB), as documented in the 2010 *Highway Capacity Manual* (2010 HCM) for vehicles. The HCM method calculates control delay at an intersection based on inputs such as traffic volumes, lane geometry, signal phasing and timing, pedestrian crossing times, and peak hour factors. Control delay is defined as the delay directly associated with the traffic signal and specifically includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The relationship between LOS and control delay is summarized in **Table 1**.

Table 1: Signalized Intersection LOS Criteria

Level of Service	Description	Delay in Seconds
A	Progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	< 10.0
B	Progression is good, cycle lengths are short, or both. More vehicles stop than with LOS A, causing higher levels of average delay.	> 10.0 to 20.0
C	Higher congestion may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level, though many still pass through the intersection without stopping.	> 20.0 to 35.0
D	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	> 35.0 to 55.0
E	This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	> 55.0 to 80.0
F	This level is considered unacceptable with oversaturation, which is when arrival flow rates exceed the capacity of the intersection. This level may also occur at high V/C ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to such delay levels.	> 80.0

Source: 2010 *Highway Capacity Manual*

Table 2: Unsignalized Intersection LOS Criteria

Level of Service	Description	Delay in Seconds
A	Little or no delays	≤ 10.0
B	Short traffic delays	> 10.0 to 15.0
C	Average traffic delays	> 15.0 to 25.0
D	Long traffic delays	> 25.0 to 35.0
E	Very long traffic delays	> 35.0 to 50.0
F	Extreme traffic, delays where intersection capacity exceeded	> 50.0

Source: 2010 *Highway Capacity Manual*

Unsignalized Intersections

Traffic conditions at unsignalized (all-way stop-controlled and side-street stop-controlled) intersections were evaluated using the 2010 HCM method for unsignalized intersections. With this method, operations are defined by the average control delay per vehicle (measured in seconds). The control delay incorporates delay associated with deceleration, acceleration, stopping, and moving up in queue. **Table 2** summarizes the relationship between LOS and delay for unsignalized intersections. At side-street stop-controlled intersections, the delay is calculated for each stop-controlled movement, the left turn movement from the major street, as well as the intersection average. The intersection average delay and highest movement/approach delay are reported for side-street stop-controlled intersections.

Roadway Segments

Roadway segment service levels were calculated by comparing the daily roadway volumes to the LOS thresholds used for other projects in both Livermore and other communities within Alameda County, as presented in **Table 3**. For major streets a per-lane capacity of 800 vehicles per hour and 10,000 vehicles per day was used.

The City of Livermore does not have a level of service policy for daily roadway segment operations.

Table 3: Roadway Segment LOS Thresholds

LOS	Density
A	< 0.60
B	0.61 to 0.70
C	0.71 to 0.80
D	0.81 to 0.90
E	0.90 to 1.00
F	> 1.00

Source: Fehr & Peers, 2018

Regulatory Setting and Significance Criteria

The determination of significance for project impacts is based on applicable policies, regulations, goals, and guidelines defined by Alameda County and the City of Livermore. The proposed impact criteria for this study are presented below.

Signalized Intersections

The project may cause a significant impact if one of the two following criteria are met:

- The addition of project traffic to an intersection results in the degradation of intersection operations from acceptable operations (Mid-level LOS D or better) to unacceptable operations (Greater than Mid-level LOS D; LOS E or F).
- The addition of project traffic to an intersection results in the exacerbation of unacceptable operations (Greater than Mid-level LOS D; LOS E or F) by increasing the average control delay at the intersection by more than 5.0 seconds.

Select intersections near freeway interchanges are allowed to operate at LOS E per the City of Livermore General Plan (2014). These intersections include:

3. Springtown Boulevard/Bluebell Drive
4. Springtown Boulevard/I-580 Westbound Ramps
5. Springtown Boulevard/I-580 Eastbound Ramps

Unsignalized Intersections

The project may cause a significant impact if both of the two following criteria are met:

- The addition of project traffic to an intersection results in the degradation of overall intersection operations from acceptable operations (Mid-level LOS D or better) to unacceptable operations (Greater than Mid-level LOS D; LOS E or F).
- The Peak Hour Signal Warrant (Warrant 3) is met.

Roadway Segment

The project may cause a significant impact if one of the two following criteria are met:

- The addition of project traffic to a roadway segment results in the degradation of the segment from acceptable operations (Mid-level LOS D or better) to unacceptable operations (Greater than Mid-level LOS D; LOS E or F).

- The addition of project traffic to an intersection results in the exacerbation of unacceptable operations (Greater than Mid-level LOS D; LOS E or F) by increasing the average daily volume by more than 5 percent.

Transit System

The project would create a significant impact related to transit service if either of the following criteria are met:

- The project generates a substantial increase in transit riders that cannot be adequately served by existing transit services; or,
- The project conflicts with existing or planned transit facilities.

Pedestrian System

The project would create a significant impact related to the pedestrian system if any of the following criteria are met:

- The project design would not provide or would eliminate pedestrian facilities to connect to the area circulation system, or
- The project design would create hazardous conditions for pedestrians, or
- The project conflicts with existing or planned pedestrian facilities.

Bicycle System

The project would create a significant impact related to the bicycle system if any of the following criteria are met:

- The project design would not provide or would eliminate bicycle facilities that connect to the area circulation system, or
- The project conflicts with existing or planned bicycle facilities; or
- The project design would create hazardous conditions for bicyclists.

Vehicle Miles of Travel

In response to Senate Bill 743 (SB 743), the Office of Planning and Research (OPR) is updating California Environmental Quality Act (CEQA) guidelines to include new transportation-related evaluation metrics. Draft guidelines were developed in August 2014, with final guidelines published in November 2017 incorporating public comments from the August 2014 and January 2016 guidelines. New guidelines are

undergoing a formal rule-making process that is expected to conclude within the next six months; full compliance with the guidelines is expected by 2020. In response to the final guidelines, a preliminary assessment of vehicle miles of travel (VMT) generated by the proposed project was prepared for informational purposes only.

Report Organization

This report is divided into nine chapters as described below:

- **Chapter 1 – Introduction** discusses the purpose and organization of the report.
- **Chapter 2 – Existing Conditions** describes the transportation system in the Project vicinity, including the surrounding roadway network morning and evening peak period intersection turning movement volumes, existing bicycle, pedestrian, and transit facilities, and intersection operations.
- **Chapter 3 – Project Characteristics** presents relevant Project information, such as the Project components and Project trip generation, distribution, and assignment.
- **Chapter 4 – Existing with Project Traffic Conditions** addresses the existing conditions with the Project, and discusses Project vehicular impacts.
- **Chapter 5 – Near-Term Traffic Conditions** addresses the near-term future conditions, both without and with the Project, and discusses Project vehicular impacts.
- **Chapter 6 – Cumulative Traffic Conditions** addresses the long-term future conditions, both without and with the Project, and discusses Project vehicular impacts.
- **Chapter 7 – Vehicle Miles of Travel** presents Project generated VMT and Project effects on citywide VMT
- **Chapter 8 – Site Plan Review** describes Project access and circulation for all travel modes.
- **Chapter 9 – Project Alternative Evaluation** describes the traffic assessment of the General Plan allowable uses on the site.

2. Existing Conditions

This chapter describes transportation facilities in the study area, including the surrounding roadway network, transit, pedestrian, and bicycle facilities in the project site vicinity. Existing intersection operations are also described.

Roadway System

The project site is located in northeastern Livermore near the Springtown neighborhood. Local access to the project site is solely provided by Lassen Road off Springtown Boulevard/First Street. Regional access to the project site is provided by I-580.

Interstate 580 (I-580) is an east-west freeway, connecting Eastern Alameda County with the San Francisco Bay Area and California's Central Valley. I-580 currently provides four general purpose travel lanes in each direction, one express lane in the westbound direction and two express lanes in the eastbound direction. Express lanes are free for vehicles with two or more passengers; vehicles with one passenger can pay a toll to use the express lane.

Springtown Boulevard is a north-south roadway that provides two travel lanes in each direction with left-turn pockets at most intersections. Springtown Boulevard is classified as a major street between I-580 and Bluebell Drive, and as a collector north of Bluebell Drive. The posted speed limit is 40 miles per hour (mph). Sidewalks and bicycle lanes are provided on both sides of the street between Bluebell Drive and Rhododendron Drive. South of Bluebell Drive, there are no bicycle lanes or sidewalk on the east side of the street. Springtown Boulevard continues south past I-580 as First Street.

First Street is a north-south roadway that provides three travel lanes in each direction between Portola Avenue and the I-580 WB Ramps. Across the interchange, First Street reduces to two travel lanes in the southbound direction and one travel lane with a double left-turn lane in the northbound direction at the I-580 westbound on-ramp intersection. First Street is classified as a major street and provides access to Downtown Livermore. The posted speed limit is 40 mph. Sidewalks and bicycle lanes are provided on both sides of the street south of I-580. There are no bicycle lanes or sidewalk on the east side of the street across the interchange. First Street continues north past I-580 as Springtown Boulevard.

Bluebell Drive is a north-south roadway (but is oriented east-west at the study intersection) that provides one travel lane in each direction. Bluebell Drive is classified as a collector street between Springtown Boulevard and Hartford Avenue. The posted speed limit is 25 mph. Sidewalks and bicycle lanes are provided along the entire roadway.

Pedestrian and Bicycle Facilities

Pedestrian facilities in the study area include sidewalks, crosswalks, and pedestrian signals. Roadways in the study area generally provide sidewalks on both sides of the street. Signalized intersections in the study area all provide crosswalks and pedestrian signals. Across the I-580 interchange on Springtown Boulevard/First Street, pedestrians are channelized to the west side of the street.

Bicycle facilities include the following:

- **Bike paths (Class I)** – Bike paths provide a completely separate right-of-way and are designated for the exclusive use of people riding bicycles and walking with minimal cross-flow traffic. Such paths can be well situated along creeks, canals, and rail lines. Class I Bikeways can also offer opportunities not provided by the road system by serving as both recreational areas and/or desirable commuter routes.
- **Bike lanes (Class II)** – Bike lanes provide designated street space for bicyclists, typically adjacent to the outer vehicle travel lanes. Bike lanes include special lane markings, pavement legends, and signage. Bike lanes may be enhanced with painted buffers between vehicle lanes and/or parking, and green paint at conflict zones (such as driveways or intersections).
- **Bike routes (Class III)** – Bike routes provide enhanced mixed-traffic conditions for bicyclists through signage, striping, and/or traffic calming treatments, and to provide continuity to a bikeway network. Bike routes are typically designated along gaps between bike trails or bike lanes, or along low-volume, low-speed streets. Bicycle boulevards provide further enhancements to bike routes to encourage slow speeds and discourage non-local vehicle traffic via traffic diverters, chicanes, traffic circles, and/or speed tables. Bicycle boulevards can also feature special wayfinding signage to nearby destinations or other bikeways.
- **Separated Bikeway (Class IV)** – Separated bikeways, also referred to as cycle tracks or protected bikeways, are bikeways for the exclusive use of bicycles which are physically separated from vehicle traffic. Separated Bikeways were recently adopted by Caltrans in 2015. Types of separation may include, but are not limited to, grade separation, flexible posts, physical barriers, and on-street parking.

Class II bicycle lanes are provided on Springtown Boulevard north of Lassen Road, on First Street south of I-580, and on Bluebell Drive west of Springtown Boulevard. There are no bicycle facilities across the I-580 interchange. The City's Active Transportation Plan includes a Phase 1 project to construct buffered bicycle lanes on First Street between Southfront Road and Mines Road.

Transit Service

Transit service in the area is provided by Wheels (LAVTA), Bay Area Rapid Transit (BART), and Altamont Commuter Express (ACE). Information provided below is current as of January 25th, 2018.

Wheels provides fixed-route and paratransit service throughout the Cities of Dublin, Pleasanton, and Livermore, and provides connections to other transit service providers. Wheels buses connect major destinations within the Cities of Dublin, Pleasanton and Livermore, including Downtown areas, employment centers and transit hubs, including BART and ACE stations. Wheels bus schedules are also coordinated with ACE and BART trains during peak commute hours.

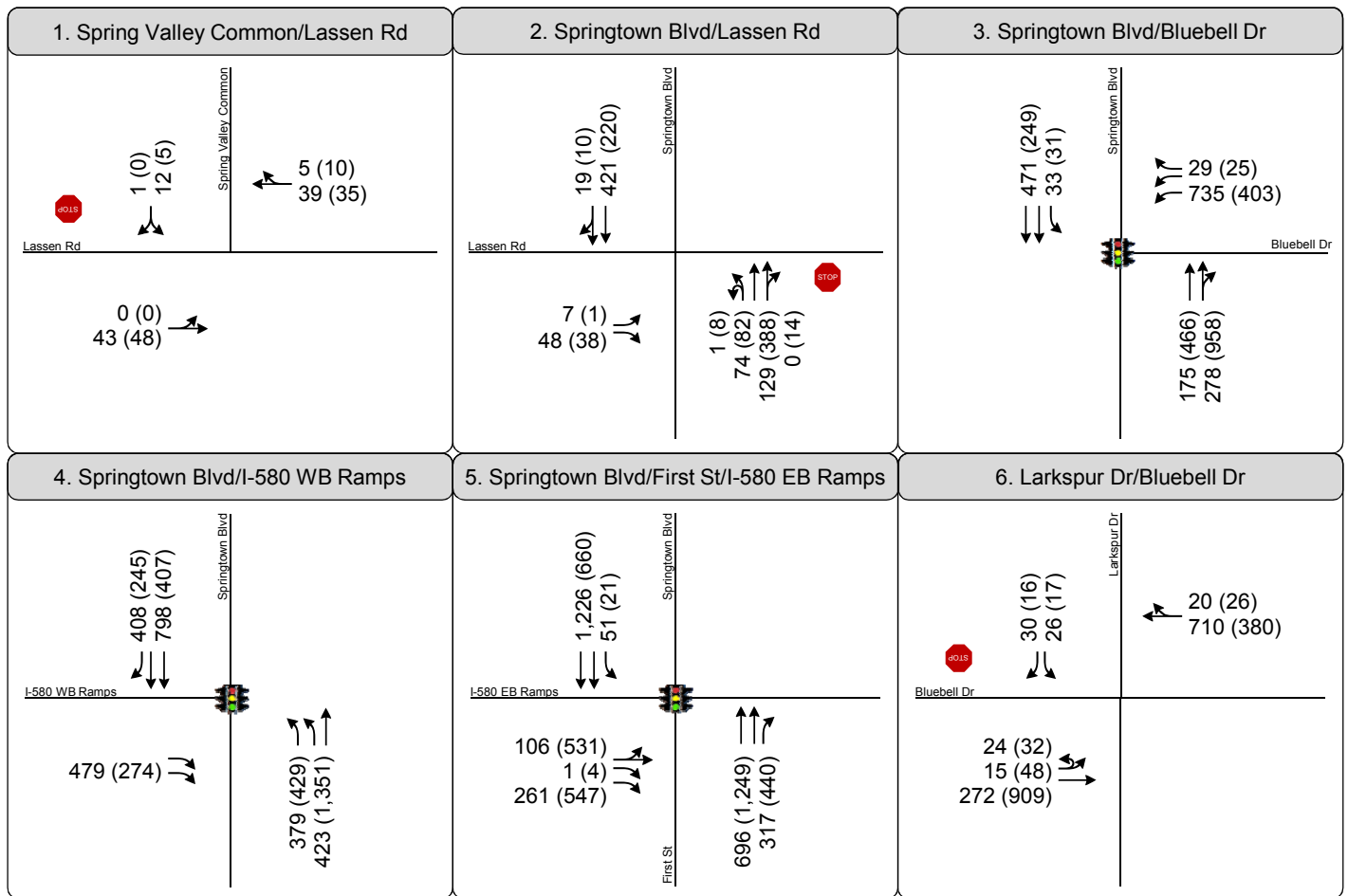
Route 15 connects Springtown to the Livermore Transit Center and runs every 30 minutes on weekdays between 5:07 AM and 7:42 PM and every hour after afterwards; the last bus is scheduled to depart the transit station at 10:42 PM. On weekends the route runs every hour between 5:49 AM and 8:49 PM. The nearest bus stop to the project site is located past the intersection of Springtown Boulevard and Bluebell Drive in the northbound direction. There are no transit amenities provided at the bus stop.

Route 580X is an express bus shuttle that travels between from the Livermore Transit Center to the East Dublin/Pleasanton BART Station every 30 minutes in the westbound direction between 5:58 AM and 7:58 AM and in the eastbound direction between 5:02 PM and 7:02 PM.

Bay Area Rapid Transit provides regional transportation connections to much of the Bay Area and the Dublin/Pleasanton line provides direct access to San Francisco, with several stops in Oakland where connections may be made to other lines. The closest BART station is the East Dublin/Pleasanton Station located approximately 9.5 miles from the project site. BART train frequency ranges between 15-30 minutes from 4:13 AM to 1:27 AM.

BART recently completed a conceptual engineering and project-level Draft Environmental Impact Report for a proposed extension of the Dublin/Pleasanton BART line. The project would extend BART by 5.5 miles along I-580 from the existing East Dublin/Pleasanton Station to a new station in the vicinity of the Isabel Avenue interchange. The Project would also incorporate improvements to the local bus system, connections with key activity centers in Livermore and inter-regional rail service. The Draft Environmental Impact Report for the BART extension estimates a completion date of 2026.

The **Altamont Commuter Express** (ACE) operates weekday train service between Stockton and San José with Tri-Valley stops in Downtown Pleasanton and Livermore. Westbound service from San Joaquin County to San José is provided in the morning, and eastbound service is provided in the afternoon/evening commute period. There are four morning trains through Pleasanton between 5:25 AM and 8:10 AM, and four evening trains between 4:37 PM and 7:40 PM.



LEGEND

XX (YY) AM (PM) Peak Hour Traffic Volumes



Signalized Intersection



Stop Sign



Project Site



Study Intersection



Figure 3

Existing Peak Hour Intersection Traffic Volumes, Lane Configurations and Traffic Controls

Analysis of Existing Conditions

Traffic Counts

Weekday morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak period intersection turning movement counts were collected at the study intersections in November 2017 with area schools in normal session. Traffic counts included a separate count of heavy vehicles, bicycles, and pedestrians. Peak hour intersection volumes are summarized on **Figure 3** along with existing lane configurations and traffic controls. Traffic counts provided in **Appendix A**.

Intersection Level of Service

Existing operations were evaluated using the methods described in Chapter 1 for the weekday AM and PM peak hours at the study intersections, based on the volumes and lane configurations shown on Figure 3. The results are summarized in **Table 4** based on the HCM 2010 method unless otherwise noted. Observed peak hour factors¹ were used at all intersections, and truck, pedestrian, and bicycle activity were also factored into the analysis

As shown in Table 4, all of the study intersections currently operate at overall acceptable service levels in accordance with benchmarks set by the City of Livermore. Detailed intersection LOS calculation worksheets are presented in **Appendix B**.

Vehicle Queues

As requested by the City of Livermore, vehicle queues were assessed for the intersections of Springtown Boulevard/Lassen Road and Springtown Boulevard/Bluebell Drive, as shown in **Table 5**. Although all intersections currently operate within the standards set by the City of Livermore, there is periodic vehicle queue spillback, particularly during the AM peak hour, for the westbound left movement at the intersection Springtown Boulevard/Bluebell Drive. This is partly related to drivers destined for westbound I-580 who choose the outer left turn lane, which directly feeds the right turn lane from southbound Springtown Boulevard to the westbound I-580 on-ramp. In addition, the storage for westbound left turns is limited to about 100 feet, due to the short distance (about 275 feet) between Springtown Boulevard and Larkspur Drive. A preliminary review of the roadway geometry in this block indicates that the westbound left turn lanes could be lengthened by 40-50 feet using space in the center median.

¹ The relationship between the peak 15-minute flow rate and the full hourly volume is given by the peak-hour factor (PHF) based on the following equation: $PHF = \text{Hourly volume} / (4 * \text{volume during the peak 15 minutes of flow})$. The analysis of level of service is based on peak rates of flow occurring within the peak hour because substantial short-term fluctuations typically occur during an hour.

It is also noted that, based on field observations, there is peak hour congestion in the PM peak hour on northbound Springtown Boulevard south of Bluebell Drive, due primarily to the lane changes (“weaving”) that drivers need to make between the I-580 eastbound off-ramp and the Bluebell intersection, in order to turn right onto Bluebell (the larger turn movement at the intersection). The I-680 westbound off-ramp also delivers substantial traffic volume to this short weaving section, exacerbating the congestion.

Roadway Segment Operations

Existing roadway operations were evaluated using the methods described in Chapter 1 for the daily level of service at the study roadway segments, as summarized **Table 6**. The analysis was based on the daily traffic volumes collected over a 72-hour period (Tuesday through Thursday) in November 2017 with area schools in session. Counts collected during the school year are representative of typical traffic conditions for the majority of the year. Traffic volumes on all three segments were fairly consistent other the three days of data collection, with Tuesday as the highest volume day for all three segments. Based on the per-lane capacities presented in Table 3, the volume-to-capacity ratios for the roadway segment are all less than 0.70, which is indicative of operations within capacity constraints.

Table 4: Existing Conditions Peak Hour Intersection LOS

Intersection	Control ¹	Peak Hour	Delay ²	LOS
1. Lassen Road/Spring Valley Common	SSSC	AM PM	1.2 (9.0) 0.5 (9.0)	A (A) A (A)
2. Springtown Boulevard/Lassen Road	SSSC	AM PM	1.8 (11.0) 1.7 (11.0)	A (B) A (B)
3. Springtown Boulevard/Bluebell Drive	Signalized	AM PM	10.4 19.3	B B
4. Springtown Boulevard/I-580 Westbound Ramps ³	Signalized	AM PM	6.5 6.4	A A
5. Springtown Boulevard/I-580 Eastbound Ramps	Signalized	AM PM	13.8 30.5	B C
6. Bluebell Drive/Larkspur Drive	SSSC	AM PM	1.0 (19.6) 0.6 (26.7)	A (C) A (D)

Notes: **Bold** text indicates potentially unacceptable intersection operations.

1. Signal = Signalized intersection; SSSC = Side-street stop-controlled intersections; traffic on the main street does not stop while traffic on the side-street is controlled by a stop sign.
 2. Average intersection delay is calculated for all signalized intersections using the 2010 HCM method for vehicles unless otherwise noted. For SSSC intersections, average delay or LOS is listed first followed by the delay or LOS for the worst approach in parentheses.
 3. Results based on HCM 2000 analysis due to limitations of analysis software.
- Source: Fehr & Peers, 2018.

Table 5: Existing Conditions 95th Percentile Vehicle Queues

Intersection	Movement	Storage Length	AM Peak Period	PM Peak Period
2. Springtown Boulevard/Lassen Road	EBR/T/L	125	25	25
	NBL	75	25	25
3. Springtown Boulevard/Bluebell Drive	WBL ¹	100	175	150
	WBR	100	25	25
	SBL	75	50	50

Notes: Storage and queue lengths are measured in feet.

1. The average queue for this movement is contained within the storage length.

Source: Fehr & Peers, 2018.

Table 6: Existing Conditions Daily Roadway Segment Analysis

Roadway Segment	Average Daily Traffic	Daily Fluctuation	V/C Ratio	LOS
Springtown Boulevard between Bluebell Drive and I-580 Westbound Ramps	22,000	±3.8%	0.55	A
First Street between I-580 Westbound Ramps and I-580 Eastbound Ramps	27,000	±1.6%	0.68	B

Source: Fehr & Peers, 2018.

3. Project Characteristics

This chapter provides an overview of the proposed Project components and addresses the proposed project trip generation, distribution, and assignment characteristics, allowing for an evaluation of Project impacts on the surrounding roadway network. The amount of traffic associated with the Project was estimated using a three-step process:

1. **Trip Generation** – The *amount* of vehicle traffic entering/exiting the Project site was estimated.
2. **Trip Distribution** – The *direction* trips would use to approach and depart the site was projected.
3. **Trip Assignment** – Trips were then *assigned* to specific roadway segments and intersection turning movements.

The proposed project would redevelop the site to provide 196 for-sale townhomes, including two-bedroom, three-bedroom, and four-bedroom floor plans. All vehicular access to the project site would be via Lassen Road.

Project Trip Generation

Trip generation refers to the process of estimating the amount of vehicular traffic a project would add to the surrounding roadway system. Estimates are created for the daily condition and for the peak one-hour period during the morning and evening commute when traffic volumes on the adjacent streets are typically the highest. Project trip generation was estimated using rates from the Institute of Transportation Engineers (ITE) *Trip Generation Manual* (9th Edition), as presented in **Table 7**. The project is expected to generate approximately 1,139 daily vehicle trips, including approximately 87 morning peak hour and 102 evening peak hour trips. Given the project's location, it is conservatively assumed that all of these trips are vehicle trips.

Table 7: Project Vehicle Trip Generation Estimates

Use	Size	Weekday						
		Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Residential ¹	196 dwelling units	1,139	15	72	87	68	34	102

1. ITE land use category 230 – Residential townhome (Adj. Streets, 7-9A, 4-6P):

Daily: $T = 5.81 (X)$

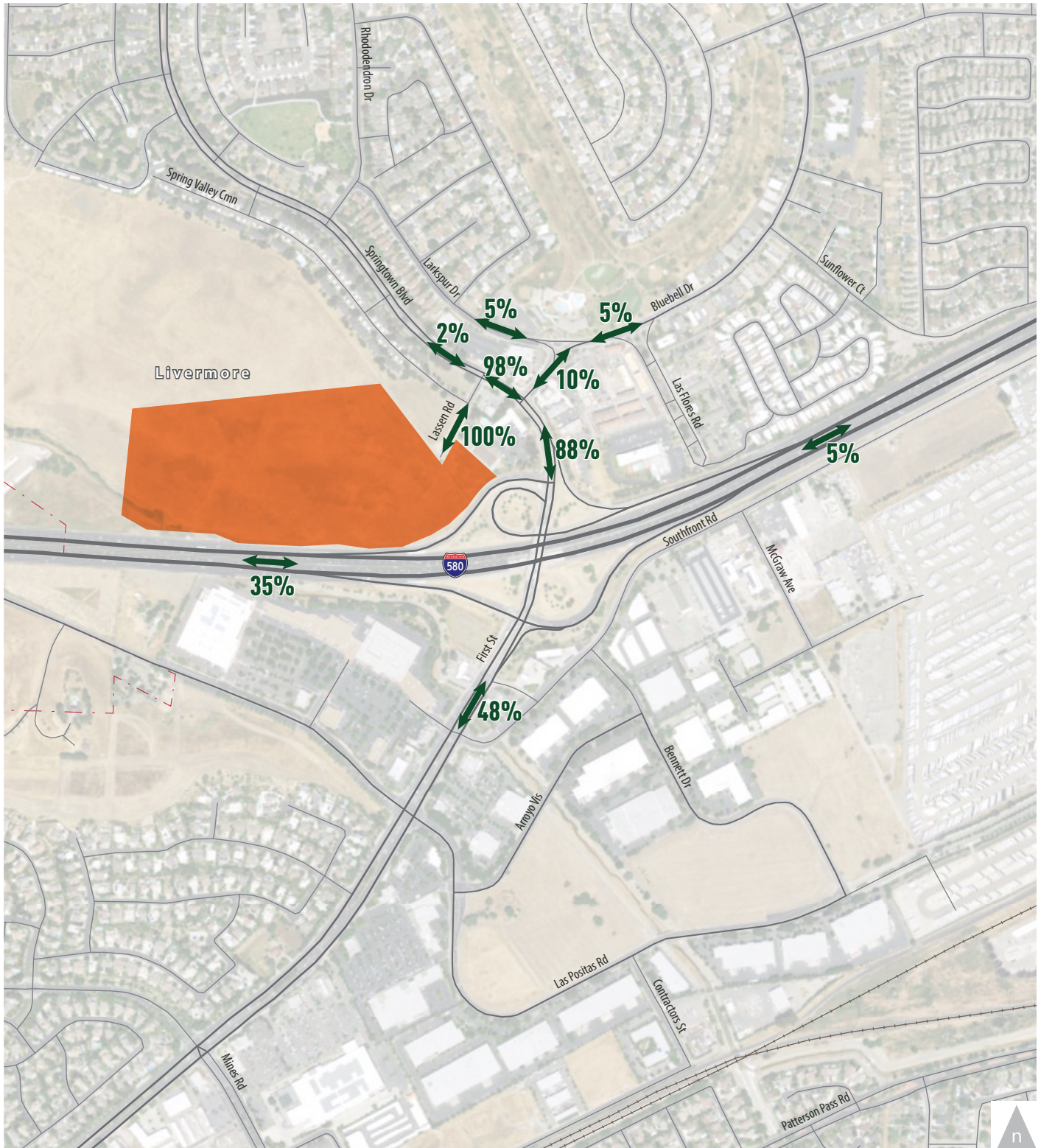
AM Peak Hour: $T = 0.44 (X)$; Enter = 17%; Exit = 83%

PM Peak Hour: $T = 0.52 (X)$; Enter = 67%; Exit = 33%

Source: *Trip Generation Manual* (9th Edition), ITE, 2012; Fehr & Peers, 2018.

Project Trip Distribution and Assignment

Project trip distribution refers to the directions of approach and departure that vehicles would take to access and depart the site. Estimates of regional project trip distribution were developed based on existing travel patterns in the area, a select zone analysis using the Alameda County Transportation Commission (Alameda CTC) travel demand model, and the location of complementary land uses. The resulting trip distribution percentages are shown on **Figure 4**. Project trips were then assigned to the roadway network based on the directions of approach and departure, as presented on **Figure 5**.



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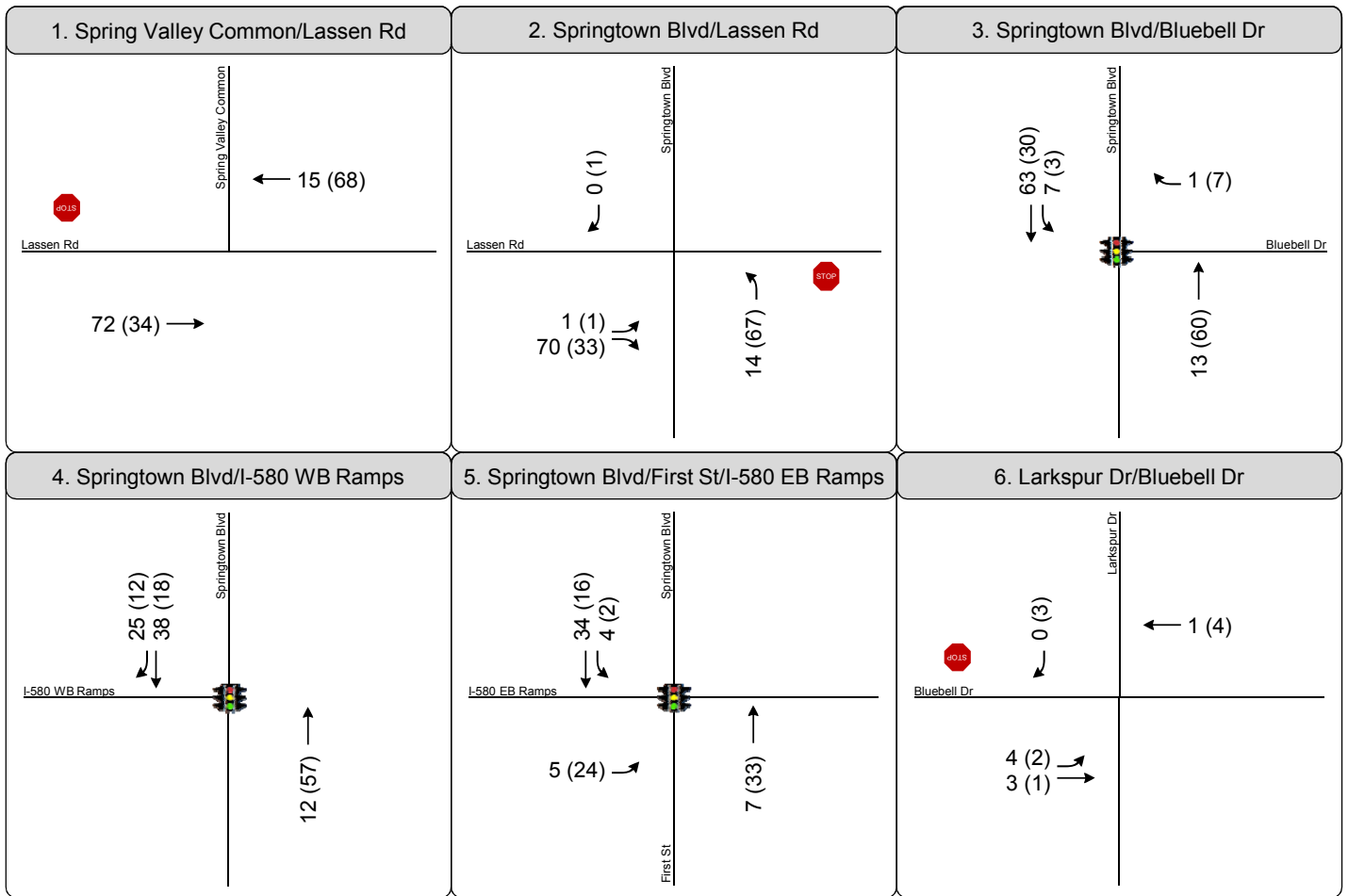
Project Site

X% Project Trip Distribution



Figure 4

Project Trip Distribution



LEGEND

XX (YY) AM (PM) Peak Hour Traffic Volumes Signalized Intersection Stop Sign

Project Site Study Intersection

Figure 5

Project Trip Assignment

4. Existing with Project Conditions

This chapter evaluates potential off-site transportation impacts under Existing with Project conditions.

Analysis of Existing with Project Conditions

The Project traffic volumes in Figure 5 were added to the existing traffic volumes from Figure 3 to estimate the Existing with Project traffic volumes, as shown on **Figure 6**. Existing with Project intersection operations were evaluated using the methods consistent with Chapter 1.

Intersection Level of Service

Table 9 presents the Existing with Project analysis results. All study intersections would continue to operate at acceptable LOS with the addition of project traffic.

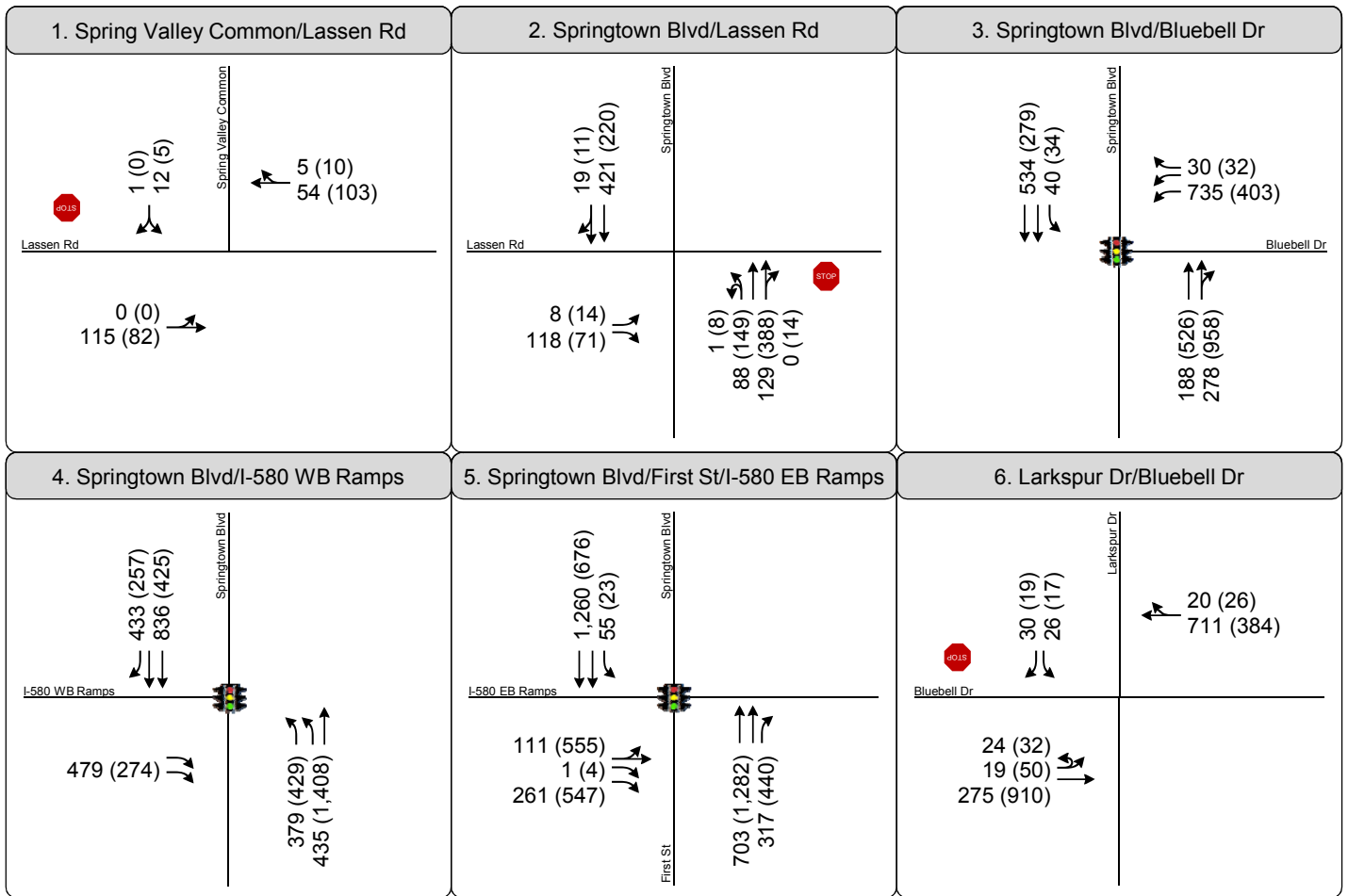
Table 8: Existing with Project Peak Hour Intersection LOS

Intersection	Control ¹	Peak Hour	Existing		Existing with Project	
			Delay ²	LOS	Delay ²	LOS
1. Lassen Road/Spring Valley Common	SSSC	AM PM	1.2 (9.0) 0.5 (9.0)	A (A) A (A)	0.7 (9.5) 0.2 (9.7)	A (A) A (A)
2. Springtown Boulevard/Lassen Road	SSSC	AM PM	1.8 (11.0) 1.7 (11.0)	A (B) A (B)	2.8 (11.4) 2.6 (11.1)	A (B) A (B)
3. Springtown Boulevard/Bluebell Drive	Signalized	AM PM	10.4 19.3	B B	10.7 20.8	B C
4. Springtown Boulevard/I-580 Westbound Ramps ³	Signalized	AM PM	6.5 6.4	A A	8.1 7.0	A A
5. Springtown Boulevard/I-580 Eastbound Ramps	Signalized	AM PM	13.8 30.5	B C	13.9 31.9	B C
6. Bluebell Drive/Larkspur Drive	SSSC	AM PM	1.0 (19.6) 0.6 (26.7)	A (C) A (D)	1.0 (19.8) 0.6 (25.7)	A (C) A (D)

Notes: **Bold** text indicates potentially unacceptable intersection operations.

1. Signal = Signalized intersection; SSSC = Side-street stop-controlled intersections; traffic on the main street does not stop while traffic on the side-street is controlled by a stop sign.
2. Average intersection delay is calculated for all signalized intersections using the 2010 HCM method for vehicles unless otherwise noted. For SSSC intersections, average delay or LOS is listed first followed by the delay or LOS for the worst approach in parentheses.
3. Results based on HCM 2000 analysis due to limitations of analysis software.

Source: Fehr & Peers, 2018



LEGEND

XX (YY) AM (PM) Peak Hour Traffic Volumes



Signalized Intersection



Stop Sign



Project Site



Study Intersection



Figure 6

Existing with Project Peak Hour Intersection Traffic Volumes, Lane Configurations and Traffic Controls



Vehicle Queues

As shown in **Table 9**, the addition of project traffic is expected to increase the 95th percentile vehicle queues for the westbound left movement at the intersection of Springtown Boulevard/Bluebell Drive by 25 feet (1 vehicle) during the AM peak hour.

The existing median between the intersections of Springtown Boulevard/Lassen Road and Springtown Boulevard/Bluebell Drive was evaluated to determine if the design provides sufficient queue storage. With the addition of project traffic, 95th percentile queues for the northbound left movement at the intersection of Springtown Boulevard/Lassen Road and for the southbound left movement at the intersection of Springtown Boulevard/Bluebell Drive would be contained within the available storage.

The westbound left turn queue at the Springtown/Bluebell intersection, which already exceeds the storage length under existing conditions, would continue to exceed storage length with the addition of Project traffic.

The existing PM peak hour congestion on northbound Springtown Boulevard south of the Bluebell Drive intersection, discussed in the existing conditions section, would continue under the Existing with Project condition, but would not be expected to worsen substantially, because most Project traffic would not need to weave from left to right, which is the primary source of the congestion.

Table 9: Existing with Project 95th Percentile Vehicle Queues

Intersection	Movement	Storage Length	AM Peak Period		PM Peak Period	
			Without	With Proj	Without	With Proj
2. Springtown Boulevard/Lassen Road	EBR/T/L	125	25	25	25	25
	NBL	75	25	25	25	25
3. Springtown Boulevard/Bluebell Drive	WBL ¹	100	175	200	150	150
	WBR	100	25	25	25	25
	SBL	75	50	50	50	50

Notes: Storage and queue lengths are measured in feet. **Bold** text indicates that the queue exceeds the storage length.

1. The average queue for this movement is contained within the storage length.

Source: Fehr & Peers, 2018.

5. Near-Term Traffic Conditions

The near-term scenario reflects existing traffic counts plus traffic from approved developments that are expected to be completed and occupied in the next 5 to 10 years. Near-term conditions without and with the Project are evaluated. The analysis of cumulative conditions (see Chapter 6 for details) considers development within the City of Livermore as described in the General Plan and the Downtown Specific Plan, and as such, reflects potential development applications received after the Project was started that are consistent with the General Plan land use and circulation assumptions.

Near-Term Forecasts

The available *City of Livermore Summary of Major Development Projects* at the time this project analysis commenced were reviewed to identify developments to include in this scenario. Copies of these reports are provided in **Appendix C**. The developments that could generate additional traffic through the study area are summarized below and their locations shown on **Figure 7**.

- a. 4696 Bennet Drive – 437 residential units
- b. 4500 Contractors Place – 4.28 acres site with mixed use industrial/commercial
- c. 3733 First Street – 101 townhomes
- d. 4260 First Street – 44 apartments
- e. 3134 Gardella Plaza – 27 townhomes

Near-Term project vehicle trip assignments to the study intersections were derived from the traffic studies prepared for each project (these studies are listed in **Appendix D**). Traffic generated by approved and pending developments was added to the existing traffic volumes to provide the basis for the Near-Term without Project analysis.

To account for other development in the city and region outside of the immediate study area, existing traffic counts were also increased by five percent prior to the addition of traffic from approved projects. The resulting volumes are presented on **Figure 8**. Project traffic volumes from Figure 5 were added to the Near-Term without Project forecasts to estimate Near-Term with Project volumes at the study intersections, as presented on **Figure 9**.

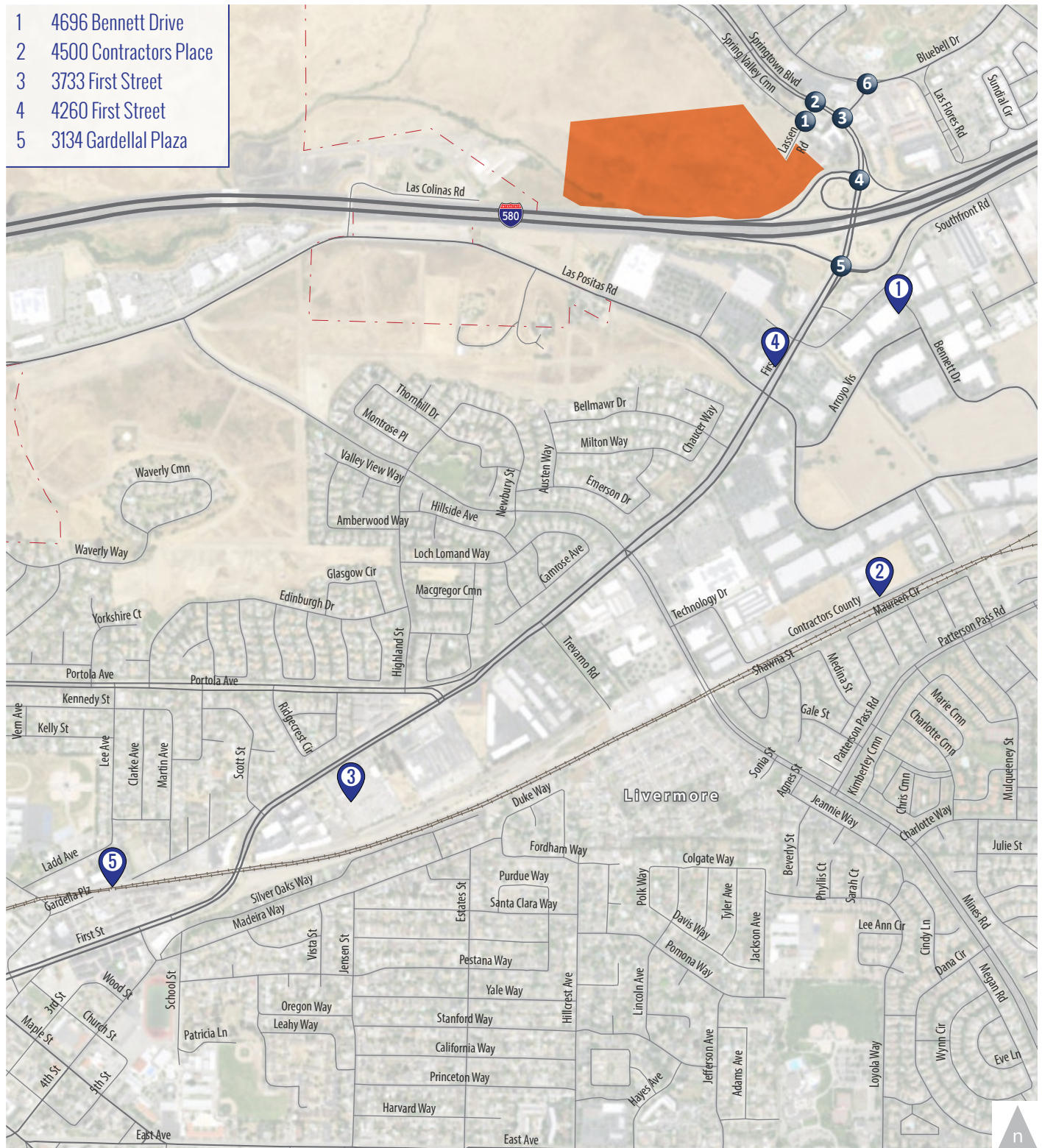


Figure 7

Near-Term Project Locations



1. Spring Valley Common/Lassen Rd	2. Springtown Blvd/Lassen Rd	3. Springtown Blvd/Bluebell Dr
4. Springtown Blvd/I-580 WB Ramps	5. Springtown Blvd/First St/I-580 EB Ramps	6. Larkspur Dr/Bluebell Dr

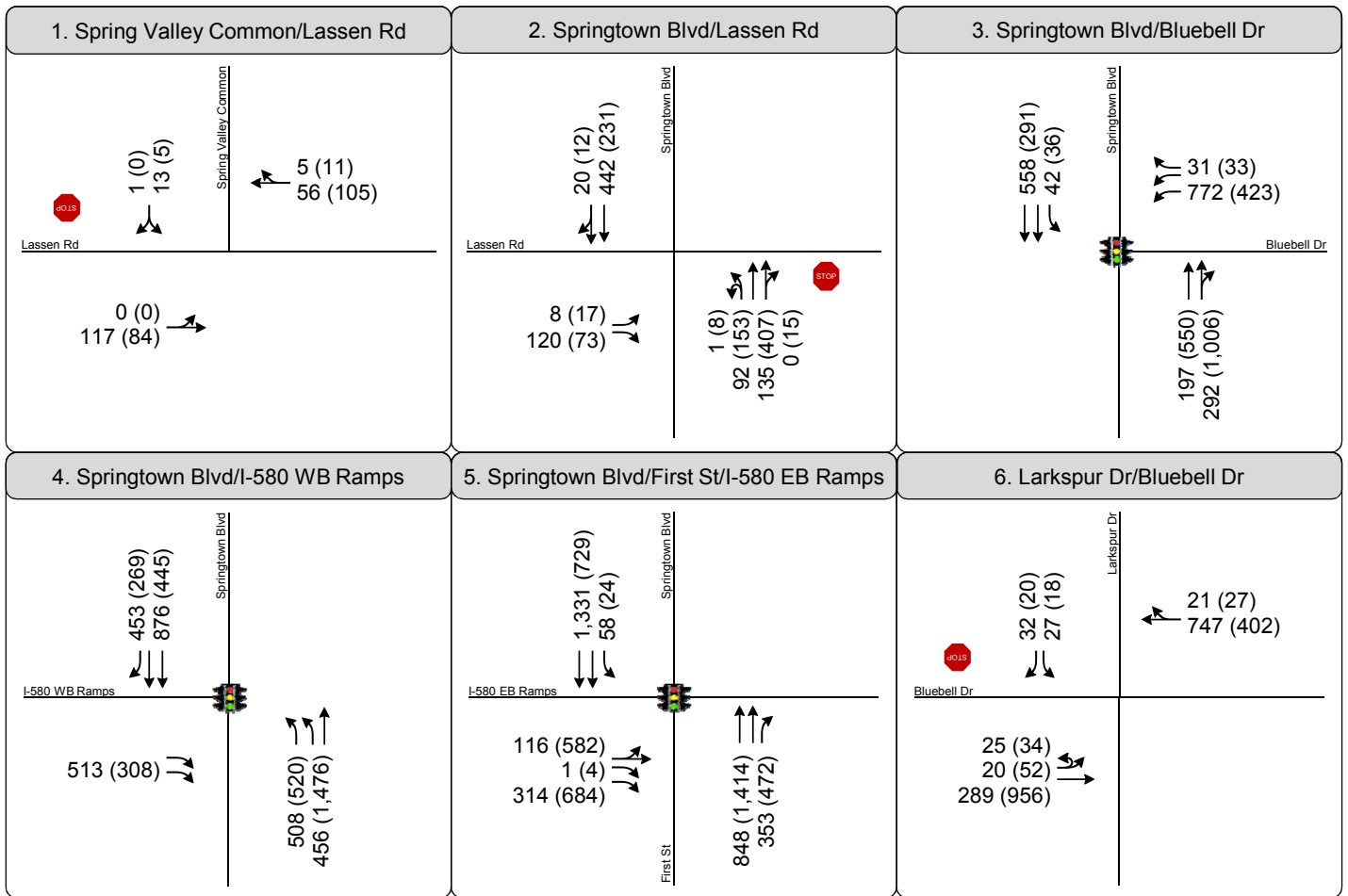
LEGEND

XX (YY) AM (PM) Peak Hour Traffic Volumes Signalized Intersection Stop Sign

Project Site Study Intersection



Figure 8
Near-Term without Project Peak Hour
Intersection Traffic Volumes, Lane Configurations and Traffic Controls



LEGEND

XX (YY) AM (PM) Peak Hour Traffic Volumes



Signalized Intersection



Stop Sign



Project Site



Study Intersection

Figure 9

Near-Term with Project Peak Hour Intersection Traffic Volumes, Lane Configurations and Traffic Controls



Analysis of Near-Term Conditions

Intersection Operations

Near-Term conditions were evaluated using the methods described in Chapter 1, with the analysis results presented in **Table 11** based on the traffic volumes, lane configurations and traffic control presented on Figure 8 and Figure 9. For the analysis of near-term conditions, signal timings, peak hour factors, pedestrian and bicycle activity, as well as truck percentages were unchanged from the existing condition. In the Near-term condition, both without and with the Project, all study intersections would operate at an acceptable level of service.

Table 11: Near-Term with Project Peak Hour Intersection LOS

Intersection	Control ¹	Peak Hour	Near-term without Project		Near-term with Project	
			Delay ²	LOS	Delay ²	LOS
1. Lassen Road/Spring Valley Common	SSSC	AM PM	1.2 (9.0) 0.4 (9.0)	A (A) A (A)	0.7 (9.6) 0.2 (9.7)	A (A) A (A)
2. Springtown Boulevard/Lassen Road	SSSC	AM PM	1.8 (11.2) 1.7 (11.2)	A (B) A (B)	2.8 (11.6) 2.6 (11.4)	A (B) A (B)
3. Springtown Boulevard/Bluebell Drive	Signalized	AM PM	10.8 24.7	B C	11.1 27.1	B C
4. Springtown Boulevard/I-580 Westbound Ramps ³	Signalized	AM PM	8.6 9.7	A A	8.9 10.2	A B
5. Springtown Boulevard/I-580 Eastbound Ramps	Signalized	AM PM	14.8 33.7	B C	14.9 35.7	B D
6. Bluebell Drive/Larkspur Drive	SSSC	AM PM	1.1 (20.9) 0.7 (29.8)	A (C) A (D)	1.1 (21.1) 0.7 (28.6)	A (C) A (D)

Notes: **Bold** text indicates potentially unacceptable intersection operations.

1. Signal = Signalized intersection; SSSC = Side-street stop-controlled intersections; traffic on the main street does not stop while traffic on the side-street is controlled by a stop sign.
2. Average intersection delay is calculated for all signalized intersections using the 2010 HCM method for vehicles unless otherwise noted. For SSSC intersections, average delay or LOS is listed first followed by the delay or LOS for the worst approach in parentheses.
3. Results based on HCM 2000 analysis due to limitations of analysis software.

Source: Fehr & Peers, 2018.

Vehicle Queues

As shown in **Table 12**, the addition of project traffic is not expected to increase the 95th percentile vehicle queues for any movements during both peak hours.



The median between the intersections of Springtown Boulevard/Lassen Road and Springtown Boulevard/Bluebell Drive was evaluated to determine if the design provides sufficient queue storage. With the addition of project traffic, 95th percentile queues for the northbound left movement at the intersection of Springtown Boulevard/Lassen Road and for the southbound left movement at the intersection of Springtown Boulevard/Bluebell Drive would be contained within the available storage.

The addition of Project traffic to Near-Term Without Project conditions would not increase the westbound left turn queue at the Springtown/Bluebell intersection, which already exceeds the storage length under existing conditions.

The existing PM peak hour congestion on northbound Springtown Boulevard south of the Bluebell Drive intersection, discussed in the existing conditions section, would continue under the Near-Term condition, but would not be expected to worsen substantially due to Project traffic, because most Project traffic would not need to weave from left to right, which is the primary source of the congestion.

Table 12: Near-Term with Project 95th Percentile Vehicle Queues

Intersection	Movement	Storage Length	AM Peak Period		PM Peak Period	
			Without	With Proj	Without	With Proj
2. Springtown Boulevard/Lassen Road	EBR/T/L	125	25	25	25	25
	NBL	75	25	25	25	25
3. Springtown Boulevard/Bluebell Drive	WBL ¹	100	200	200	175	175
	WBR	100	25	25	25	25
	SBL	75	50	50	50	50

Notes: Storage and queue lengths are measured in feet.

1. The average queue for this movement is contained within the storage length.

Source: Fehr & Peers, 2018.

The median between the intersections of Springtown Boulevard/Lassen Road and Springtown Boulevard/Bluebell Drive was evaluated to determine if the design provides sufficient queue storage. With the addition of project traffic, 95th percentile queues for the northbound left movement at the intersection of Springtown Boulevard/Lassen Road and for the southbound left movement at the intersection of Springtown Boulevard/Bluebell Drive would be contained within the available storage.

The addition of Project traffic to Near-Term without Project conditions would not increase the westbound left turn queue at the Springtown/Bluebell intersection, which already exceeds the storage length under existing conditions.

The existing PM peak hour congestion on northbound Springtown Boulevard south of the Bluebell Drive intersection, discussed in the existing conditions section, would continue under the Near-Term condition, but would not be expected to worsen substantially due to Project traffic, because most Project traffic would not need to weave from left to right, which is the primary source of the congestion.

Table 12: Near-Term with Project 95th Percentile Vehicle Queues

Intersection	Movement	Storage Length	AM Peak Period		PM Peak Period	
			Without	With Proj	Without	With Proj
2. Springtown Boulevard/Lassen Road	EBR/T/L	125	25	25	25	25
	NBL	75	25	25	25	25
3. Springtown Boulevard/Bluebell Drive	WBL ¹	100	200	200	175	175
	WBR	100	25	25	25	25
	SBL	75	50	50	50	50

Notes: Storage and queue lengths are measured in feet.

1. The average queue for this movement is contained within the storage length.

Source: Fehr & Peers, 2018.

Roadway Segment Operations

Near-term operations were evaluated using the methods described in Chapter 1 for the daily level of service at the study roadway segments, as summarized in **Table 13**. The daily project traffic volumes in Table 7 were added to the near-term traffic volumes to estimate the Near-term with Project traffic volumes. Volume on all the roadway segments increase with the addition of project traffic, but both roadway segments would continue to operate at an acceptable level of service.

Table 13: Near-Term with Project Daily Roadway Segment Analysis

Roadway Segment	Near-term without Project Conditions			Near-term with Project Conditions		
	Average Daily Traffic	V/C Ratio	LOS	Average Daily Traffic	V/C Ratio	LOS
Springtown Boulevard between Bluebell Drive and I-580 Westbound Ramps	24,000	0.60	B	25,000	0.63	B
First Street between I-580 Westbound Ramps and I-580 Eastbound Ramps	30,000	0.75	C	30,600	0.77	C

Source: Fehr & Peers, 2018.

6. Cumulative Traffic Conditions

This chapter discusses Cumulative traffic conditions both without and with the Project. The future conditions analysis considers development within the City of Livermore as described in the Livermore General Plan and the Livermore Downtown Specific Plan.

Cumulative Traffic Forecasts

The future conditions analysis considers development consistent with the City of Livermore General Plan and includes the I-580/First Street Interchange modification. Design details from the project specification report were used to determine the lane configurations at the study intersections.

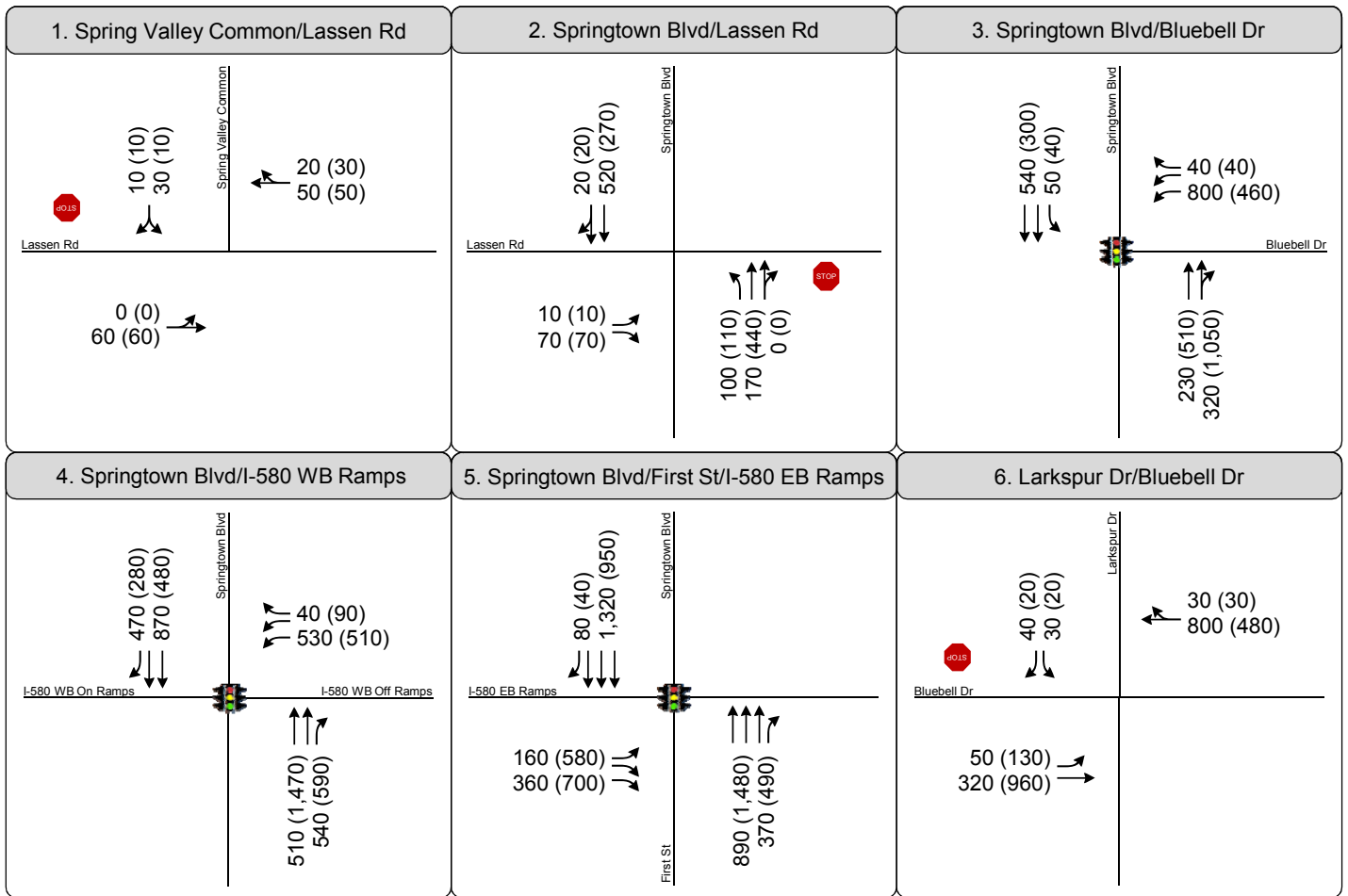
To develop cumulative traffic forecasts, the 2040 ACTC travel demand model was used in combination with a review of recent forecasts prepared near the study area. The model growth trends were applied to the existing traffic counts. Recent forecasts prepared for other projects were reviewed for consistency. Household and employment growth assumed for the City of Livermore are presented in **Table 14**.

Table 14: Cumulative Land Use Growth

	Base Year Households	2040 Households	% Growth	Base Year Employment	2040 Employment	% Growth
City of Livermore	29,432	40,935	39%	48,164	67,107	28%

Source: Alameda CTC Travel Demand Model; Fehr & Peers, 2018.

Minor adjustments were made to the forecasts to balance traffic volumes between closely spaced intersections in the study area. The resulting Cumulative without Project forecasts are presented on **Figure 10**, which are representative of conditions over the next 20 to 25 years. The Project volumes from Figure 5 were added to the Cumulative without Project traffic volumes to represent Cumulative with Project conditions, as presented on **Figure 11**.



LEGEND

XX (YY) AM (PM) Peak Hour Traffic Volumes



Signalized Intersection



Stop Sign



Project Site

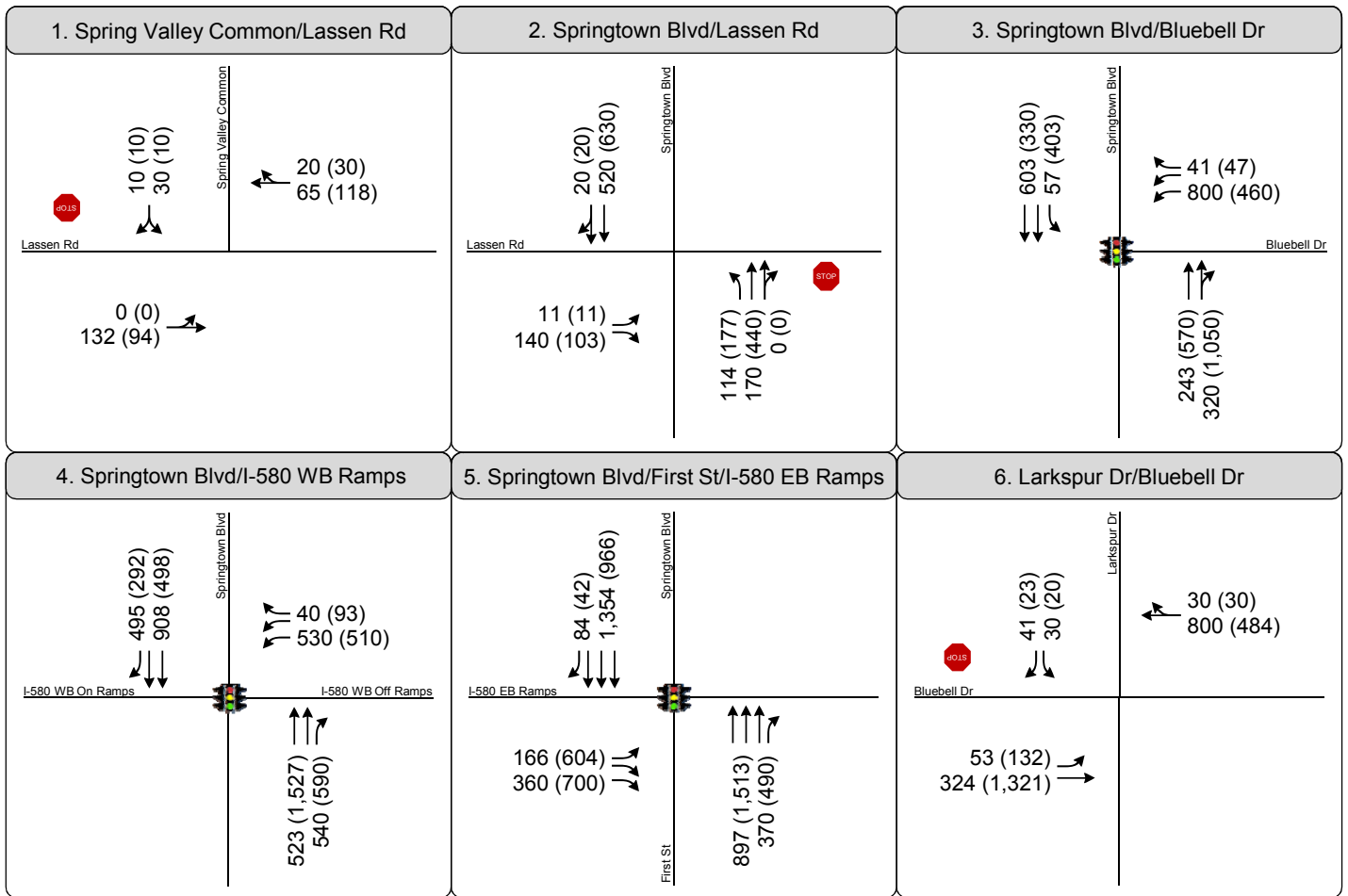


Study Intersection



Figure 10

Cumulative without Project Peak Hour
Intersection Traffic Volumes, Lane Configurations and Traffic Controls



LEGEND

XX (YY) AM (PM) Peak Hour Traffic Volumes



Signalized Intersection



Stop Sign



Project Site



Study Intersection

Figure 11

Cumulative with Project Peak Hour Intersection Traffic Volumes, Lane Configurations and Traffic Controls



Analysis of Cumulative Conditions

Intersection Operations

Cumulative without and with Project conditions were evaluated using the methods described in Chapter 1. For the analysis of cumulative conditions, peak hour factors, pedestrian, bicycle and heavy vehicle volumes were left unchanged from the analysis of existing condition. Signal timings were optimized to better accommodate projected traffic volumes. The same signal timings were used for the analysis of without and with project conditions. The analysis results are presented in **Table 15**, based on the traffic volumes presented on Figure 10 and Figure 11.

In the Cumulative condition, both without and with the Project, the southbound approach at the intersection of Bluebell Drive/Larkspur Drive would operate at LOS F during the PM peak hour. The project is expected to add right-turning vehicles (as opposed to left-turning vehicles that endure higher delay) to the southbound right-turn movement at the intersection and cause the average delay of the approach to improve with the addition of project traffic, resulting in a less-than-significant impact at that intersection. All other intersections would operate at an acceptable level of service.

Table 15: Cumulative with Project Peak Hour Intersection LOS

Intersection	Control ¹	Peak Hour	Cumulative without Project		Cumulative with Project	
			Delay ²	LOS	Delay ²	LOS
1. Lassen Road/Spring Valley Common	SSSC	AM PM	2.2 (9.3) 1.1 (9.0)	A (A) A (A)	1.5 (9.8) 0.7 (9.6)	A (A) A (A)
2. Springtown Boulevard/Lassen Road	SSSC	AM PM	2.0 (11.0) 1.8 (9.7)	A (B) A (A)	2.9 (11.9) 2.6 (10.0)	A (B) A (B)
3. Springtown Boulevard/Bluebell Drive	Signalized	AM PM	12.0 11.4	B B	10.8 11.6	B B
4. Springtown Boulevard/I-580 Westbound Ramps	Signalized	AM PM	7.1 7.1	A A	6.5 7.2	A A
5. Springtown Boulevard/I-580 Eastbound Ramps	Signalized	AM PM	8.2 36.1	A D	11.7 35.8	B D
6. Bluebell Drive/Larkspur Drive	SSSC	AM PM	1.9 (26.5) 2.1 (55.2)	A (D) A (F)	1.9 (26.7) 2.1 (53.3)	A (D) A (F)

Notes: **Bold** text indicates potentially unacceptable intersection operations.

1. Signal = Signalized intersection; SSSC = Side-street stop-controlled intersections; traffic on the main street does not stop while traffic on the side-street is controlled by a stop sign.
2. Average intersection delay is calculated for all signalized intersections using the 2010 HCM method. For SSSC intersections, average delay or LOS is listed first followed by the delay or LOS for the worst approach in parentheses.

Source: Fehr & Peers, 2018



To assess the need for signalization of stop-controlled intersections, the Peak Hour Volume Warrant (Warrant 3B) and the Peak Hour Delay Warrant (Warrant 3A) were used in this study as a supplemental analysis tool to assess operations at the unsignalized intersections of Springtown Boulevard/Lassen Road and Bluebell Drive/Larkspur Drive. Neither unsignalized intersections meet peak hour signal warrants in the cumulative condition, even with the addition of Project traffic.

Vehicle Queues

As shown in **Table 16**, the addition of project traffic is expected to increase the 95th percentile vehicle queues for the westbound left movement and the southbound left movement at the intersection of Springtown Boulevard/Bluebell Drive by 25 feet (1 vehicle) during the AM peak hour.

The median between the intersections of Springtown Boulevard/Lassen Road and Springtown Boulevard/Bluebell Drive was evaluated to determine if the design provides sufficient queue storage. With the addition of project traffic, 95th percentile queues for the northbound left movement at the intersection of Springtown Boulevard/Lassen Road and for the southbound left movement at the intersection of Springtown Boulevard/Bluebell Drive would be contained within the available storage.

The westbound left turn queue at the Springtown/Bluebell intersection, which already exceeds the storage length under existing conditions, would continue to exceed storage length in the Cumulative Without Project and Cumulative With Project conditions.

The existing PM peak hour congestion on northbound Springtown Boulevard south of the Bluebell Drive intersection, discussed in the existing conditions section, would continue under the Cumulative condition, but would not be expected to worsen substantially due to Project traffic, because most Project traffic would not need to weave from left to right, which is the primary source of the congestion.

Roadway Segment Operations

Cumulative operations were evaluated using the methods described in Chapter 1 for the daily level of service at the study roadway segments, as summarized in **Table 17**. The daily project traffic volumes in Table 7 were added to the cumulative traffic volumes to estimate the Cumulative with Project traffic volumes. Volume on all the roadway segments increase with the addition of project traffic, but both roadway segments continue to operate at an acceptable level of service.

Table 16: Cumulative with Project 95th Percentile Vehicle Queues

Intersection	Movement	Storage Length	AM Peak Period		PM Peak Period	
			Without	With Proj	Without	With Proj
2. Springtown Boulevard/Lassen Road	EBR/T/L	125	25	25	25	25
	NBL	75	25	25	25	25
3. Springtown Boulevard/Bluebell Drive	WBL ¹	100	175	200	150	150
	WBR	100	25	25	25	25
	SBL	75	50	75	75	75

Notes: Storage and queue lengths are measured in feet.

1. The average queue for this movement is contained within the storage length.

Source: Fehr & Peers, 2018.

Table 17: Cumulative with Project Daily Roadway Segment Analysis

Roadway Segment	Cumulative without Project Conditions			Cumulative with Project Conditions		
	Average Daily Traffic	V/C Ratio	LOS	Average Daily Traffic	V/C Ratio	LOS
Springtown Boulevard between Bluebell Drive and I-580 Westbound Ramps	25,000	0.42	A	26,000	0.43	A
First Street between I-580 Westbound Ramps and I-580 Eastbound Ramps	33,000	0.55	A	33,600	0.56	A

Source: Fehr & Peers, 2018.

7. Vehicle Miles of Travel

In response to Senate Bill 743 (SB 743), the Office of Planning and Research (OPR) has updated California Environmental Quality Act (CEQA) guidelines to include new transportation-related evaluation metrics. Draft guidelines were developed in August 2014, with updated draft guidelines prepared January 2016, which incorporated public comments from the August 2014 guidelines. OPR released final proposed guidelines on November 27, 2017. The final proposed Guidelines include a new Section 15064.3 on VMT analysis and thresholds for land use developments. OPR also released a Technical Advisory on Evaluating Transportation Impacts in CEQA. New Guidelines do not take effect until January 1, 2020 unless the lead agency adopts them earlier. Neither the City of Livermore nor the Alameda CTC has established any standards or thresholds on vehicle miles of travel (VMT). Therefore, the new guidelines have not yet been adopted and are not in effect at this time.

The final guidelines may change based on the comments received during the Natural Resources Agency formal administrative rulemaking process for adoption under the Administrative Procedure Act. Since there are no standards in effect on VMT analysis, a preliminary assessment of the VMT generated by the proposed project was prepared for information and disclosure purposes only. No determination on the significance of VMT impacts is made in this document since none is legally required.

Analysis Methodology

VMT estimates for the project were estimated using the Alameda County Transportation Commission's travel demand model (ACTC Model, 2015). The project site was added into the model, and the project's VMT was estimated through a select link analysis of the node representing the project. The average household population of the project was assumed to be similar to the neighboring traffic analysis zones (TAZs).

VMT estimates within the City of Livermore were estimated using the regional Metropolitan Transportation Commission's travel demand model (MTC Model, 2015). The MTC Model is a regional model for the nine county Bay Area. Citywide VMT was reported as the sum of vehicle miles traveled for trips going to or from TAZs within the City of Livermore. Total household, population, and employment data for the TAZs within the City of Livermore were also pulled from the model. The resulting metric is a summary of the average VMT per household and service population (residents and workers). For purposes of comparison to the proposed project, the total home-based VMT per residential population was used.

Analysis Results

As shown in **Table 18**, the project has the potential to generate approximately 13,300 vehicle miles of travel per day. The project would generate VMT per capita (residents only) at a level approximately 30 percent more than the existing City-wide average.

Table 18: Project VMT

Scenario	Households	Population	Employment	Daily Residential VMT	Residential VMT per Capita (VMT/Population)
Project Only	196	544	0	13,300	24.4
Existing City of Livermore	--	60,510	17,472	1,136,000	18.8

Source: Alameda CTC Model, Fehr & Peers, 2018.

VMT Conclusion

Results of the VMT analysis indicate that the Project would contribute to an increase in vehicle miles of travel per resident and would increase the VMT per capita when compared to the current citywide average.

8. Site Plan Review

This chapter provides an assessment of parking supply, site access and internal circulation for vehicles, pedestrians, bicycles, and emergency vehicles based on the conceptual site plan presented previously on Figure 2. The site plan is dated January 9, 2018.

Parking

According to the Project Plan Set, the Project proposes to provide 389 covered parking spaces, 67 on-street parking spaces, and 3 off-street ADA accessible parking spaces. The off-street spaces (70 total) are uncovered and available for visitor parking.

As presented in **Table 19**, the City of Livermore's parking requirements presented in Section 4.04.020 of the City of Livermore's Development Code requires a development of this size to provide 441 automobile parking spaces; 392 of which should be provided for residents at a rate of two spaces per unit.

Table 19: Parking Requirements

	Number of Units	Automobile Parking Rate	Required Spaces	Proposed Spaces	Surplus/(Deficit)
2+ Bedroom Townhomes	196 units	2 spaces per unit	392	392	0
Guest Parking Spaces		1 space per 4 units	49	67	+18
Total Parking Spaces			441	459	+18

Source: Livermore Development Code, Fehr & Peers, 2018.

On-street parking facilities are in accordance to the standards detailed in the City of Livermore's Standard Details for streets.

Vehicular Site Access and Circulation

Primary vehicular access to the project site would be provided by an unsignalized intersection on Lassen Road off Springtown Boulevard. As presented in the prior chapters, the site access intersection would operate at acceptable service levels.

Internal vehicular circulation would be provided by two primary internal roadways, both 34' wide (curb to curb) with a 26-foot traveled way serving a two-way traffic and 8 feet for parking on one side. The current site plan does not specify traffic control at any of the internal intersections.

Recommendation 1: Referring to Figure 2, as a part of the final site plan, consider providing stop signs and striping stop bars at the following locations:

- The southbound approach of Court A at the intersection of Street A/Court A (east).
- The northbound approach of Street B at the intersection of Street A/Street B (west).
- The northbound approach of Street B at the intersection of Street A/Street B (east).

Emergency Vehicle

Factors such as number of access points, roadway width, and proximity to fire stations determine whether a project provides sufficient emergency access. Lassen Road provides a 40-foot wide point of entry from curb to curb and internal roadways are between 20 to 26-feet wide, excluding on-street parking. The preliminary fire access plan, shown in **Figure 12**, shows the trajectory of a Livermore Pleasanton Fire Department truck through the site plan. The proposed width of internal roadways is sufficient for emergency vehicle circulation.

The fire station most likely to serve the site is Livermore Pleasanton Fire Department Station #8 located on Scenic Avenue, located one and a half miles from the project site. Emergency vehicles would travel west along Scenic Avenue, south on Heather Lane and Bluebell Drive, and north on Springtown Boulevard before turning left onto Lassen Road. Given these considerations, the Project provides sufficient emergency access.

Pedestrian & Bicycle Access and Circulation

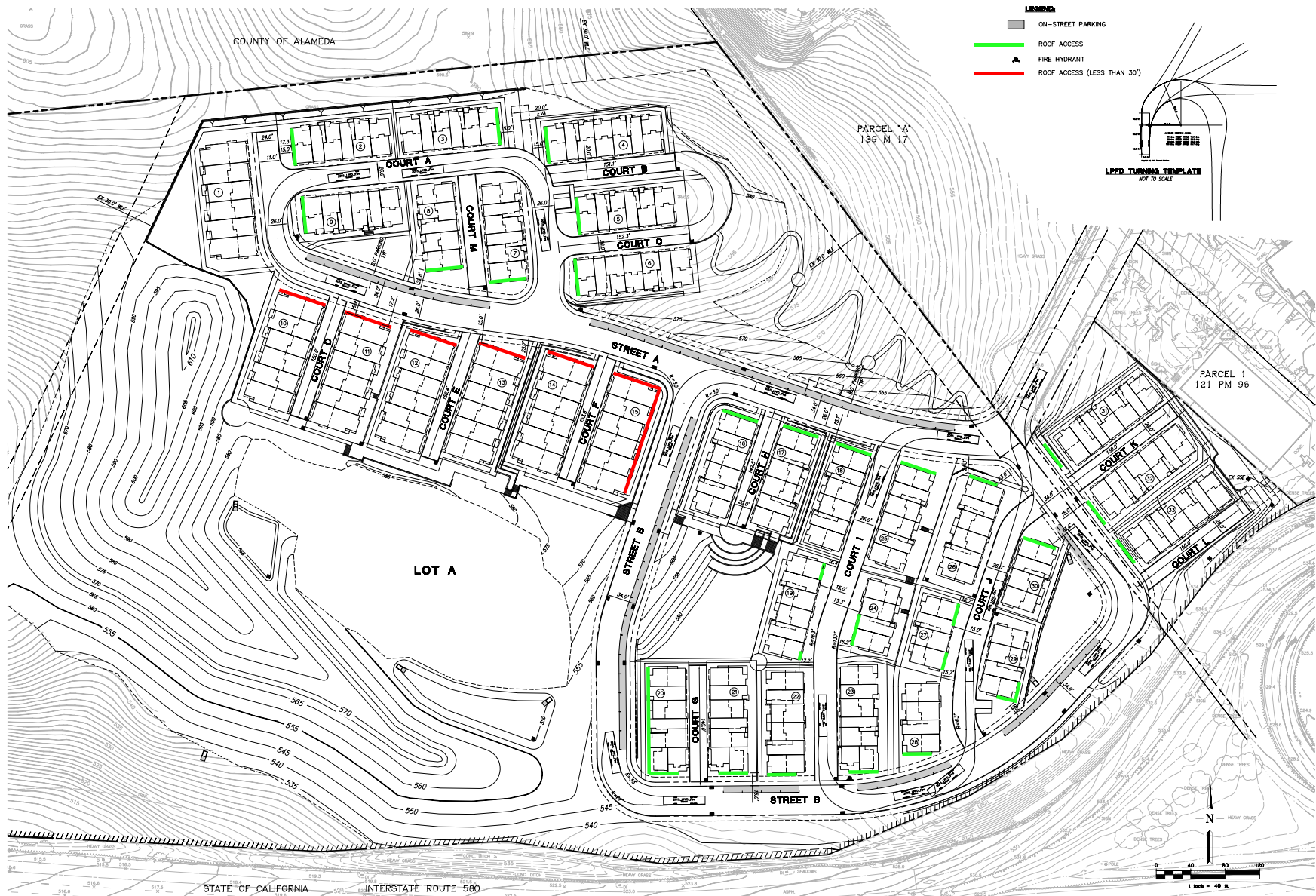
There are insufficient details on the conceptual project site plan to evaluate pedestrian and bicycle access and circulation to and within the site. Bicycle lanes are not currently planned along the roadways around the project site.

Recommendation 2: As a part of the final site plan, provide ADA accessible sidewalks² along roadways adjacent to residential townhomes and on-street parking. Sidewalks, which are contiguous to a street, should not exceed the grade established for the adjacent street; they are exempt from a 5% grade requirement. Additionally, provide ADA accessible pedestrian paths to the entryway of each residential townhome. Consider providing crosswalks at the intersections of Street A/Court A, Street A/Street B (west), and Street A/Street B (east).

² A minimum sidewalk width of 5' is required per Section 12.04.030 of the Livermore Municipal Code

Transit Access and Circulation

It is expected that some residents and guests may use transit to access the project site. The nearest bus stop to the project site is located past the intersection of Springtown Boulevard and Bluebell Drive in the northbound direction. Sidewalks and crosswalks with access to the bus stop at the intersection of Springtown Boulevard and Bluebell Drive are provided.



Site Plan Source: Ruggeri-Jensen-Azar, Dec. 15, 2017.

Figure 12

Emergency Vehicle Access and Circulation

9. General Plan Alternative Evaluation

A project alternative reflecting the existing General Plan land use designations for the site was defined by City staff as follows:

- Low-Intensity Industrial (LII) Use: 6.75 acres at 45% coverage, two stories – 264,600 SF
- Warehouse Use: 6.75 acres, 45% coverage, one story – 132,300 SF
- Service Commercial Use: 1.2 acres at 0.3 FAR – 15,700 SF
- Limited Agriculture Use: 20 acres

It is noted that office uses are an allowable use for the site, per the General Plan. However, the above land uses were considered by the City to be a reasonably foreseeable development envelope for the site.

Trip Generation

Table 20 presents the estimated trip generation for the existing General Plan designations. Because the types and amounts of uses on the limited agriculture portion of the site that would generate peak hour trips are speculative, and are also likely to be very low-generating relative to the other allowed uses, this component of the site was not included in the trip generation estimate. This alternative is estimated to generate approximately 2,985 daily trips, 354 AM peak hour trips, and 386 PM peak hour trips; these are substantially higher than the proposed project trip generation estimates.

No pass-by or diverted-trip reductions, to account for vehicle trips already on the roadway network stopping at the site as part of a planned trip, was applied to the retail use, since the effect on the General Plan Alternative's net trip generation would be very small. Furthermore, internalization of trips between the light industrial and retail uses would be relatively small, and therefore a reduction for internal site trips was also not taken.

Trip Distribution and Assignment

The General Plan Alternative trips were distributed to the roadway network using a distribution derived from the Alameda CTC Travel Demand Model. The model was run with the proposed uses on the site, and a select-zone assignment was used to derive the distribution, shown in **Figure 13**. The resulting General Plan Alternative trip assignment is shown in **Figure 14**.

Table 20: General Plan Alternative Vehicle Trip Generation Estimates

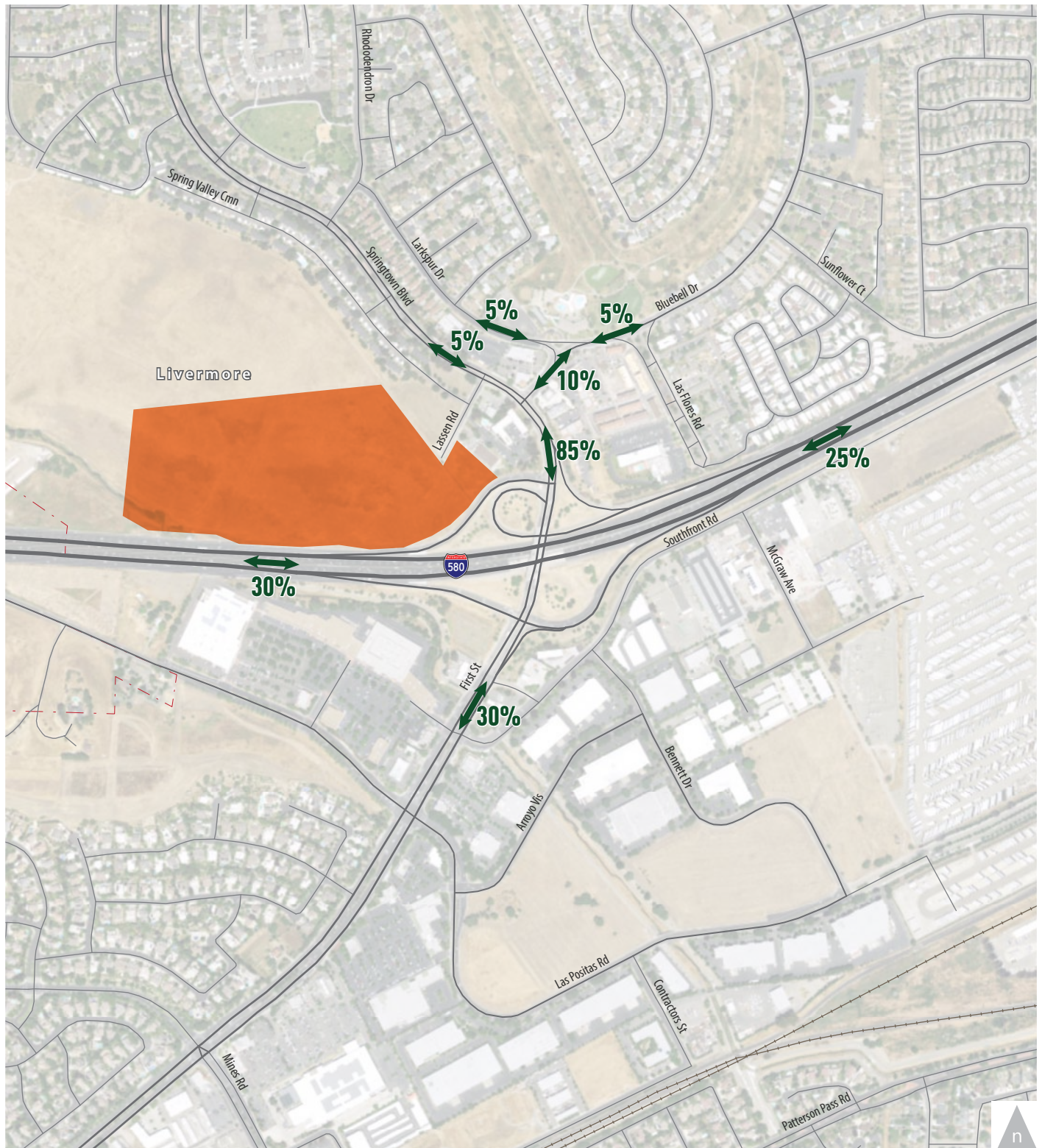
Use	Size	Weekday						
		Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Retail ¹	15,700 square feet	670	9	6	15	28	30	58
Light Industrial ²	264,600 square feet	1,844	214	29	243	31	226	257
Warehouse ³	132,300 square feet	471	76	20	96	18	53	71
Total Project Trips		2,985	299	55	354	77	309	386

1. ITE land use category 820 - Retail (Adj Streets, 7-9A, 4-6P):
Daily: $(T) = 42.7 (X)$
AM Peak Hour: $T = 0.96 (X)$; Enter = 62%; Exit = 38%
PM Peak Hour: $T = 3.71 (X)$; Enter = 48%; Exit = 52%
2. ITE land use category 110 - Light Industrial (Adj Streets, 7-9A, 4-6P):
Daily: $(T) = 6.97 (X)$
AM Peak Hour: $T = 0.92 (X)$; Enter = 88%; Exit = 12%
PM Peak Hour: $T = 0.97 (X)$; Enter = 12%; Exit = 88%
3. ITE land use category 150 - Warehouse (Generator, 7-9A, 4-6P):
Daily: $(T) = 3.56 (X)$
AM Peak Hour: $\ln(T) = 0.55 \ln(X) + 1.88$; Enter = 79%; Exit = 21%
PM Peak Hour: $\ln(T) = 0.64 \ln(X) + 1.14$; Enter = 25%; Exit = 75%

Source: *Trip Generation Manual* (9th Edition), ITE, 2012; Fehr & Peers, 2018.

Existing Conditions

Figure 15 presents the Existing with General Plan Alternative traffic volumes at the study intersections. Intersection operations were evaluated using the methods described in Chapter 1. The Existing with General Plan Alternative analysis results are presented in **Table 21**, based on the traffic volumes presented on Figure 15. While the LOS grade worsens at two intersections, all study intersections would continue to operate at acceptable LOS with the addition of the General Plan Alternative traffic.



LEGEND



Project Site

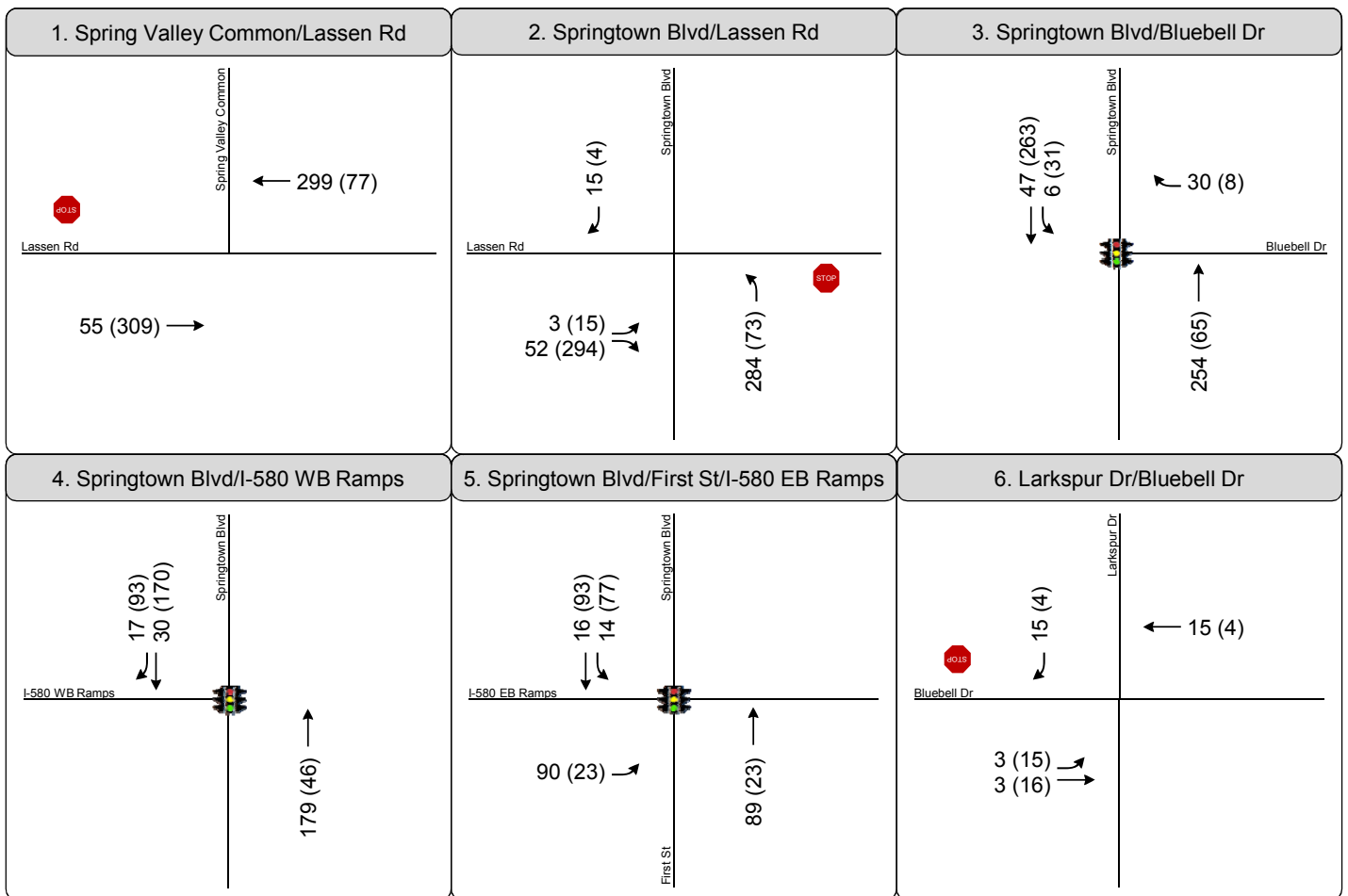


Project Trip Distribution

Figure 13

General Plan Alternative Trip Distribution





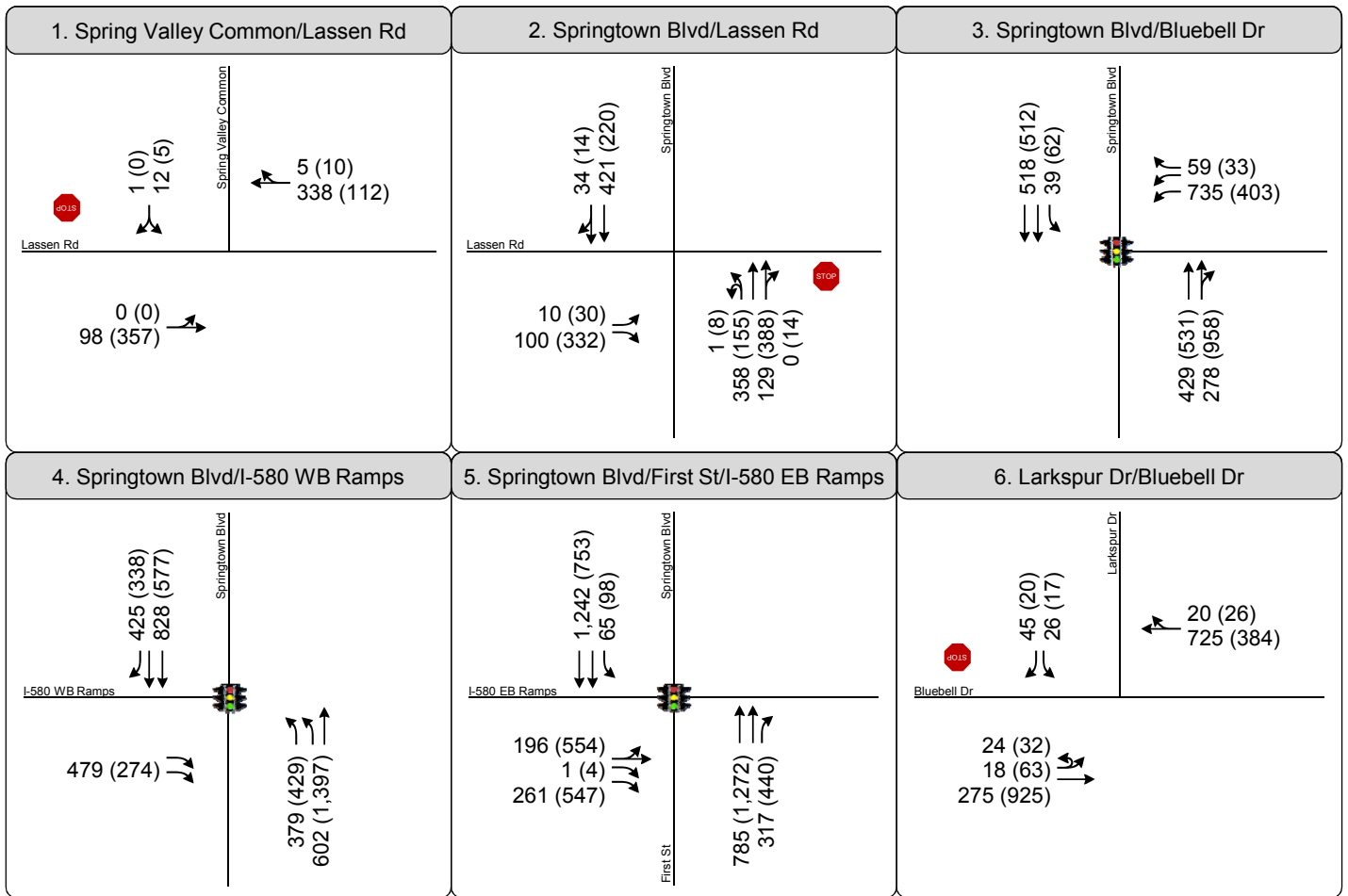
LEGEND

XX (YY) AM (PM) Peak Hour Traffic Volumes Signalized Intersection Stop Sign

Project Site Study Intersection

Figure 14

General Plan Alternative Project Trip Assignment



LEGEND

XX (YY) AM (PM) Peak Hour Traffic Volumes



Signalized Intersection



Stop Sign



Project Site



Study Intersection



Figure 15

Existing with General Plan Alternative Peak Hour Intersection Traffic Volumes, Lane Configurations and Traffic Controls

Table 21: Existing with General Plan Alternative Peak Hour Intersection LOS

Intersection	Control ¹	Peak Hour	Existing		Existing with General Plan Project	
			Delay ²	LOS	Delay ²	LOS
1. Lassen Road/Spring Valley Common	SSSC	AM PM	1.2 (9.0) 0.5 (9.0)	A (A) A (A)	0.3 (11.9) 0.1 (12.2)	A (B) A (B)
2. Springtown Boulevard/Lassen Road	SSSC	AM PM	1.8 (11.0) 1.7 (11.0)	A (B) A (B)	4.9 (12.9) 5.3 (13.4)	A (B) A (B)
3. Springtown Boulevard/Bluebell Drive	Signalized	AM PM	10.4 19.3	B B	13.1 21.4	B C
4. Springtown Boulevard/I-580 Westbound Ramps ³	Signalized	AM PM	6.5 6.4	A A	6.3 6.8	A A
5. Springtown Boulevard/I-580 Eastbound Ramps	Signalized	AM PM	13.8 30.5	B C	15.9 36.3	B D
6. Bluebell Drive/Larkspur Drive	SSSC	AM PM	1.0 (19.6) 0.6 (26.7)	A (C) A (D)	1.2 (19.5) 0.7 (26.7)	A (C) A (D)

Notes: **Bold** text indicates potentially unacceptable intersection operations.

1. Signal = Signalized intersection; SSSC = Side-street stop-controlled intersections; traffic on the main street does not stop while traffic on the side-street is controlled by a stop sign.
2. Average intersection delay is calculated for all signalized intersections using the 2010 HCM method for vehicles unless otherwise noted. For SSSC intersections, average delay or LOS is listed first followed by the delay or LOS for the worst approach in parentheses.
3. Results based on HCM 2000 analysis due to limitations of analysis software.

Source: Fehr & Peers, 2018

Table 22 presents the daily roadway segment analysis for the Existing with General Plan Alternative case.

Table 22: Existing with General Plan Alternative Daily Roadway Segment Analysis

Roadway Segment	Existing Conditions			Existing with General Plan Project Conditions		
	Average Daily Traffic	V/C Ratio	LOS	Average Daily Traffic	V/C Ratio	LOS
Springtown Boulevard between Bluebell Drive and I-580 Westbound Ramps	22,000	0.55	A	25,000	0.63	B
First Street between I-580 Westbound Ramps and I-580 Eastbound Ramps	27,000	0.68	B	28,700	0.72	C

Source: Fehr & Peers, 2018.

Near-Term Conditions

The Near-Term with General Plan Alternative traffic volumes were developed by adding the volumes in Figure 15 to the volumes in Figure 8. The resulting volumes are shown in **Figure 16**. The Near-Term with General Plan Alternative analysis results are presented in **Table 23**, based on the traffic volumes presented on **Figure 17**. While the LOS grade worsens at one intersection, all study intersections would continue to operate at acceptable LOS with the addition of General Plan Alternative traffic.

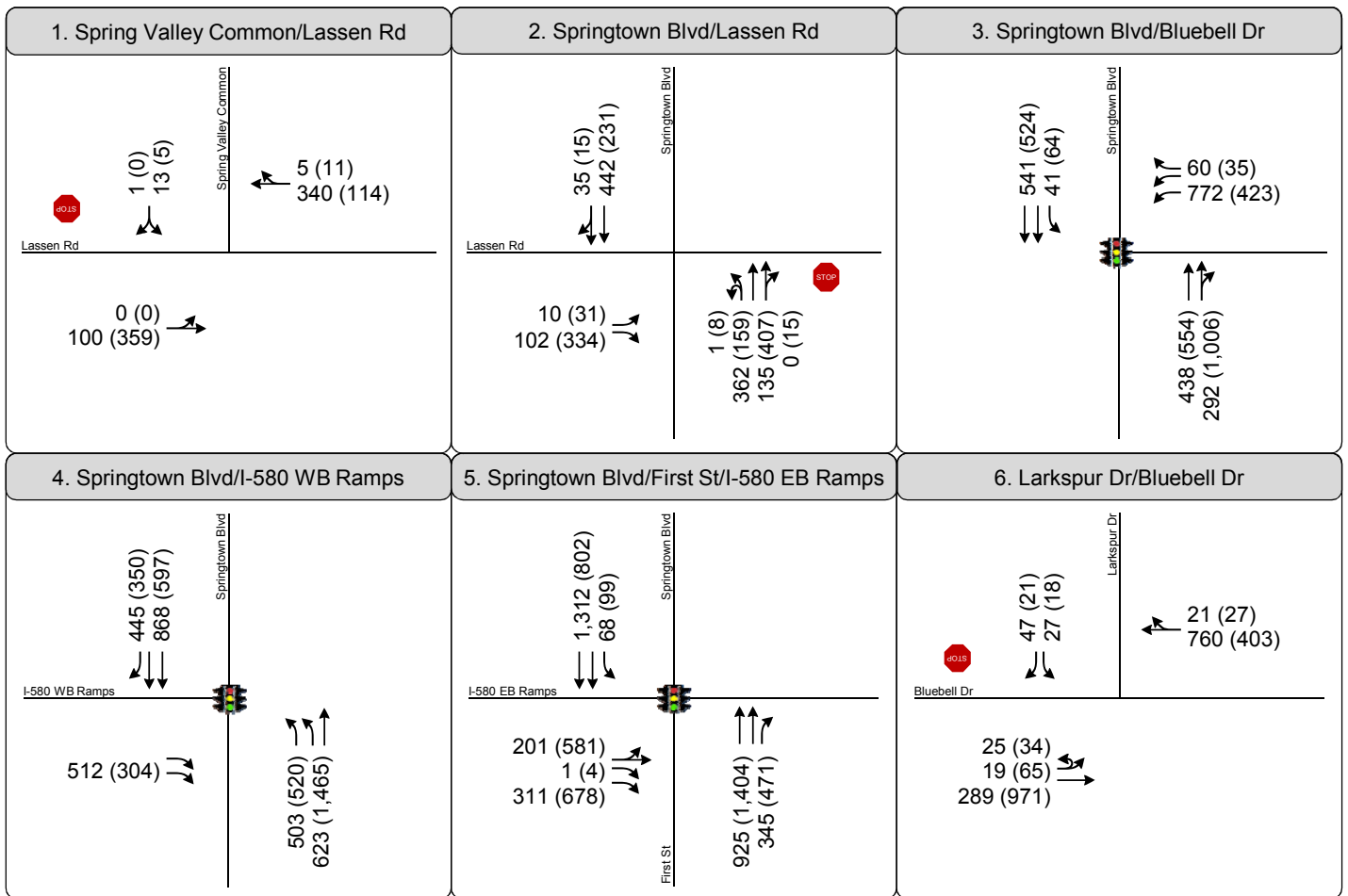
Table 23: Near-Term with General Plan Alternative Peak Hour Intersection LOS

Intersection	Control ¹	Peak Hour	Near-term without Project		Near-term with General Plan Project	
			Delay ²	LOS	Delay ²	LOS
1. Lassen Road/Spring Valley Common	SSSC	AM PM	1.2 (9.0) 0.4 (9.0)	A (A) A (A)	0.4 (11.9) 0.1 (12.3)	A (B) A (B)
2. Springtown Boulevard/Lassen Road	SSSC	AM PM	1.8 (11.2) 1.7 (11.2)	A (B) A (B)	4.9 (13.2) 5.4 (13.8)	A (B) A (B)
3. Springtown Boulevard/Bluebell Drive	Signalized	AM PM	10.8 24.7	B C	13.7 26.3	B C
4. Springtown Boulevard/I-580 Westbound Ramps ³	Signalized	AM PM	8.6 9.7	A A	8.3 9.7	A A
5. Springtown Boulevard/I-580 Eastbound Ramps	Signalized	AM PM	14.8 33.7	B C	16.6 43.7	B D
6. Bluebell Drive/Larkspur Drive	SSSC	AM PM	1.1 (20.9) 0.7 (29.8)	A (C) A (D)	1.3 (20.9) 0.8 (30.0)	A (C) A (D)

Notes: **Bold** text indicates potentially unacceptable intersection operations.

1. Signal = Signalized intersection; SSSC = Side-street stop-controlled intersections; traffic on the main street does not stop while traffic on the side-street is controlled by a stop sign.
2. Average intersection delay is calculated for all signalized intersections using the 2010 HCM method for vehicles unless otherwise noted. For SSSC intersections, average delay or LOS is listed first followed by the delay or LOS for the worst approach in parentheses.
3. Results based on HCM 2000 analysis due to limitations of analysis software.

Source: Fehr & Peers, 2018.



LEGEND

XX (YY) AM (PM) Peak Hour Traffic Volumes



Signalized Intersection



Stop Sign



Project Site

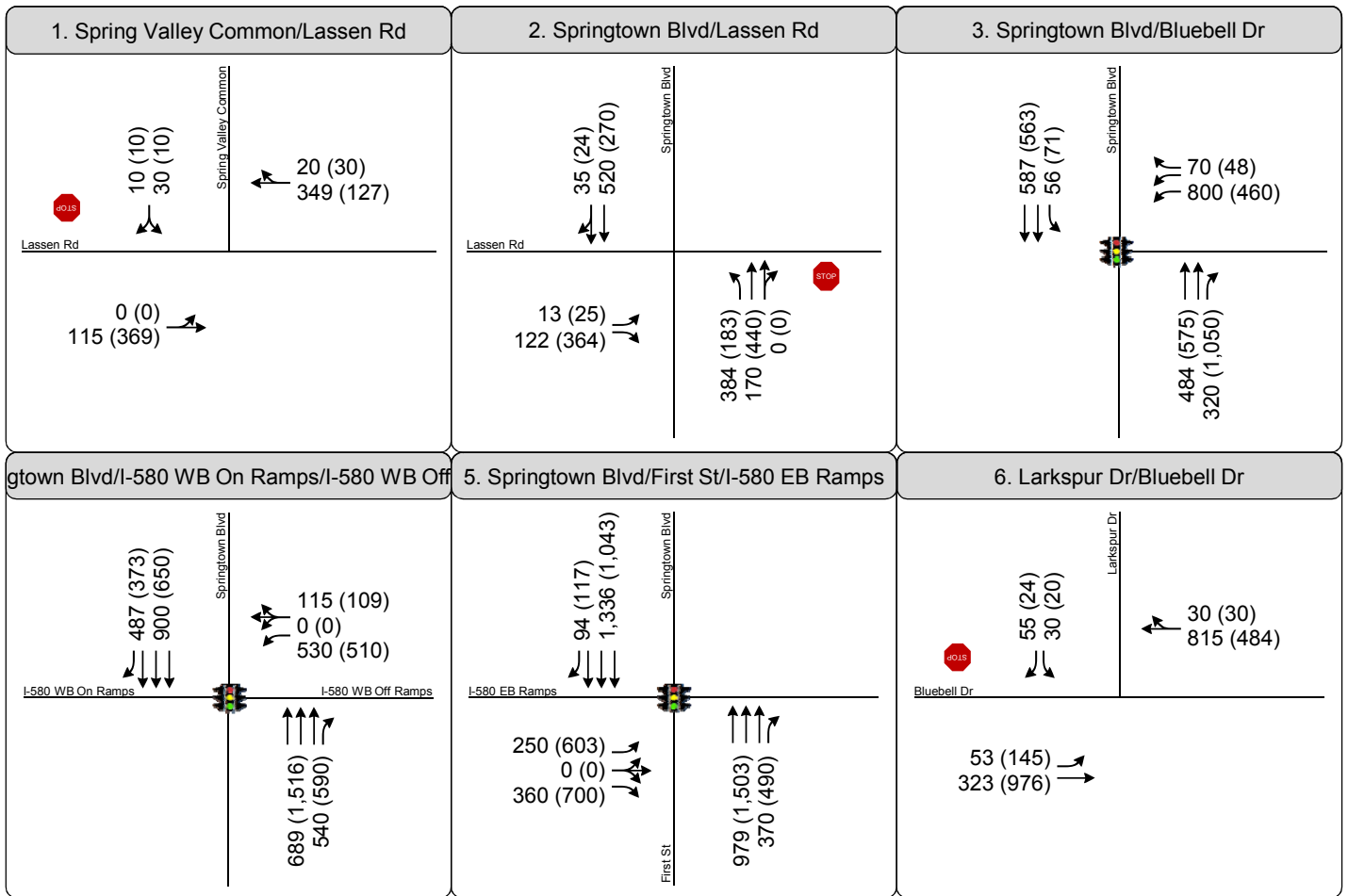


Study Intersection



Figure 16

Near-Term with General Plan Alternative Peak Hour Intersection Traffic Volumes, Lane Configurations and Traffic Controls



LEGEND

XX (YY) AM (PM) Peak Hour Traffic Volumes Signalized Intersection Stop Sign

Project Site Study Intersection



Figure 17
Cumulative with General Plan Alternative Peak Hour
Intersection Traffic Volumes, Lane Configurations and Traffic Controls

Table 24 presents the daily roadway segment analysis for the Near-Term with General Plan Alternative case.

Table 24: Near-Term with General Plan Alternative Daily Roadway Segment Analysis

Roadway Segment	Near-term without Project Conditions			Near-term with General Plan Project Conditions		
	Average Daily Traffic	V/C Ratio	LOS	Average Daily Traffic	V/C Ratio	LOS
Springtown Boulevard between Bluebell Drive and I-580 Westbound Ramps	24,000	0.60	B	27,000	0.68	B
First Street between I-580 Westbound Ramps and I-580 Eastbound Ramps	30,000	0.75	C	31,700	0.79	C

Source: Fehr & Peers, 2018.

Cumulative Conditions

The Cumulative with General Plan Alternative traffic volumes were developed by adding the volumes in Figure 15 to the volumes in Figure 10. The resulting volumes are shown in Figure 17. The Cumulative with General Plan Alternative analysis results are presented in **Table 25**, based on the traffic volumes presented on Figure 17. With or without the General Plan Alternative traffic, the worst movement at the intersection of Bluebell Drive/Larkspur Drive would deteriorate to LOS F in both peak hours, although the overall intersection LOS would remain LOS A.

Table 26 presents the daily roadway segment analysis for the Cumulative with General Plan Alternative case.

Vehicle Miles of Travel

A vehicle miles of travel assessment was also prepared for the General Plan Alternative, which includes service commercial use (retail) that was assumed to be local serving. For this assessment, the retail uses were excluded from the VMT assessment. Based on information presented in the Technical Advisory, new retail development typically redistributes shopping trips, and the addition of retail, especially local serving retail, tends to shorten trips and reduce VMT. As the retail included in the General Plan Alternative is less than 50,000 square feet, the size which may distinguish local-serving from regional retail, the VMT impacts of the potential retail component of the General Plan Alternative are expected to be minimal.

Table 25: Cumulative with General Plan Alternative Peak Hour Intersection LOS

Intersection	Control ¹	Peak Hour	Cumulative without Project		Cumulative with General Plan Project	
			Delay ²	LOS	Delay ²	LOS
1. Lassen Road/Spring Valley Common	SSSC	AM PM	2.2 (9.3) 1.1 (9.0)	A (A) A (A)	0.9 (12.4) 0.4 (11.1)	A (A) A (B)
2. Springtown Boulevard/Lassen Road	SSSC	AM PM	2.0 (11.0) 1.8 (9.7)	A (B) A (A)	4.9 (11.7) 5.2 (13.6)	A (B) A (B)
3. Springtown Boulevard/Bluebell Drive	Signalized	AM PM	12.0 11.4	B B	12.4 12.6	B B
4. Springtown Boulevard/I-580 Westbound Ramps	Signalized	AM PM	7.1 7.1	A A	7.0 7.1	A A
5. Springtown Boulevard/I-580 Eastbound Ramps	Signalized	AM PM	8.2 36.1	A D	11.2 35.5	B D
6. Bluebell Drive/Larkspur Drive	SSSC	AM PM	1.9 (26.5) 2.1 (55.2)	A (D) A (F)	2.2 (26.4) 2.3 (58.5)	A (D) A (F)

Notes: **Bold** text indicates potentially unacceptable intersection operations.

1. Signal = Signalized intersection; SSSC = Side-street stop-controlled intersections; traffic on the main street does not stop while traffic on the side-street is controlled by a stop sign.
2. Average intersection delay is calculated for all signalized intersections using the 2010 HCM method. For SSSC intersections, average delay or LOS is listed first followed by the delay or LOS for the worst approach in parentheses.

Source: Fehr & Peers, 2018.

Table 26: Cumulative with General Plan Alternative Daily Roadway Segment Analysis

Roadway Segment	Cumulative without Project Conditions			Cumulative with General Plan Project Conditions		
	Average Daily Traffic	V/C Ratio	LOS	Average Daily Traffic	V/C Ratio	LOS
Springtown Boulevard between Bluebell Drive and I-580 Westbound Ramps	25,000	0.42	A	28,000	0.47	A
First Street between I-580 Westbound Ramps and I-580 Eastbound Ramps	33,000	0.55	A	34,700	0.58	A

Source: Fehr & Peers, 2018.

The draft guidelines had indicated that retail centers less than 50,000 SF were presumed to be local serving and less than significant, however the metric was later changed to depend on whether or not the proposed retail center increased VMT. Nevertheless, the retail center is too small on its own to be adequately analyzed in a regional model.

As shown in **Table 27**, the General Plan Alternative has the potential to generate approximately 15,700 vehicle miles of travel per day. The General Plan Alternative would generate VMT per capita (workers only) at a level approximately 20 percent less than the existing City-wide average. Results of the VMT analysis indicate that the Project would contribute to a decrease in VMT per capita, as the General Plan Alternative adds employment in a mostly residential area.

Table 27: General Plan Alternative VMT

Scenario	Households	Population	Employment	Daily Work Based VMT	Work VMT per Capita (VMT/Employment)
Project Only	0	0	640	15,700	24.5
Existing City of Livermore	--	60,510	17,472	533,400	30.5

Source: Alameda CTC Model, Fehr & Peers, 2018.

Appendix A:

Traffic Counts



Weekday Counts

ALL TRAFFIC DATA

(916) 771-8700

orders@atdtraffic.com

File Name : 17-07904-001

Date : 11/02/2017

Unshifted Count = All Vehicles & Utturns

	Lassen Rd Southbound					Spring Valley Common Westbound					Lassen Rd Northbound					Spring Valley Common Eastbound					Total	Utturns Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
7:00	0	8	0	0	8	0	0	0	0	0	0	10	0	0	10	3	0	0	0	3	21	0
7:15	0	2	2	0	4	0	0	0	0	0	0	1	0	0	1	2	0	0	0	2	7	0
7:30	0	9	1	0	10	0	0	0	0	0	0	4	0	0	4	4	0	0	0	4	18	0
7:45	0	10	3	0	13	0	0	0	0	0	0	7	0	0	7	1	0	0	0	1	21	0
Total	0	29	6	0	35	0	0	0	0	0	0	22	0	0	22	10	0	0	0	10	67	0
8:00	0	9	0	0	9	0	0	0	0	0	0	13	0	0	13	4	0	0	0	4	26	0
8:15	0	11	1	0	12	0	0	0	0	0	0	11	0	0	11	1	0	1	0	2	25	0
8:30	0	7	0	0	7	0	0	0	0	0	0	11	0	0	11	0	0	0	0	0	18	0
8:45	0	3	1	0	4	0	0	0	0	0	1	5	0	0	6	2	0	0	0	2	12	0
Total	0	30	2	0	32	0	0	0	0	0	1	40	0	0	41	7	0	1	0	8	81	0
16:00	0	7	1	0	8	0	0	0	0	0	0	4	0	0	4	2	0	0	0	2	14	0
16:15	0	9	1	0	10	0	0	0	0	0	0	3	0	0	3	1	0	0	0	1	14	0
16:30	0	10	2	0	12	0	0	0	0	0	0	15	0	0	15	2	0	0	0	2	29	0
16:45	0	7	1	0	8	0	0	0	0	0	0	8	0	0	8	1	0	0	0	1	17	0
Total	0	33	5	0	38	0	0	0	0	0	0	30	0	0	30	6	0	0	0	6	74	0
17:00	0	11	3	0	14	0	0	0	0	0	0	8	0	0	8	1	0	0	0	1	23	0
17:15	0	7	4	0	11	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	20	0
17:30	0	8	3	0	11	0	0	0	0	0	0	9	0	0	9	1	0	0	0	1	21	0
17:45	0	9	1	0	10	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	15	0
Total	0	35	11	0	46	0	0	0	0	0	0	31	0	0	31	2	0	0	0	2	79	0
Grand Total	0	127	24	0	151	0	0	0	0	0	1	123	0	0	124	25	0	1	0	26	301	0
Apprch %	0.0%	84.1%	15.9%	0.0%		0.0%	0.0%	0.0%	0.0%		0.8%	99.2%	0.0%	0.0%		96.2%	0.0%	3.8%	0.0%			
Total %	0.0%	42.2%	8.0%	0.0%	50.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	40.9%	0.0%	0.0%	41.2%	8.3%	0.0%	0.3%	0.0%	8.6%	100.0%	

AM PEAK HOUR	Lassen Rd Southbound					Spring Valley Common Westbound					Lassen Rd Northbound					Spring Valley Common Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 07:30 to 08:30																					
Peak Hour For Entire Intersection Begins at 07:30																					
7:30	0	9	1	0	10	0	0	0	0	0	0	4	0	0	4	4	0	0	0	4	18
7:45	0	10	3	0	13	0	0	0	0	0	0	7	0	0	7	1	0	0	0	1	21
8:00	0	9	0	0	9	0	0	0	0	0	0	13	0	0	13	4	0	0	0	4	26
8:15	0	11	1	0	12	0	0	0	0	0	0	11	0	0	11	1	0	1	0	2	25
Total Volume	0	39	5	0	44	0	0	0	0	0	0	35	0	0	35	10	0	1	0	11	90
% App Total	0.0%	88.6%	11.4%	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	100.0%	0.0%	0.0%		90.9%	0.0%	9.1%	0.0%		
PHF	.000	.886	.417	.000	.846	.000	.000	.000	.000	.000	.000	.673	.000	.000	.673	.625	.000	.250	.000	.688	.865

PM PEAK HOUR	Lassen Rd Southbound					Spring Valley Common Westbound					Lassen Rd Northbound					Spring Valley Common Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 16:30 to 17:30																					
Peak Hour For Entire Intersection Begins at 16:30																					
16:30	0	10	2	0	12	0	0	0	0	0	0	15	0	0	15	2	0	0	0	2	29
16:45	0	7	1	0	8	0	0	0	0	0	0	8	0	0	8	1	0	0	0	1	17
17:00	0	11	3	0	14	0	0	0	0	0	0	8	0	0	8	1	0	0	0	1	23
17:15	0	7	4	0	11	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	20
Total Volume	0	35	10	0	45	0	0	0	0	0	0	40	0	0	40	4	0	0	0	4	89
% App Total	0.0%	77.8%	22.2%	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	100.0%	0.0%	0.0%		100.0%	0.0%	0.0%	0.0%		
PHF	.000	.795	.625	.000	.804	.000	.000	.000	.000	.000	.000	.667	.000	.000	.667	.500	.000	.000	.000	.500	.767

ALL TRAFFIC DATA

(916) 771-8700

orders@atdtraffic.com

File Name : 17-07904-001

Date : 11/02/2017

Bank 1 Count = Bikes & Peds

	Lassen Rd Southbound					Spring Valley Common Westbound					Lassen Rd Northbound					Spring Valley Common Eastbound					Total	Peds Total
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL		
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	1	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	1	1
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	2	0	0	0	0	4	0	0	0	0	0	0	0	6
Total	0	0	0	0	0	0	0	0	2	0	0	0	0	4	0	0	0	0	0	0	0	6
Grand Total	0	0	0	0	0	0	0	0	2	0	0	1	0	5	1	1	0	0	0	1	2	7
Apprch %	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			100.0%	0.0%	0.0%				
Total %	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	50.0%	0.0%	50.0%		50.0%	0.0%	0.0%		50.0%	100.0%	

AM PEAK HOUR	Lassen Rd Southbound					Spring Valley Common Westbound					Lassen Rd Northbound					Spring Valley Common Eastbound					Total
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	
Peak Hour Analysis From 07:30 to 08:30																					
Peak Hour For Entire Intersection Begins at 07:30																					
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	1
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	1
% App Total	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			100.0%	0.0%	0.0%			
PHF	.000	.000	.000		.000	.000	.000	.000		.000	.000	.000	.000		.000	.250	.000	.000		.250	.250

PM PEAK HOUR	Lassen Rd Southbound					Spring Valley Common Westbound					Lassen Rd Northbound					Spring Valley Common Eastbound					Total
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	
Peak Hour Analysis From 16:30 to 17:30																					
Peak Hour For Entire Intersection Begins at 16:30																					
16:30	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
% App Total	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			
PHF	.000	.000	.000		.000	.000	.000	.000		.000	.250	.000		.250		.000	.000	.000		.000	.250

ALL TRAFFIC DATA

(916) 771-8700

orders@atdtraffic.com

File Name : 17-07904-002

Date : 11/02/2017

Unshifted Count = All Vehicles & Uturns

	Lassen Rd Southbound					Springtown Blvd Westbound					Lassen Rd Northbound					Springtown Blvd Eastbound					Total	Uturns Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
7:00	0	0	0	0	0	15	11	1	2	29	0	0	10	0	10	0	73	4	0	77	116	2
7:15	0	0	0	0	0	9	14	0	1	24	2	0	8	0	10	0	96	2	0	98	132	1
7:30	0	0	0	0	0	14	20	0	0	34	1	0	7	0	8	0	133	6	0	139	181	0
7:45	0	0	0	0	0	25	40	0	1	66	0	0	9	0	9	0	117	4	0	121	196	1
Total	0	0	0	0	0	63	85	1	4	153	3	0	34	0	37	0	419	16	0	435	625	4
8:00	0	0	0	0	0	17	41	0	0	58	4	0	18	0	22	0	69	4	0	73	153	0
8:15	0	0	0	0	0	17	25	0	0	42	2	0	14	0	16	0	102	5	0	107	165	0
8:30	0	0	0	0	0	16	32	1	2	51	0	0	13	0	13	0	59	3	0	62	126	2
8:45	0	0	0	0	0	6	26	4	0	36	1	0	8	0	9	0	67	4	0	71	116	0
Total	0	0	0	0	0	56	124	5	2	187	7	0	53	0	60	0	297	16	0	313	560	2
16:00	0	0	0	0	0	15	59	1	1	76	3	0	7	0	10	0	42	2	0	44	130	1
16:15	0	0	0	0	0	17	79	3	1	100	2	0	5	0	7	0	46	0	0	46	153	1
16:30	0	0	0	0	0	17	78	3	1	99	1	1	17	0	19	0	46	3	0	49	167	1
16:45	0	0	0	0	0	16	81	4	2	103	2	0	10	0	12	0	46	1	0	47	162	2
Total	0	0	0	0	0	65	297	11	5	378	8	1	39	0	48	0	180	6	0	186	612	5
17:00	0	0	0	0	0	18	94	3	0	115	1	0	10	0	11	0	51	0	0	51	177	0
17:15	0	0	0	0	0	24	116	4	5	149	4	0	9	0	13	0	55	3	0	58	220	5
17:30	0	0	0	0	0	16	75	3	1	95	4	1	13	0	18	0	58	3	0	61	174	1
17:45	0	0	0	0	0	24	103	4	2	133	5	0	6	0	11	0	56	4	0	60	204	2
Total	0	0	0	0	0	82	388	14	8	492	14	1	38	0	53	0	220	10	0	230	775	8
Grand Total	0	0	0	0	0	266	894	31	19	1210	32	2	164	0	198	0	1116	48	0	1164	2572	19
Apprch %	0.0%	0.0%	0.0%	0.0%		22.0%	73.9%	2.6%	1.6%		16.2%	1.0%	82.8%	0.0%		0.0%	95.9%	4.1%	0.0%			
Total %	0.0%	0.0%	0.0%	0.0%	0.0%	10.3%	34.8%	1.2%	0.7%	47.0%	1.2%	0.1%	6.4%	0.0%	7.7%	0.0%	43.4%	1.9%	0.0%	45.3%	100.0%	

AM PEAK HOUR	Lassen Rd Southbound					Springtown Blvd Westbound					Lassen Rd Northbound					Springtown Blvd Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 07:30 to 08:30																					
Peak Hour For Entire Intersection Begins at 07:30																					
7:30	0	0	0	0	0	14	20	0	0	34	1	0	7	0	8	0	133	6	0	139	181
7:45	0	0	0	0	0	25	40	0	1	66	0	0	9	0	9	0	117	4	0	121	196
8:00	0	0	0	0	0	17	41	0	0	58	4	0	18	0	22	0	69	4	0	73	153
8:15	0	0	0	0	0	17	25	0	0	42	2	0	14	0	16	0	102	5	0	107	165
Total Volume	0	0	0	0	0	73	126	0	1	200	7	0	48	0	55	0	421	19	0	440	695
% App Total	0.0%	0.0%	0.0%	0.0%		36.5%	63.0%	0.0%	0.5%		12.7%	0.0%	87.3%	0.0%		0.0%	95.7%	4.3%	0.0%		
PHF	.000	.000	.000	.000	.000	.730	.768	.000	.250	.758	.438	.000	.667	.000	.625	.000	.791	.792	.000	.791	.886

PM PEAK HOUR	Lassen Rd Southbound					Springtown Blvd Westbound					Lassen Rd Northbound					Springtown Blvd Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 17:00 to 18:00																					
Peak Hour For Entire Intersection Begins at 17:00																					
17:00	0	0	0	0	0	18	94	3	0	115	1	0	10	0	11	0	51	0	0	51	177
17:15	0	0	0	0	0	24	116	4	5	149	4	0	9	0	13	0	55	3	0	58	220
17:30	0	0	0	0	0	16	75	3	1	95	4	1	13	0	18	0	58	3	0	61	174
17:45	0	0	0	0	0	24	103	4	2	133	5	0	6	0	11	0	56	4	0	60	204
Total Volume	0	0	0	0	0	82	388	14	8	492	14	1	38	0	53	0	220	10	0	230	775
% App Total	0.0%	0.0%	0.0%	0.0%		16.7%	78.9%	2.8%	1.6%		26.4%	1.9%	71.7%	0.0%		0.0%	95.7%	4.3%	0.0%		
PHF	.000	.000	.000	.000	.000	.854	.836	.875	.400	.826	.700	.250	.731	.000	.736	.000	.948	.625	.000	.943	.881

ALL TRAFFIC DATA

(916) 771-8700

orders@atdtraffic.com

File Name : 17-07904-002

Date : 11/02/2017

Bank 1 Count = Bikes & Peds

	Lassen Rd Southbound					Springtown Blvd Westbound					Lassen Rd Northbound					Springtown Blvd Eastbound					Total	Peds Total
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL		
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:30	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1	2
7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Total	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	1	1	4
8:00	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1	1
8:45	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2	1
Total	0	0	0	3	0	0	0	0	0	0	0	0	0	2	0	0	3	0	0	3	3	5
16:00	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	1	1
16:45	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
Total	0	0	0	0	0	0	2	0	0	2	1	0	0	0	1	0	0	0	1	0	3	1
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0
Total	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2	3
Grand Total	0	0	0	8	0	0	2	0	0	2	1	0	0	4	1	0	6	0	1	6	9	13
Apprch %	0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			100.0%	0.0%	0.0%			0.0%	100.0%	0.0%				
Total %	0.0%	0.0%	0.0%		0.0%	0.0%	22.2%	0.0%		22.2%	11.1%	0.0%	0.0%		11.1%	0.0%	66.7%	0.0%		66.7%	100.0%	

AM PEAK HOUR	Lassen Rd Southbound					Springtown Blvd Westbound					Lassen Rd Northbound					Springtown Blvd Eastbound					Total
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	
Peak Hour Analysis From 07:30 to 08:30																					
Peak Hour For Entire Intersection Begins at 07:30																					
7:30	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1
7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
8:00	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	3	0	0	0	0	0	0	0	0	0	3	0	0	1	0	0	1	1
% App Total	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			
PHF	.000	.000	.000		.000	.000	.000	.000		.000	.000	.000	.000		.000	.000	.250	.000		.250	.250

PM PEAK HOUR	Lassen Rd Southbound					Springtown Blvd Westbound					Lassen Rd Northbound					Springtown Blvd Eastbound					Total
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	
Peak Hour Analysis From 17:00 to 18:00																					
Peak Hour For Entire Intersection Begins at 17:00																					
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Total Volume	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2
% App Total	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			
PHF	.000	.000	.000		.000	.000	.000	.000		.000	.000	.000	.000		.000	.000	.500	.000		.500	.500

ALL TRAFFIC DATA

(916) 771-8700

orders@atdtraffic.com

File Name : 17-07904-003

Date : 11/02/2017

Unshifted Count = All Vehicles & Uturns

	Bluebell Dr Southbound					Springtown Blvd Westbound					Bluebell Dr Northbound					Springtown Blvd Eastbound					Total	Uturns Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
7:00	134	0	8	0	142	0	21	34	0	55	0	0	0	0	0	6	90	0	0	96	293	0
7:15	165	0	7	0	172	0	19	38	0	57	0	0	0	0	0	9	105	0	0	114	343	0
7:30	261	0	7	0	268	0	27	39	0	66	0	0	0	0	0	4	142	0	0	146	480	0
7:45	178	0	8	0	186	0	57	78	0	135	0	0	0	0	0	6	131	0	0	137	458	0
Total	738	0	30	0	768	0	124	189	0	313	0	0	0	0	0	25	468	0	0	493	1574	0
8:00	147	0	8	0	155	0	51	94	0	145	0	0	0	0	0	12	89	0	0	101	401	0
8:15	149	0	6	0	155	0	38	61	0	99	0	0	0	0	0	11	109	0	0	120	374	0
8:30	183	0	12	0	195	0	39	39	0	78	0	0	0	0	0	9	74	0	0	83	356	0
8:45	141	0	4	0	145	0	31	49	0	80	0	0	0	0	0	5	77	0	0	82	307	0
Total	620	0	30	0	650	0	159	243	0	402	0	0	0	0	0	37	349	0	0	386	1438	0
16:00	88	0	3	0	91	0	72	189	0	261	0	0	0	0	0	3	48	0	0	51	403	0
16:15	90	0	10	0	100	0	89	217	0	306	0	0	0	0	0	3	55	0	0	58	464	0
16:30	88	0	4	0	92	0	95	216	0	311	0	0	0	0	0	5	60	0	0	65	468	0
16:45	93	0	9	0	102	0	93	215	0	308	0	0	0	0	0	12	53	0	0	65	475	0
Total	359	0	26	0	385	0	349	837	0	1186	0	0	0	0	0	23	216	0	0	239	1810	0
17:00	93	0	8	0	101	0	106	246	0	352	0	0	0	0	0	9	49	0	0	58	511	0
17:15	92	0	8	0	100	0	143	248	0	391	0	0	0	0	0	7	68	0	1	76	567	1
17:30	94	0	3	0	97	0	91	222	0	313	0	0	0	0	0	10	72	0	0	82	492	0
17:45	116	0	6	0	122	0	125	242	0	367	0	0	0	0	0	5	60	0	0	65	554	0
Total	395	0	25	0	420	0	465	958	0	1423	0	0	0	0	0	31	249	0	1	281	2124	1
Grand Total	2112	0	111	0	2223	0	1097	2227	0	3324	0	0	0	0	0	116	1282	0	1	1399	6946	1
Apprch %	95.0%	0.0%	5.0%	0.0%		0.0%	33.0%	67.0%	0.0%		0.0%	0.0%	0.0%	0.0%		8.3%	91.6%	0.0%	0.1%			
Total %	30.4%	0.0%	1.6%	0.0%	32.0%	0.0%	15.8%	32.1%	0.0%	47.9%	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%	18.5%	0.0%	0.0%	20.1%	100.0%	

AM PEAK HOUR	Bluebell Dr Southbound					Springtown Blvd Westbound					Bluebell Dr Northbound					Springtown Blvd Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 07:30 to 08:30																					
Peak Hour For Entire Intersection Begins at 07:30																					
7:30	261	0	7	0	268	0	27	39	0	66	0	0	0	0	0	4	142	0	0	146	480
7:45	178	0	8	0	186	0	57	78	0	135	0	0	0	0	0	6	131	0	0	137	458
8:00	147	0	8	0	155	0	51	94	0	145	0	0	0	0	0	12	89	0	0	101	401
8:15	149	0	6	0	155	0	38	61	0	99	0	0	0	0	0	11	109	0	0	120	374
Total Volume	735	0	29	0	764	0	173	272	0	445	0	0	0	0	0	33	471	0	0	504	1713
% App Total	96.2%	0.0%	3.8%	0.0%		0.0%	38.9%	61.1%	0.0%		0.0%	0.0%	0.0%	0.0%		6.5%	93.5%	0.0%	0.0%		
PHF	.704	.000	.906	.000	.713	.000	.759	.723	.000	.767	.000	.000	.000	.000	.000	.688	.829	.000	.000	.863	.892

PM PEAK HOUR	Bluebell Dr Southbound					Springtown Blvd Westbound					Bluebell Dr Northbound					Springtown Blvd Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 17:00 to 18:00																					
Peak Hour For Entire Intersection Begins at 17:00																					
17:00	93	0	8	0	101	0	106	246	0	352	0	0	0	0	0	9	49	0	0	58	511
17:15	92	0	8	0	100	0	143	248	0	391	0	0	0	0	0	7	68	0	1	76	567
17:30	94	0	3	0	97	0	91	222	0	313	0	0	0	0	0	10	72	0	0	82	492
17:45	116	0	6	0	122	0	125	242	0	367	0	0	0	0	0	5	60	0	0	65	554
Total Volume	395	0	25	0	420	0	465	958	0	1423	0	0	0	0	0	31	249	0	1	281	2124
% App Total	94.0%	0.0%	6.0%	0.0%		0.0%	32.7%	67.3%	0.0%		0.0%	0.0%	0.0%	0.0%		11.0%	88.6%	0.0%	0.4%		
PHF	.851	.000	.781	.000	.861	.000	.813	.966	.000	.910	.000	.000	.000	.000	.000	.775	.865	.000	.250	.857	.937

ALL TRAFFIC DATA

(916) 771-8700

orders@atdtraffic.com

File Name : 17-07904-003

Date : 11/02/2017

Bank 1 Count = Bikes & Peds

	Bluebell Dr Southbound					Springtown Blvd Westbound					Bluebell Dr Northbound					Springtown Blvd Eastbound					Total	Peds Total
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL		
7:00	0	0	0	0	0	0	0	1	2	1	0	0	0	1	0	0	0	0	0	0	1	3
7:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	2	0	0	0	2	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	3	2
7:45	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	2	1
Total	3	0	0	0	3	0	0	2	3	2	0	0	0	3	0	0	1	0	0	1	6	6
8:00	0	0	1	1	1	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	2	2
8:15	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
8:30	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	3	0
8:45	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	2	0	0	2	2	3
Total	3	0	1	1	4	0	0	1	3	1	0	0	0	1	0	0	3	0	0	3	8	5
16:00	0	0	0	5	0	0	1	0	6	1	0	0	0	0	0	0	0	0	0	0	1	11
16:15	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
16:30	0	0	0	1	0	0	0	0	4	0	0	0	0	0	0	1	0	0	0	1	1	5
16:45	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	7	0	0	1	0	11	1	0	0	0	0	0	1	0	0	0	1	2	18
17:00	0	0	0	0	0	0	0	2	1	2	0	0	0	0	0	1	0	0	0	1	3	1
17:15	0	0	0	2	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	2
17:30	0	0	0	8	0	0	0	1	7	1	0	0	0	0	0	0	0	0	0	0	1	15
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	10	0	0	0	4	8	4	0	0	0	0	0	1	0	0	0	1	5	18
Grand Total	6	0	1	18	7	0	1	7	25	8	0	0	0	4	0	2	4	0	0	6	21	47
Apprch %	85.7%	0.0%	14.3%			0.0%	12.5%	87.5%			0.0%	0.0%	0.0%			33.3%	66.7%	0.0%				
Total %	28.6%	0.0%	4.8%		33.3%	0.0%	4.8%	33.3%		38.1%	0.0%	0.0%	0.0%		0.0%	9.5%	19.0%	0.0%		28.6%	100.0%	

AM PEAK HOUR	Bluebell Dr Southbound					Springtown Blvd Westbound					Bluebell Dr Northbound					Springtown Blvd Eastbound					Total
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	
Peak Hour Analysis From 07:30 to 08:30																					
Peak Hour For Entire Intersection Begins at 07:30																					
7:30	2	0	0	0	2	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	3
7:45	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	2
8:00	0	0	1	1	1	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	2
8:15	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total Volume	4	0	1	1	5	0	0	2	1	2	0	0	0	3	0	0	1	0	0	1	8
% App Total	80.0%	0.0%	20.0%			0.0%	0.0%	100.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			
PHF	.500	.000	.250		.625	.000	.000	.500		.500	.000	.000	.000		.000	.250	.000		.250		.667

PM PEAK HOUR	Bluebell Dr Southbound					Springtown Blvd Westbound					Bluebell Dr Northbound					Springtown Blvd Eastbound					Total
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	
Peak Hour Analysis From 17:00 to 18:00																					
Peak Hour For Entire Intersection Begins at 17:00																					
17:00	0	0	0	0	0	0	0	2	1	2	0	0	0	0	0	1	0	0	0	1	3
17:15	0	0	0	2	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
17:30	0	0	0	8	0	0	0	1	7	1	0	0	0	0	0	0	0	0	0	0	1
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	10	0	0	0	4	8	4	0	0	0	0	0	1	0	0	0	1	5
% App Total	0.0%	0.0%	0.0%			0.0%	0.0%	100.0%			0.0%	0.0%	0.0%			100.0%	0.0%	0.0%			
PHF	.000	.000	.000		.000	.000	.000	.500		.500	.000	.000	.000		.000	.250	.000	.000		.250	.417

ALL TRAFFIC DATA

(916) 771-8700

orders@atdtraffic.com

File Name : 17-07904-004

Date : 11/02/2017

Unshifted Count = All Vehicles & Uturns

	Springtown Blvd Southbound					I-580 WB Ramps Westbound					Springtown Blvd Northbound					I-580 WB Ramps Eastbound					Total	Uturns Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
7:00	0	113	114	0	227	0	0	12	0	12	105	40	0	0	145	0	0	77	0	77	461	0
7:15	0	163	107	0	270	0	0	9	0	9	103	45	0	0	148	0	0	117	0	117	544	0
7:30	0	270	130	0	400	0	0	4	0	4	95	62	0	0	157	0	0	151	0	151	712	0
7:45	0	206	98	0	304	0	0	9	0	9	105	133	0	0	238	0	0	136	0	136	687	0
Total	0	752	449	0	1201	0	0	34	0	34	408	280	0	0	688	0	0	481	0	481	2404	0
8:00	0	159	79	0	238	0	0	8	0	8	74	134	0	0	208	0	0	93	0	93	547	0
8:15	0	160	99	0	259	0	0	9	0	9	105	92	0	0	197	0	0	99	0	99	564	0
8:30	0	163	91	0	254	0	0	7	0	7	70	76	0	0	146	0	0	132	0	132	539	0
8:45	0	139	81	0	220	0	0	6	0	6	74	69	0	0	143	0	0	112	0	112	481	0
Total	0	621	350	0	971	0	0	30	0	30	323	371	0	0	694	0	0	436	0	436	2131	0
16:00	0	82	51	0	133	0	0	13	0	13	115	235	0	0	350	0	0	61	0	61	557	0
16:15	0	90	55	0	145	0	0	11	0	11	86	282	0	0	368	0	0	71	0	71	595	0
16:30	0	98	51	0	149	0	0	20	0	20	123	283	0	0	406	1	0	85	0	86	661	0
16:45	0	104	44	0	148	0	0	14	0	14	90	310	0	0	400	0	0	70	0	70	632	0
Total	0	374	201	0	575	0	0	58	0	58	414	1110	0	0	1524	1	0	287	0	288	2445	0
17:00	0	86	54	0	140	0	0	20	0	20	141	292	0	0	433	0	0	63	0	63	656	0
17:15	0	109	53	0	162	0	0	17	0	17	124	351	0	0	475	0	0	74	0	74	728	0
17:30	0	111	55	0	166	0	0	17	0	17	70	350	0	0	420	0	0	58	0	58	661	0
17:45	0	90	76	0	166	0	0	19	0	19	94	353	0	0	447	0	0	79	0	79	711	0
Total	0	396	238	0	634	0	0	73	0	73	429	1346	0	0	1775	0	0	274	0	274	2756	0
Grand Total	0	2143	1238	0	3381	0	0	195	0	195	1574	3107	0	0	4681	1	0	1478	0	1479	9736	0
Apprch %	0.0%	63.4%	36.6%	0.0%		0.0%	0.0%	100.0%	0.0%		33.6%	66.4%	0.0%	0.0%		0.1%	0.0%	99.9%	0.0%			
Total %	0.0%	22.0%	12.7%	0.0%	34.7%	0.0%	0.0%	2.0%	0.0%	2.0%	16.2%	31.9%	0.0%	0.0%	48.1%	0.0%	0.0%	15.2%	0.0%	15.2%	100.0%	

AM PEAK HOUR	Springtown Blvd Southbound					I-580 WB Ramps Westbound					Springtown Blvd Northbound					I-580 WB Ramps Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 07:30 to 08:30																					
Peak Hour For Entire Intersection Begins at 07:30																					
7:30	0	270	130	0	400	0	0	4	0	4	95	62	0	0	157	0	0	151	0	151	712
7:45	0	206	98	0	304	0	0	9	0	9	105	133	0	0	238	0	0	136	0	136	687
8:00	0	159	79	0	238	0	0	8	0	8	74	134	0	0	208	0	0	93	0	93	547
8:15	0	160	99	0	259	0	0	9	0	9	105	92	0	0	197	0	0	99	0	99	564
Total Volume	0	795	406	0	1201	0	0	30	0	30	379	421	0	0	800	0	0	479	0	479	2510
% App Total	0.0%	66.2%	33.8%	0.0%		0.0%	0.0%	100.0%	0.0%		47.4%	52.6%	0.0%	0.0%		0.0%	0.0%	100.0%	0.0%		
PHF	.000	.736	.781	.000	.751	.000	.000	.833	.000	.833	.902	.785	.000	.000	.840	.000	.000	.793	.000	.793	.881

PM PEAK HOUR	Springtown Blvd Southbound					I-580 WB Ramps Westbound					Springtown Blvd Northbound					I-580 WB Ramps Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 17:00 to 18:00																					
Peak Hour For Entire Intersection Begins at 17:00																					
17:00	0	86	54	0	140	0	0	20	0	20	141	292	0	0	433	0	0	63	0	63	656
17:15	0	109	53	0	162	0	0	17	0	17	124	351	0	0	475	0	0	74	0	74	728
17:30	0	111	55	0	166	0	0	17	0	17	70	350	0	0	420	0	0	58	0	58	661
17:45	0	90	76	0	166	0	0	19	0	19	94	353	0	0	447	0	0	79	0	79	711
Total Volume	0	396	238	0	634	0	0	73	0	73	429	1346	0	0	1775	0	0	274	0	274	2756
% App Total	0.0%	62.5%	37.5%	0.0%		0.0%	0.0%	100.0%	0.0%		24.2%	75.8%	0.0%	0.0%		0.0%	0.0%	100.0%	0.0%		
PHF	.000	.892	.783	.000	.955	.000	.000	.913	.000	.913	.761	.953	.000	.000	.934	.000	.000	.867	.000	.867	.946

ALL TRAFFIC DATA

(916) 771-8700

orders@atdtraffic.com

File Name : 17-07904-004

Date : 11/02/2017

Bank 1 Count = Bikes & Peds

	Springtown Blvd Southbound					I-580 WB Ramps Westbound					Springtown Blvd Northbound					I-580 WB Ramps Eastbound					Total	Peds Total
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL		
7:00	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0
7:15	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
7:30	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3	0
7:45	0	2	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	1
Total	0	5	0	0	5	0	0	0	1	0	0	2	0	0	2	0	0	0	0	0	7	1
8:00	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	1	1
8:15	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	2
8:30	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
8:45	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Total	0	5	0	0	5	0	0	0	2	0	0	1	0	0	1	0	0	0	2	0	6	4
16:00	0	0	0	0	0	0	0	0	6	0	0	1	0	0	1	0	0	0	0	0	1	6
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
16:45	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	1	1
Total	0	0	0	0	0	0	0	0	9	0	0	2	0	0	2	0	0	0	0	0	2	9
17:00	0	0	0	0	0	0	0	0	2	0	0	1	0	0	1	0	0	0	0	0	1	2
17:15	0	0	0	0	0	0	0	0	5	0	0	2	0	0	2	0	0	0	1	0	2	6
17:30	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	1	0	1	2
17:45	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	9	0	0	4	0	0	4	0	0	0	2	0	4	11
Grand Total	0	10	0	0	10	0	0	0	21	0	0	9	0	0	9	0	0	0	4	0	19	25
Apprch %	0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			0.0%	0.0%	0.0%				
Total %	0.0%	52.6%	0.0%		52.6%	0.0%	0.0%	0.0%		0.0%	0.0%	47.4%	0.0%		47.4%	0.0%	0.0%	0.0%		0.0%	100.0%	

AM PEAK HOUR	Springtown Blvd Southbound					I-580 WB Ramps Westbound					Springtown Blvd Northbound					I-580 WB Ramps Eastbound					Total
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	
Peak Hour Analysis From 07:30 to 08:30																					
Peak Hour For Entire Intersection Begins at 07:30																					
7:30	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3
7:45	0	2	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
8:00	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	1
8:15	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1
Total Volume	0	5	0	0	5	0	0	0	2	0	0	2	0	0	2	0	0	0	2	0	7
% App Total	0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			
PHF	.000	.625	.000		.625	.000	.000	.000		.000	.000	.500	.000		.500	.000	.000	.000		.000	.583

PM PEAK HOUR	Springtown Blvd Southbound					I-580 WB Ramps Westbound					Springtown Blvd Northbound					I-580 WB Ramps Eastbound					Total
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	
Peak Hour Analysis From 17:00 to 18:00																					
Peak Hour For Entire Intersection Begins at 17:00																					
17:00	0	0	0	0	0	0	0	0	2	0	0	1	0	0	1	0	0	0	0	0	1
17:15	0	0	0	0	0	0	0	0	5	0	0	2	0	0	2	0	0	0	1	0	2
17:30	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	1	0	1
17:45	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	9	0	0	4	0	0	4	0	0	0	2	0	4
% App Total	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			
PHF	.000	.000	.000		.000	.000	.000	.000		.000	.000	.500	.000		.500	.000	.000	.000		.000	.500

ALL TRAFFIC DATA

(916) 771-8700

orders@atdtraffic.com

File Name : 17-07904-005

Date : 11/02/2017

Unshifted Count = All Vehicles & Uturns

	Springtown Blvd Southbound					I-580 EB Ramps Westbound					Springtown Blvd Northbound					I-580 EB Ramps Eastbound					Total	Uturns Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
7:00	15	175	0	0	190	0	0	0	0	0	0	111	58	0	169	15	0	48	0	63	422	0
7:15	10	267	0	0	277	0	0	0	0	0	0	132	59	0	191	16	1	65	0	82	550	0
7:30	10	403	0	0	413	0	0	0	0	0	0	145	65	0	210	20	1	53	0	74	697	0
7:45	12	317	0	0	329	0	0	0	0	0	0	208	108	0	316	31	0	80	0	111	756	0
Total	47	1162	0	0	1209	0	0	0	0	0	0	596	290	0	886	82	2	246	0	330	2425	0
8:00	16	241	0	0	257	0	0	0	0	0	0	196	79	0	275	24	0	54	0	78	610	0
8:15	13	242	0	0	255	0	0	0	0	0	0	143	65	0	208	31	0	74	0	105	568	0
8:30	9	281	0	0	290	0	0	0	0	0	0	139	75	0	214	17	0	73	0	90	594	0
8:45	8	245	0	0	253	0	0	0	0	0	0	116	59	0	175	13	0	81	0	94	522	0
Total	46	1009	0	0	1055	0	0	0	0	0	0	594	278	0	872	85	0	282	0	367	2294	0
16:00	4	136	0	0	140	0	0	0	0	0	0	253	107	0	360	94	0	105	0	199	699	0
16:15	6	161	0	0	167	0	0	0	0	0	0	245	100	0	345	118	1	125	0	244	756	0
16:30	5	173	0	0	178	0	0	0	0	0	0	281	112	0	393	117	0	133	0	250	821	0
16:45	7	166	0	0	173	0	0	0	0	0	0	265	101	0	366	128	1	162	0	291	830	0
Total	22	636	0	0	658	0	0	0	0	0	0	1044	420	0	1464	457	2	525	0	984	3106	0
17:00	2	148	0	0	150	0	0	0	0	0	0	287	104	0	391	124	2	121	0	247	788	0
17:15	5	178	0	0	183	0	0	0	0	0	0	333	106	0	439	143	1	159	0	303	925	0
17:30	8	161	0	0	169	0	0	0	0	0	0	282	121	0	403	135	1	140	0	276	848	0
17:45	6	167	0	0	173	0	0	0	0	0	0	318	109	0	427	117	0	127	0	244	844	0
Total	21	654	0	0	675	0	0	0	0	0	0	1220	440	0	1660	519	4	547	0	1070	3405	0
Grand Total	136	3461	0	0	3597	0	0	0	0	0	0	3454	1428	0	4882	1143	8	1600	0	2751	11230	0
Apprch %	3.8%	96.2%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	70.7%	29.3%	0.0%		41.5%	0.3%	58.2%	0.0%			
Total %	1.2%	30.8%	0.0%	0.0%	32.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	30.8%	12.7%	0.0%	43.5%	10.2%	0.1%	14.2%	0.0%	24.5%	100.0%	

AM PEAK HOUR	Springtown Blvd Southbound					I-580 EB Ramps Westbound					Springtown Blvd Northbound					I-580 EB Ramps Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 07:30 to 08:30																					
Peak Hour For Entire Intersection Begins at 07:30																					
7:30	10	403	0	0	413	0	0	0	0	0	0	145	65	0	210	20	1	53	0	74	697
7:45	12	317	0	0	329	0	0	0	0	0	0	208	108	0	316	31	0	80	0	111	756
8:00	16	241	0	0	257	0	0	0	0	0	0	196	79	0	275	24	0	54	0	78	610
8:15	13	242	0	0	255	0	0	0	0	0	0	143	65	0	208	31	0	74	0	105	568
Total Volume	51	1203	0	0	1254	0	0	0	0	0	0	692	317	0	1009	106	1	261	0	368	2631
% App Total	4.1%	95.9%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	68.6%	31.4%	0.0%		28.8%	0.3%	70.9%	0.0%		
PHF	.797	.746	.000	.000	.759	.000	.000	.000	.000	.000	.000	.832	.734	.000	.798	.855	.250	.816	.000	.829	.870

PM PEAK HOUR	Springtown Blvd Southbound					I-580 EB Ramps Westbound					Springtown Blvd Northbound					I-580 EB Ramps Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 17:00 to 18:00																					
Peak Hour For Entire Intersection Begins at 17:00																					
17:00	2	148	0	0	150	0	0	0	0	0	0	287	104	0	391	124	2	121	0	247	788
17:15	5	178	0	0	183	0	0	0	0	0	0	333	106	0	439	143	1	159	0	303	925
17:30	8	161	0	0	169	0	0	0	0	0	0	282	121	0	403	135	1	140	0	276	848
17:45	6	167	0	0	173	0	0	0	0	0	0	318	109	0	427	117	0	127	0	244	844
Total Volume	21	654	0	0	675	0	0	0	0	0	0	1220	440	0	1660	519	4	547	0	1070	3405
% App Total	3.1%	96.9%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	73.5%	26.5%	0.0%		48.5%	0.4%	51.1%	0.0%		
PHF	.656	.919	.000	.000	.922	.000	.000	.000	.000	.000	.000	.916	.909	.000	.945	.907	.500	.860	.000	.883	.920

ALL TRAFFIC DATA

(916) 771-8700

orders@atdtraffic.com

File Name : 17-07904-005

Date : 11/02/2017

Bank 1 Count = Bikes & Peds

	Springtown Blvd Southbound					I-580 EB Ramps Westbound					Springtown Blvd Northbound					I-580 EB Ramps Eastbound					Total	Peds Total
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL		
7:00	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0
7:15	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
7:30	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3	0
7:45	0	2	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	1
Total	0	5	0	0	5	0	0	0	1	0	0	2	0	0	2	0	0	0	0	0	7	1
8:00	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	1	1
8:15	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	2
8:30	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
8:45	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Total	0	6	0	0	6	0	0	0	2	0	0	1	0	0	1	0	0	0	1	0	7	3
16:00	0	0	0	0	0	0	0	0	6	0	0	1	0	0	1	0	0	0	0	0	1	6
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
16:45	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	1	1
Total	0	0	0	0	0	0	0	0	9	0	0	2	0	0	2	0	0	0	0	0	2	9
17:00	0	0	0	0	0	0	0	0	2	0	0	1	0	0	1	0	0	0	0	0	1	2
17:15	0	0	0	0	0	0	0	0	5	0	0	2	0	0	2	0	0	0	1	0	2	6
17:30	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	1	0	1	2
17:45	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	9	0	0	4	0	0	4	0	0	0	2	0	4	11
Grand Total	0	11	0	0	11	0	0	0	21	0	0	9	0	0	9	0	0	0	3	0	20	24
Apprch %	0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			0.0%	0.0%	0.0%				
Total %	0.0%	55.0%	0.0%		55.0%	0.0%	0.0%	0.0%		0.0%	0.0%	45.0%	0.0%		45.0%	0.0%	0.0%	0.0%		0.0%	100.0%	

AM PEAK HOUR	Springtown Blvd Southbound					I-580 EB Ramps Westbound					Springtown Blvd Northbound					I-580 EB Ramps Eastbound					Total
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	
Peak Hour Analysis From 07:30 to 08:30																					
Peak Hour For Entire Intersection Begins at 07:30																					
7:30	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3
7:45	0	2	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
8:00	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	1
8:15	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1
Total Volume	0	5	0	0	5	0	0	0	3	0	0	2	0	0	2	0	0	0	1	0	7
% App Total	0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			
PHF	.000	.625	.000		.625	.000	.000	.000		.000	.500	.000		.500		.000	.000	.000		.000	.583

PM PEAK HOUR	Springtown Blvd Southbound					I-580 EB Ramps Westbound					Springtown Blvd Northbound					I-580 EB Ramps Eastbound					Total
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	
Peak Hour Analysis From 17:00 to 18:00																					
Peak Hour For Entire Intersection Begins at 17:00																					
17:00	0	0	0	0	0	0	0	0	2	0	0	1	0	0	1	0	0	0	0	0	1
17:15	0	0	0	0	0	0	0	0	5	0	0	2	0	0	2	0	0	0	1	0	2
17:30	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	1	0	1
17:45	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	9	0	0	4	0	0	4	0	0	0	2	0	4
% App Total	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			
PHF	.000	.000	.000		.000	.000	.000	.000		.000	.500	.000		.500		.000	.000	.000		.000	.500

ALL TRAFFIC DATA

(916) 771-8700

orders@atdtraffic.com

File Name : 17-07904-006

Date : 11/02/2017

Unshifted Count = All Vehicles & UtURNS

	Bluebell Dr Southbound					Larkspur Dr Westbound					Bluebell Dr Northbound					Larkspur Dr Eastbound					Total	UtURNS Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
7:00	0	0	0	0	0	5	33	0	9	47	0	0	3	0	3	0	135	4	0	139	189	9
7:15	0	0	0	0	0	1	39	0	7	47	1	0	2	0	3	0	172	2	0	174	224	7
7:30	0	0	0	0	0	4	38	0	4	46	3	0	11	0	14	0	247	5	0	252	312	4
7:45	0	0	0	0	0	7	74	0	6	87	3	0	6	0	9	0	165	5	0	170	266	6
Total	0	0	0	0	0	17	184	0	26	227	7	0	22	0	29	0	719	16	0	735	991	26
8:00	0	0	0	0	0	3	95	0	6	104	10	0	6	0	16	0	145	1	0	146	266	6
8:15	0	0	0	0	0	1	65	0	8	74	10	0	7	0	17	0	146	9	0	155	246	8
8:30	0	0	0	0	0	6	40	0	7	53	3	0	10	0	13	0	179	4	0	183	249	7
8:45	0	0	0	0	0	3	47	0	4	54	2	0	7	0	9	0	132	4	0	136	199	4
Total	0	0	0	0	0	13	247	0	25	285	25	0	30	0	55	0	602	18	0	620	960	25
16:00	0	0	0	0	0	7	180	0	4	191	3	0	6	0	9	0	77	2	0	79	279	4
16:15	0	0	0	0	0	12	199	0	8	219	5	0	8	0	13	0	85	2	0	87	319	8
16:30	0	0	0	0	0	10	204	0	11	225	2	0	2	0	4	0	79	0	0	79	308	11
16:45	0	0	0	0	0	13	202	0	10	225	3	0	9	0	12	0	85	3	0	88	325	10
Total	0	0	0	0	0	42	785	0	33	860	13	0	25	0	38	0	326	7	0	333	1231	33
17:00	0	0	0	0	0	9	230	0	10	249	4	0	3	0	7	0	87	8	0	95	351	10
17:15	0	0	0	0	0	14	242	0	7	263	5	0	4	0	9	0	92	4	0	96	368	7
17:30	0	0	0	0	0	11	211	0	4	226	4	0	2	0	6	0	92	7	0	99	331	4
17:45	0	0	0	0	0	14	225	0	11	250	4	0	7	0	11	0	109	7	0	116	377	11
Total	0	0	0	0	0	48	908	0	32	988	17	0	16	0	33	0	380	26	0	406	1427	32
Grand Total	0	0	0	0	0	120	2124	0	116	2360	62	0	93	0	155	0	2027	67	0	2094	4609	116
Apprch %	0.0%	0.0%	0.0%	0.0%		5.1%	90.0%	0.0%	4.9%		40.0%	0.0%	60.0%	0.0%		0.0%	96.8%	3.2%	0.0%			
Total %	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%	46.1%	0.0%	2.5%	51.2%	1.3%	0.0%	2.0%	0.0%	3.4%	0.0%	44.0%	1.5%	0.0%	45.4%	100.0%	

AM PEAK HOUR	Bluebell Dr Southbound					Larkspur Dr Westbound					Bluebell Dr Northbound					Larkspur Dr Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 07:30 to 08:30																					
Peak Hour For Entire Intersection Begins at 07:30																					
7:30	0	0	0	0	0	4	38	0	4	46	3	0	11	0	14	0	247	5	0	252	312
7:45	0	0	0	0	0	7	74	0	6	87	3	0	6	0	9	0	165	5	0	170	266
8:00	0	0	0	0	0	3	95	0	6	104	10	0	6	0	16	0	145	1	0	146	266
8:15	0	0	0	0	0	1	65	0	8	74	10	0	7	0	17	0	146	9	0	155	246
Total Volume	0	0	0	0	0	15	272	0	24	311	26	0	30	0	56	0	703	20	0	723	1090
% App Total	0.0%	0.0%	0.0%	0.0%		4.8%	87.5%	0.0%	7.7%		46.4%	0.0%	53.6%	0.0%		0.0%	97.2%	2.8%	0.0%		
PHF	.000	.000	.000	.000	.000	.536	.716	.000	.750	.748	.650	.000	.682	.000	.824	.000	.712	.556	.000	.717	.873

PM PEAK HOUR	Bluebell Dr Southbound					Larkspur Dr Westbound					Bluebell Dr Northbound					Larkspur Dr Eastbound					Total
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 17:00 to 18:00																					
Peak Hour For Entire Intersection Begins at 17:00																					
17:00	0	0	0	0	0	9	230	0	10	249	4	0	3	0	7	0	87	8	0	95	351
17:15	0	0	0	0	0	14	242	0	7	263	5	0	4	0	9	0	92	4	0	96	368
17:30	0	0	0	0	0	11	211	0	4	226	4	0	2	0	6	0	92	7	0	99	331
17:45	0	0	0	0	0	14	225	0	11	250	4	0	7	0	11	0	109	7	0	116	377
Total Volume	0	0	0	0	0	48	908	0	32	988	17	0	16	0	33	0	380	26	0	406	1427
% App Total	0.0%	0.0%	0.0%	0.0%		4.9%	91.9%	0.0%	3.2%		51.5%	0.0%	48.5%	0.0%		0.0%	93.6%	6.4%	0.0%		
PHF	.000	.000	.000	.000	.000	.857	.938	.000	.727	.939	.850	.000	.571	.000	.750	.000	.872	.813	.000	.875	.946

ALL TRAFFIC DATA

(916) 771-8700

orders@atdtraffic.com

File Name : 17-07904-006

Date : 11/02/2017

Bank 1 Count = Bikes & Peds

	Bluebell Dr Southbound					Larkspur Dr Westbound					Bluebell Dr Northbound					Larkspur Dr Eastbound					Total	Peds Total
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL		
7:00	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
7:15	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	4
7:30	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	1	0	5	1	3	5
7:45	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	10
Total	0	0	0	14	0	0	2	0	0	2	0	0	0	0	0	0	1	0	9	1	3	23
8:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	0	0	0	2	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	1	3
8:45	0	0	0	1	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	2	1
Total	0	0	0	4	0	0	3	0	0	3	0	0	0	0	0	0	0	0	2	0	3	6
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
16:30	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	2	1
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	1	0	0	1	0	2	1	0	0	0	0	0	0	1	0	0	1	2	3
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2	0
17:15	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2	2	3
17:30	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	2
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0
Total	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	6	0	3	6	6	5
Grand Total	0	0	0	21	0	0	6	0	2	6	0	0	0	0	0	0	8	0	14	8	14	37
Apprch %	0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%				
Total %	0.0%	0.0%	0.0%		0.0%	0.0%	42.9%	0.0%		42.9%	0.0%	0.0%	0.0%		0.0%	0.0%	57.1%	0.0%		57.1%	100.0%	

AM PEAK HOUR	Bluebell Dr Southbound					Larkspur Dr Westbound					Bluebell Dr Northbound					Larkspur Dr Eastbound					Total
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	
Peak Hour Analysis From 07:30 to 08:30																					
Peak Hour For Entire Intersection Begins at 07:30																					
7:30	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	1	0	5	1	3
7:45	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
8:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	8	0	0	2	0	0	2	0	0	0	0	0	0	1	0	9	1	3
% App Total	0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			
PHF	.000	.000	.000		.000	.000	.250	.000		.250	.000	.000	.000		.000	.000	.250	.000		.250	.250

PM PEAK HOUR	Bluebell Dr Southbound					Larkspur Dr Westbound					Bluebell Dr Northbound					Larkspur Dr Eastbound					Total
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	
Peak Hour Analysis From 17:00 to 18:00																					
Peak Hour For Entire Intersection Begins at 17:00																					
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2
17:15	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2	2
17:30	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Total Volume	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	6	0	3	6	6
% App Total	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			
PHF	.000	.000	.000		.000	.000	.000	.000		.000	.000	.000	.000		.000	.750	.000		.750	.750	.750

Weekday Roadway Segment Volumes

VOLUME

Springtown Blvd Bet. Bluebell Dr & I-580 WB Ramps

Day: Tuesday

City: Livermore

Date: 10/31/2017

Project #: CA17_7905_001

DAILY TOTALS					NB	SB						EB	WB						Total
					12,423	10,422						0	0						22,845
AM Period	NB	SB	EB	WB	TOTAL		PM Period	NB	SB	EB	WB	TOTAL							
0:00	20	8			28		12:00	129	123			252							
0:15	20	14			34		12:15	161	106			267							
0:30	21	6			27		12:30	137	105			242							
0:45	10	71	8	36	18	107	12:45	161	588	123	457	284	1045						
1:00	7	5			12		13:00	145	144			289							
1:15	5	9			14		13:15	188	121			309							
1:30	6	3			9		13:30	154	141			295							
1:45	4	22	5	22	9	44	13:45	220	707	129	535	349	1242						
2:00	13	4			17		14:00	204	149			353							
2:15	8	6			14		14:15	209	163			372							
2:30	7	5			12		14:30	191	147			338							
2:45	10	38	8	23	18	61	14:45	238	842	179	638	417	1480						
3:00	5	7			12		15:00	252	169			421							
3:15	3	9			12		15:15	343	128			471							
3:30	4	12			16		15:30	361	124			485							
3:45	4	16	21	49	25	65	15:45	341	1297	144	565	485	1862						
4:00	9	37			46		16:00	383	134			517							
4:15	7	26			33		16:15	380	143			523							
4:30	9	61			70		16:30	358	138			496							
4:45	12	37	73	197	85	234	16:45	402	1523	135	550	537	2073						
5:00	9	93			102		17:00	429	157			586							
5:15	25	105			130		17:15	407	138			545							
5:30	19	122			141		17:30	429	154			583							
5:45	30	83	119	439	149	522	17:45	403	1668	146	595	549	2263						
6:00	21	142			163		18:00	424	122			546							
6:15	26	168			194		18:15	322	131			453							
6:30	30	201			231		18:30	303	130			433							
6:45	49	126	214	725	263	851	18:45	239	1288	118	501	357	1789						
7:00	43	222			265		19:00	187	98			285							
7:15	74	272			346		19:15	149	74			223							
7:30	72	394			466		19:30	146	58			204							
7:45	138	327	276	1164	414	1491	19:45	129	611	62	292	191	903						
8:00	122	249			371		20:00	120	80			200							
8:15	79	243			322		20:15	125	105			230							
8:30	89	188			277		20:30	122	89			211							
8:45	66	356	209	889	275	1245	20:45	131	498	84	358	215	856						
9:00	77	202			279		21:00	172	109			281							
9:15	91	183			274		21:15	124	85			209							
9:30	107	175			282		21:30	124	60			184							
9:45	87	362	164	724	251	1086	21:45	106	526	69	323	175	849						
10:00	114	133			247		22:00	112	51			163							
10:15	106	125			231		22:15	79	45			124							
10:30	100	136			236		22:30	70	47			117							
10:45	114	434	162	556	276	990	22:45	48	309	25	168	73	477						
11:00	114	127			241		23:00	49	24			73							
11:15	132	133			265		23:15	42	25			67							
11:30	135	145			280		23:30	45	17			62							
11:45	145	526	123	528	268	1054	23:45	32	168	22	88	54	256						
TOTALS	2398	5352			7750		TOTALS	10025	5070			15095							
SPLIT %	30.9%	69.1%			33.9%		SPLIT %	66.4%	33.6%			66.1%							

DAILY TOTALS					NB	SB						EB	WB						Total
					12,423	10,422						0	0						22,845
AM Peak Hour	11:45	7:15			7:15		PM Peak Hour	17:00	14:15			17:00							
AM Pk Volume	572	1191			1597		PM Pk Volume	1668	658			2263							
Pk Hr Factor	0.888	0.756			0.857		Pk Hr Factor	0.972	0.919			0.965							
7 - 9 Volume	683	2053	0	0	2736		4 - 6 Volume	3191	1145	0	0	4336							
7 - 9 Peak Hour	7:45	7:15			7:15		4 - 6 Peak Hour	17:00	17:00			17:00							
7 - 9 Pk Volume	428	1191	0	0	1597		4 - 6 Pk Volume	1668	595	0	0	2263							
Pk Hr Factor	0.775	0.756	0.000	0.000	0.857		Pk Hr Factor	0.972	0.947	0.000	0.000	0.965							

VOLUME

Springtown Blvd Bet. Bluebell Dr & I-580 WB Ramps

Day: Wednesday

City: Livermore

Date: 11/1/2017

Project #: CA17_7905_001

DAILY TOTALS					NB	SB	EB					WB	Total
					12,003	10,264						0	0
AM Period	NB	SB	EB	WB	TOTAL		PM Period	NB	SB	EB	WB	TOTAL	
0:00	24	12			36		12:00	173	125			298	
0:15	19	13			32		12:15	168	126			294	
0:30	17	11			28		12:30	153	140			293	
0:45	11	71	7	43	18	114	12:45	157	651	151	542	308	1193
1:00	19	3			22		13:00	174	139			313	
1:15	7	7			14		13:15	163	130			293	
1:30	9	4			13		13:30	149	209			358	
1:45	14	49	6	20	20	69	13:45	209	695	208	686	417	1381
2:00	8	5			13		14:00	213	161			374	
2:15	12	6			18		14:15	209	112			321	
2:30	8	6			14		14:30	188	131			319	
2:45	9	37	5	22	14	59	14:45	202	812	119	523	321	1335
3:00	10	7			17		15:00	198	123			321	
3:15	8	15			23		15:15	251	149			400	
3:30	8	28			36		15:30	276	131			407	
3:45	10	36	20	70	30	106	15:45	294	1019	141	544	435	1563
4:00	13	34			47		16:00	316	108			424	
4:15	6	31			37		16:15	322	140			462	
4:30	9	56			65		16:30	301	156			457	
4:45	9	37	68	189	77	226	16:45	343	1282	148	552	491	1834
5:00	13	96			109		17:00	370	140			510	
5:15	17	103			120		17:15	399	150			549	
5:30	17	104			121		17:30	364	139			503	
5:45	18	65	125	428	143	493	17:45	410	1543	159	588	569	2131
6:00	14	151			165		18:00	359	136			495	
6:15	21	172			193		18:15	350	138			488	
6:30	32	202			234		18:30	332	130			462	
6:45	36	103	204	729	240	832	18:45	282	1323	148	552	430	1875
7:00	48	207			255		19:00	241	95			336	
7:15	63	271			334		19:15	229	95			324	
7:30	69	382			451		19:30	189	99			288	
7:45	116	296	302	1162	418	1458	19:45	202	861	84	373	286	1234
8:00	137	247			384		20:00	150	74			224	
8:15	94	244			338		20:15	142	63			205	
8:30	90	252			342		20:30	167	68			235	
8:45	94	415	187	930	281	1345	20:45	140	599	66	271	206	870
9:00	86	190			276		21:00	127	49			176	
9:15	85	171			256		21:15	141	44			185	
9:30	80	150			230		21:30	113	63			176	
9:45	75	326	153	664	228	990	21:45	104	485	34	190	138	675
10:00	85	155			240		22:00	71	31			102	
10:15	81	146			227		22:15	65	36			101	
10:30	98	141			239		22:30	57	19			76	
10:45	109	373	124	566	233	939	22:45	41	234	23	109	64	343
11:00	111	115			226		23:00	40	17			57	
11:15	132	119			251		23:15	40	19			59	
11:30	160	111			271		23:30	23	14			37	
11:45	166	569	102	447	268	1016	23:45	19	122	14	64	33	186
TOTALS	2377		5270		7647		TOTALS	9626		4994		14620	
SPLIT %	31.1%		68.9%		34.3%		SPLIT %	65.8%		34.2%		65.7%	

DAILY TOTALS			NB		SB		EB			WB		Total	
			12,003		10,264					0		0	
AM Peak Hour	11:30	7:15			7:30		PM Peak Hour	17:00	13:15			17:00	
AM Pk Volume	667	1202			1591		PM Pk Volume	1543	708			2131	
Pk Hr Factor	0.964	0.787			0.882		Pk Hr Factor	0.941	0.847			0.936	
7 - 9 Volume	711	2092	0	0	2803		4 - 6 Volume	2825	1140	0	0	3965	
7 - 9 Peak Hour	7:45	7:15			7:30		4 - 6 Peak Hour	17:00	16:30			17:00	
7 - 9 Pk Volume	437	1202	0	0	1591		4 - 6 Pk Volume	1543	594	0	0	2131	
Pk Hr Factor	0.797	0.787	0.000	0.000	0.882		Pk Hr Factor	0.941	0.952	0.000	0.000	0.936	

VOLUME

Springtown Blvd Bet. Bluebell Dr & I-580 WB Ramps

Day: Thursday
Date: 11/2/2017City: Livermore
Project #: CA17_7905_001

DAILY TOTALS					NB	SB						EB	WB						Total
					11,491	10,298						0	0						21,789
AM Period	NB	SB	EB	WB	TOTAL		PM Period	NB	SB	EB	WB	TOTAL							
0:00	25	7			32		12:00	137	121			258							
0:15	21	5			26		12:15	135	149			284							
0:30	11	3			14		12:30	127	123			250							
0:45	14	71	4	19	18	90	12:45	149	548	125	518	274	1066						
1:00	11	7			18		13:00	137	115			252							
1:15	18	13			31		13:15	158	122			280							
1:30	11	6			17		13:30	135	152			287							
1:45	5	45	6	32	11	77	13:45	196	626	118	507	314	1133						
2:00	5	9			14		14:00	192	123			315							
2:15	10	4			14		14:15	154	140			294							
2:30	4	4			8		14:30	183	148			331							
2:45	1	20	9	26	10	46	14:45	177	706	148	559	325	1265						
3:00	5	8			13		15:00	230	183			413							
3:15	6	8			14		15:15	344	160			504							
3:30	10	21			31		15:30	305	139			444							
3:45	8	29	27	64	35	93	15:45	304	1183	145	627	449	1810						
4:00	7	27			34		16:00	269	130			399							
4:15	10	34			44		16:15	305	146			451							
4:30	7	58			65		16:30	319	149			468							
4:45	13	37	77	196	90	233	16:45	323	1216	142	567	465	1783						
5:00	14	90			104		17:00	360	142			502							
5:15	12	96			108		17:15	386	163			549							
5:30	21	122			143		17:30	330	157			487							
5:45	18	65	121	429	139	494	17:45	356	1432	177	639	533	2071						
6:00	17	144			161		18:00	317	139			456							
6:15	25	172			197		18:15	298	115			413							
6:30	30	215			245		18:30	258	147			405							
6:45	35	107	212	743	247	850	18:45	249	1122	124	525	373	1647						
7:00	54	228			282		19:00	230	103			333							
7:15	57	274			331		19:15	221	107			328							
7:30	68	395			463		19:30	184	95			279							
7:45	142	321	295	1192	437	1513	19:45	182	817	83	388	265	1205						
8:00	140	230			370		20:00	187	86			273							
8:15	102	258			360		20:15	183	98			281							
8:30	81	250			331		20:30	136	63			199							
8:45	72	395	211	949	283	1344	20:45	141	647	59	306	200	953						
9:00	73	175			248		21:00	141	51			192							
9:15	96	163			259		21:15	138	49			187							
9:30	91	136			227		21:30	111	59			170							
9:45	89	349	147	621	236	970	21:45	93	483	37	196	130	679						
10:00	100	149			249		22:00	68	29			97							
10:15	96	131			227		22:15	71	31			102							
10:30	91	134			225		22:30	79	28			107							
10:45	100	387	119	533	219	920	22:45	50	268	15	103	65	371						
11:00	118	134			252		23:00	48	22			70							
11:15	114	114			228		23:15	25	12			37							
11:30	128	114			242		23:30	32	16			48							
11:45	123	483	137	499	260	982	23:45	29	134	10	60	39	194						
TOTALS	2309	5303			7612		TOTALS	9182	4995			14177							
SPLIT %	30.3%	69.7%			34.9%		SPLIT %	64.8%	35.2%			65.1%							

DAILY TOTALS					NB	SB						EB	WB						Total
					11,491	10,298						0	0						21,789
AM Peak Hour	11:30	7:15			7:30		PM Peak Hour	17:00	14:30			17:00							
AM Pk Volume	523	1194			1630		PM Pk Volume	1432	639			2071							
Pk Hr Factor	0.954	0.756			0.880		Pk Hr Factor	0.927	0.873			0.943							
7 - 9 Volume	716	2141	0	0	2857		4 - 6 Volume	2648	1206	0	0	3854							
7 - 9 Peak Hour	7:45	7:15			7:30		4 - 6 Peak Hour	17:00	17:00			17:00							
7 - 9 Pk Volume	465	1194	0	0	1630		4 - 6 Pk Volume	1432	639	0	0	2071							
Pk Hr Factor	0.819	0.756	0.000	0.000	0.880		Pk Hr Factor	0.927	0.903	0.000	0.000	0.943							

VOLUME

Springtown Blvd & I-580 WB Ramps & I-580 EB Ramps

Day: Tuesday
Date: 10/31/2017

City: Livermore
Project #: CA17_7905_002

DAILY TOTALS					NB	SB						EB	WB	Total
					16,311	11,109						0	0	27,420
AM Period	NB	SB	EB	WB	TOTAL		PM Period	NB	SB	EB	WB	TOTAL		
0:00	19	10			29		12:00	190	161			351		
0:15	26	11			37		12:15	211	128			339		
0:30	21	11			32		12:30	197	126			323		
0:45	16	82	8	40	24	122	12:45	235	833	155	570	390	1403	
1:00	12	4			16		13:00	242	162			404		
1:15	7	7			14		13:15	226	145			371		
1:30	9	6			15		13:30	236	156			392		
1:45	7	35	8	25	15	60	13:45	271	975	161	624	432	1599	
2:00	10	5			15		14:00	257	152			409		
2:15	10	5			15		14:15	256	157			413		
2:30	9	10			19		14:30	252	177			429		
2:45	22	51	13	33	35	84	14:45	305	1070	224	710	529	1780	
3:00	12	9			21		15:00	336	221			557		
3:15	5	15			20		15:15	398	160			558		
3:30	9	30			39		15:30	414	136			550		
3:45	9	35	39	93	48	128	15:45	375	1523	170	687	545	2210	
4:00	26	34			60		16:00	445	154			599		
4:15	31	54			85		16:15	433	166			599		
4:30	50	63			113		16:30	437	145			582		
4:45	43	150	52	203	95	353	16:45	435	1750	166	631	601	2381	
5:00	60	74			134		17:00	500	146			646		
5:15	60	63			123		17:15	488	161			649		
5:30	60	76			136		17:30	480	174			654		
5:45	85	265	98	311	183	576	17:45	462	1930	165	646	627	2576	
6:00	82	96			178		18:00	429	115			544		
6:15	93	125			218		18:15	348	149			497		
6:30	120	137			257		18:30	329	137			466		
6:45	132	427	174	532	306	959	18:45	254	1360	112	513	366	1873	
7:00	138	193			331		19:00	217	96			313		
7:15	162	258			420		19:15	169	91			260		
7:30	161	414			575		19:30	174	63			237		
7:45	211	672	307	1172	518	1844	19:45	134	694	68	318	202	1012	
8:00	202	238			440		20:00	151	89			240		
8:15	153	247			400		20:15	147	102			249		
8:30	160	236			396		20:30	146	108			254		
8:45	118	633	240	961	358	1594	20:45	166	610	104	403	270	1013	
9:00	123	236			359		21:00	198	109			307		
9:15	167	174			341		21:15	146	96			242		
9:30	168	181			349		21:30	143	89			232		
9:45	157	615	189	780	346	1395	21:45	124	611	69	363	193	974	
10:00	173	134			307		22:00	126	49			175		
10:15	146	158			304		22:15	105	50			155		
10:30	160	142			302		22:30	75	43			118		
10:45	195	674	187	621	382	1295	22:45	59	365	23	165	82	530	
11:00	177	149			326		23:00	71	27			98		
11:15	199	159			358		23:15	49	24			73		
11:30	183	151			334		23:30	47	18			65		
11:45	188	747	157	616	345	1363	23:45	37	204	23	92	60	296	
TOTALS	4386	5387			9773		TOTALS	11925	5722			17647		
SPLIT %	44.9%	55.1%			35.6%		SPLIT %	67.6%	32.4%			64.4%		

DAILY TOTALS			NB	SB	EB			WB	Total		
			16,311	11,109				0			
AM Peak Hour	11:45	7:15			7:15	PM Peak Hour	17:00	14:30			17:00
AM Pk Volume	786	1217			1953	PM Pk Volume	1930	782			2576
Pk Hr Factor	0.931	0.735			0.849	Pk Hr Factor	0.965	0.873			0.985
7 - 9 Volume	1305	2133	0	0	3438	4 - 6 Volume	3680	1277	0	0	4957
7 - 9 Peak Hour	7:15	7:15			7:15	4 - 6 Peak Hour	17:00	16:45			17:00
7 - 9 Pk Volume	736	1217	0	0	1953	4 - 6 Pk Volume	1930	647	0	0	2576
Pk Hr Factor	0.872	0.735	0.000	0.000	0.849	Pk Hr Factor	0.965	0.930	0.000	0.000	0.985

VOLUME

Springtown Blvd & I-580 WB Ramps & I-580 EB Ramps

Day: Wednesday

City: Livermore

Date: 11/1/2017

Project #: CA17_7905_002

DAILY TOTALS					NB	SB	EB					WB	Total
					16,057	10,888						0	0
AM Period	NB	SB	EB	WB	TOTAL		PM Period	NB	SB	EB	WB	TOTAL	
0:00	28	16			44		12:00	220	131			351	
0:15	22	10			32		12:15	206	165			371	
0:30	18	11			29		12:30	202	130			332	
0:45	20	88	8	45	28	133	12:45	236	864	161	587	397	1451
1:00	20	6			26		13:00	220	153			373	
1:15	14	9			23		13:15	202	138			340	
1:30	10	7			17		13:30	206	191			397	
1:45	13	57	10	32	23	89	13:45	273	901	276	758	549	1659
2:00	10	5			15		14:00	271	198			469	
2:15	16	9			25		14:15	269	137			406	
2:30	16	11			27		14:30	244	133			377	
2:45	19	61	9	34	28	95	14:45	253	1037	135	603	388	1640
3:00	14	17			31		15:00	268	141			409	
3:15	10	18			28		15:15	304	165			469	
3:30	17	28			45		15:30	323	153			476	
3:45	25	66	36	99	61	165	15:45	346	1241	159	618	505	1859
4:00	39	37			76		16:00	383	121			504	
4:15	29	37			66		16:15	376	161			537	
4:30	38	69			107		16:30	356	168			524	
4:45	39	145	58	201	97	346	16:45	404	1519	171	621	575	2140
5:00	47	62			109		17:00	435	162			597	
5:15	50	71			121		17:15	453	158			611	
5:30	68	74			142		17:30	432	177			609	
5:45	79	244	100	307	179	551	17:45	462	1782	162	659	624	2441
6:00	90	106			196		18:00	423	135			558	
6:15	101	125			226		18:15	392	135			527	
6:30	103	157			260		18:30	386	148			534	
6:45	120	414	171	559	291	973	18:45	307	1508	154	572	461	2080
7:00	137	187			324		19:00	284	106			390	
7:15	149	248			397		19:15	261	84			345	
7:30	163	394			557		19:30	218	99			317	
7:45	200	649	338	1167	538	1816	19:45	249	1012	92	381	341	1393
8:00	204	245			449		20:00	179	53			232	
8:15	164	240			404		20:15	176	66			242	
8:30	164	293			457		20:30	182	64			246	
8:45	153	685	214	992	367	1677	20:45	165	702	64	247	229	949
9:00	128	187			315		21:00	171	66			237	
9:15	160	181			341		21:15	174	51			225	
9:30	152	209			361		21:30	137	64			201	
9:45	149	589	200	777	349	1366	21:45	140	622	40	221	180	843
10:00	151	158			309		22:00	91	37			128	
10:15	137	152			289		22:15	78	37			115	
10:30	150	156			306		22:30	68	25			93	
10:45	181	619	158	624	339	1243	22:45	54	291	19	118	73	409
11:00	179	138			317		23:00	56	17			73	
11:15	205	157			362		23:15	44	20			64	
11:30	193	148			341		23:30	32	21			53	
11:45	225	802	148	591	373	1393	23:45	27	159	17	75	44	234
TOTALS	4419	5428			9847		TOTALS	11638	5460			17098	
SPLIT %	44.9%	55.1%			36.5%		SPLIT %	68.1%	31.9%			63.5%	

DAILY TOTALS					NB	SB						EB	WB	Total	
					16,057	10,888						0	0	26,945	
AM Peak Hour	11:45	7:15	7:30			PM Peak Hour	17:00	13:15	17:00						
AM Pk Volume	853	1225	1948			PM Pk Volume	1782	803	2441						
Pk Hr Factor	0.948	0.777	0.874			Pk Hr Factor	0.964	0.727	0.978						
7 - 9 Volume	1334	2159	0	0	3493	4 - 6 Volume	3301	1280	0	0	4581				
7 - 9 Peak Hour	7:45	7:15	7:30			4 - 6 Peak Hour	17:00	16:45	17:00						
7 - 9 Pk Volume	732	1225	0	0	1948	4 - 6 Pk Volume	1782	668	0	0	2441				
Pk Hr Factor	0.897	0.777	0.000	0.000	0.874	Pk Hr Factor	0.964	0.944	0.000	0.000	0.978				

VOLUME

Springtown Blvd & I-580 WB Ramps & I-580 EB Ramps

Day: Thursday
Date: 11/2/2017

City: Livermore
Project #: CA17_7905_002

DAILY TOTALS					NB	SB	EB					WB	Total	
					15,771	11,041						0		
AM Period	NB	SB	EB	WB	TOTAL		PM Period	NB	SB	EB	WB	TOTAL		
0:00	28	10			38		12:00	199	143			342		
0:15	28	11			39		12:15	205	155			360		
0:30	11	7			18		12:30	186	165			351		
0:45	19	86	6	34	25	120	12:45	225	815	144	607	369	1422	
1:00	15	11			26		13:00	210	147			357		
1:15	20	5			25		13:15	226	135			361		
1:30	18	8			26		13:30	218	186			404		
1:45	4	57	4	28	8	85	13:45	242	896	158	626	400	1522	
2:00	10	3			13		14:00	245	151			396		
2:15	13	7			20		14:15	236	147			383		
2:30	10	5			15		14:30	254	169			423		
2:45	9	42	7	22	16	64	14:45	255	990	206	673	461	1663	
3:00	12	8			20		15:00	300	215			515		
3:15	9	17			26		15:15	400	173			573		
3:30	14	28			42		15:30	380	138			518		
3:45	16	51	31	84	47	135	15:45	324	1404	159	685	483	2089	
4:00	18	36			54		16:00	340	140			480		
4:15	34	43			77		16:15	361	169			530		
4:30	41	65			106		16:30	384	171			555		
4:45	42	135	70	214	112	349	16:45	382	1467	175	655	557	2122	
5:00	47	57			104		17:00	403	154			557		
5:15	67	81			148		17:15	455	184			639		
5:30	79	72			151		17:30	407	164			571		
5:45	70	263	99	309	169	572	17:45	425	1690	169	671	594	2361	
6:00	84	96			180		18:00	379	158			537		
6:15	104	119			223		18:15	330	128			458		
6:30	110	160			270		18:30	316	159			475		
6:45	116	414	177	552	293	966	18:45	295	1320	140	585	435	1905	
7:00	136	186			322		19:00	269	115			384		
7:15	156	275			431		19:15	278	106			384		
7:30	162	402			564		19:30	210	100			310		
7:45	232	686	336	1199	568	1885	19:45	230	987	80	401	310	1388	
8:00	220	242			462		20:00	206	89			295		
8:15	174	248			422		20:15	197	78			275		
8:30	155	293			448		20:30	159	77			236		
8:45	129	678	241	1024	370	1702	20:45	169	731	53	297	222	1028	
9:00	141	201			342		21:00	169	45			214		
9:15	168	186			354		21:15	157	49			206		
9:30	158	165			323		21:30	148	63			211		
9:45	163	630	180	732	343	1362	21:45	119	593	43	200	162	793	
10:00	152	173			325		22:00	92	28			120		
10:15	161	178			339		22:15	84	32			116		
10:30	175	151			326		22:30	85	33			118		
10:45	161	649	145	647	306	1296	22:45	51	312	17	110	68	422	
11:00	177	142			319		23:00	62	18			80		
11:15	184	142			326		23:15	34	22			56		
11:30	175	159			334		23:30	38	23			61		
11:45	171	707	165	608	336	1315	23:45	34	168	15	78	49	246	
TOTALS	4398	5453			9851		TOTALS	11373	5588			16961		
SPLIT %	44.6%	55.4%			36.7%		SPLIT %	67.1%	32.9%			63.3%		

DAILY TOTALS					NB	SB						EB	WB	Total	
					15,771	11,041						0	0	26,812	
AM Peak Hour	7:30	7:15	7:15			PM Peak Hour	17:00	14:30	17:00						
AM Pk Volume	788	1255	2025			PM Pk Volume	1690	763	2361						
Pk Hr Factor	0.849	0.780	0.891			Pk Hr Factor	0.929	0.887	0.924						
7 - 9 Volume	1364	2223	0	0	3587	4 - 6 Volume	3157	1326	0	0	4483				
7 - 9 Peak Hour	7:30	7:15	7:15			4 - 6 Peak Hour	17:00	16:30	17:00						
7 - 9 Pk Volume	788	1255	0	0	2025	4 - 6 Pk Volume	1690	684	0	0	2361				
Pk Hr Factor	0.849	0.780	0.000	0.000	0.891	Pk Hr Factor	0.929	0.929	0.000	0.000	0.924				

Appendix B:

LOS Calculation Worksheets



HCM 2010 TWSC
1: Lassen Rd & Spring Valley Common

Lassen Road Mixed Use TIA
Existing AM Peak Hour

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	43	39	5	12	1
Future Vol, veh/h	0	43	39	5	12	1
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	49	45	6	14	1
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	51	0	-	0	97	49
Stage 1	-	-	-	-	48	-
Stage 2	-	-	-	-	49	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1568	-	-	-	907	1025
Stage 1	-	-	-	-	980	-
Stage 2	-	-	-	-	979	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1567	-	-	-	907	1024
Mov Cap-2 Maneuver	-	-	-	-	907	-
Stage 1	-	-	-	-	980	-
Stage 2	-	-	-	-	979	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		9		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1567	-	-	-	915	
HCM Lane V/C Ratio	-	-	-	-	0.016	
HCM Control Delay (s)	0	-	-	-	9	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

Intersection											
Int Delay, s/veh	1.8										
Movement	EBL	EBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations											
Traffic Vol, veh/h	0	48	1	74	129	0	0	421	19	0	0
Future Vol, veh/h	0	48	1	74	129	0	0	421	19	0	0
Conflicting Peds, #/hr	0	0	0	3	0	0	0	0	3	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	-	None	-	-	None	-	-
Storage Length	0	-	-	88	-	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	-	0	-	-	0	-	-	-
Grade, %	0	-	-	-	0	-	-	0	-	0	-
Peak Hour Factor	92	89	89	89	89	92	92	89	89	92	92
Heavy Vehicles, %	2	0	0	0	0	2	2	0	0	2	2
Mvmt Flow	0	54	1	83	145	0	0	473	21	0	0
Major/Minor	Minor2		Major1			Major2					
Conflicting Flow All	728	250	494	497	0	0	-	-	0		
Stage 1	487	-	-	-	-	-	-	-	-		
Stage 2	241	-	-	-	-	-	-	-	-		
Critical Hdwy	6.8	6.9	6.4	4.1	-	-	-	-	-		
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-	-	-		
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-	-	-		
Follow-up Hdwy	3.5	3.3	2.5	2.2	-	-	-	-	-		
Pot Cap-1 Maneuver	363	756	707	1077	-	-	0	-	-		
Stage 1	589	-	-	-	-	-	0	-	-		
Stage 2	783	-	-	-	-	-	0	-	-		
Platoon blocked, %					-	-		-	-		
Mov Cap-1 Maneuver	361	754	1068	1068	-	-	-	-	-		
Mov Cap-2 Maneuver	361	-	-	-	-	-	-	-	-		
Stage 1	587	-	-	-	-	-	-	-	-		
Stage 2	781	-	-	-	-	-	-	-	-		
Approach	EB		NB			SB					
HCM Control Delay, s	11		3.2			0					
HCM LOS	B										
Minor Lane/Major Mvmt	NBL		NBT	NBR	EBLn1	SBT	SBR				
Capacity (veh/h)	1068		-	-	662	-	-				
HCM Lane V/C Ratio	0.079		-	-	0.093	-	-				
HCM Control Delay (s)	8.7		-	-	11	-	-				
HCM Lane LOS	A		-	-	B	-	-				
HCM 95th %tile Q(veh)	0.3		-	-	0.3	-	-				

HCM 2010 Signalized Intersection Summary 3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Existing AM Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 		 			 		
Traffic Volume (veh/h)	735	29	175	278	33	471		
Future Volume (veh/h)	735	29	175	278	33	471		
Number	7	14	6	16	5	2		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.97	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900		
Adj Flow Rate, veh/h	826	21	197	90	37	529		
Adj No. of Lanes	2	1	2	0	1	2		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89		
Percent Heavy Veh, %	0	0	0	0	0	0		
Cap, veh/h	1235	568	712	311	69	1522		
Arrive On Green	0.35	0.35	0.29	0.28	0.04	0.42		
Sat Flow, veh/h	3510	1615	2517	1058	1810	3705		
Grp Volume(v), veh/h	826	21	145	142	37	529		
Grp Sat Flow(s),veh/h/ln	1755	1615	1805	1674	1810	1805		
Q Serve(g_s), s	7.8	0.3	2.4	2.6	0.8	3.9		
Cycle Q Clear(g_c), s	7.8	0.3	2.4	2.6	0.8	3.9		
Prop In Lane	1.00	1.00		0.63	1.00			
Lane Grp Cap(c), veh/h	1235	568	531	493	69	1522		
V/C Ratio(X)	0.67	0.04	0.27	0.29	0.54	0.35		
Avail Cap(c_a), veh/h	3623	1667	1863	1728	1176	3726		
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	10.8	8.4	10.6	10.8	18.5	7.7		
Incr Delay (d2), s/veh	0.6	0.0	0.3	0.3	2.4	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	3.9	0.4	1.2	1.2	0.4	1.9		
LnGrp Delay(d),s/veh	11.4	8.4	10.9	11.1	20.9	7.8		
LnGrp LOS	B	A	B	B	C	A		
Approach Vol, veh/h	847		287			566		
Approach Delay, s/veh	11.3		11.0			8.7		
Approach LOS	B		B			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		21.3		17.9	5.0	16.3		
Change Period (Y+Rc), s		5.3		4.6	4.0	5.3		
Max Green Setting (Gmax), s		40.0		40.0	25.0	40.0		
Max Q Clear Time (g_c+I1), s		5.9		9.8	2.8	4.6		
Green Ext Time (p_c), s		6.1		3.5	0.0	6.2		
Intersection Summary								
HCM 2010 Ctrl Delay			10.4					
HCM 2010 LOS			B					

Queues
3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Existing AM Peak Hour

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	826	33	509	37	529
v/c Ratio	0.58	0.05	0.43	0.14	0.38
Control Delay	13.1	7.1	7.5	22.8	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.1	7.1	7.5	22.8	11.0
Queue Length 50th (ft)	67	2	15	8	46
Queue Length 95th (ft)	172	17	66	37	96
Internal Link Dist (ft)	302		14		205
Turn Bay Length (ft)	95	110		70	
Base Capacity (vph)	3070	1400	2858	1098	3610
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.27	0.02	0.18	0.03	0.15
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

4: Springtown Blvd & I-580 WB Ramps

Lassen Road Mixed Use TIA
Existing AM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	479	379	423	798	408
Future Volume (vph)	0	479	379	423	798	408
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.7	3.7	3.5	4.4	4.4
Lane Util. Factor		0.88	0.97	1.00	0.95	1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00
Frt		0.85	1.00	1.00	1.00	0.85
Flt Protected		1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)		2842	3502	1900	3610	1591
Flt Permitted		1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)		2842	3502	1900	3610	1591
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	544	431	481	907	464
RTOR Reduction (vph)	0	133	0	0	0	140
Lane Group Flow (vph)	0	411	431	481	907	324
Confl. Peds. (#/hr)						2
Confl. Bikes (#/hr)						5
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type		Over	Prot	NA	NA	Perm
Protected Phases		5	5	Free	6	
Permitted Phases		5				6
Actuated Green, G (s)		8.1	8.1	33.0	15.8	15.8
Effective Green, g (s)		8.6	8.6	33.0	16.3	16.3
Actuated g/C Ratio		0.26	0.26	1.00	0.49	0.49
Clearance Time (s)		4.2	4.2		4.9	4.9
Vehicle Extension (s)		0.2	0.2		0.2	0.2
Lane Grp Cap (vph)		740	912	1900	1783	785
v/s Ratio Prot		c0.14	0.12	0.25	c0.25	
v/s Ratio Perm						0.20
v/c Ratio		0.56	0.47	0.25	0.51	0.41
Uniform Delay, d1		10.5	10.3	0.0	5.6	5.3
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.5	0.1	0.3	0.1	0.1
Delay (s)		11.1	10.4	0.3	5.7	5.4
Level of Service		B	B	A	A	A
Approach Delay (s)	11.1			5.1	5.6	
Approach LOS	B			A	A	
Intersection Summary						
HCM 2000 Control Delay			6.5		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.52			
Actuated Cycle Length (s)			33.0		Sum of lost time (s)	8.1
Intersection Capacity Utilization			46.8%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM 2010 Signalized Intersection Summary

5: First St/Springtown Blvd & I-580 EB Ramps

Lassen Road Mixed Use TIA

Existing AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↩	↩↩					↩↩	↩	↩	↩↩	
Traffic Volume (veh/h)	106	1	261	0	0	0	0	696	317	51	1226	0
Future Volume (veh/h)	106	1	261	0	0	0	0	696	317	51	1226	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	1900	1900				0	1900	1900	1900	1900	0
Adj Flow Rate, veh/h	122	1	300				0	800	0	59	1409	0
Adj No. of Lanes	0	1	2				0	2	1	1	2	0
Peak Hour Factor	0.87	0.87	0.87				0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	0	0				0	0	0	0	0	0
Cap, veh/h	240	2	380				0	2686	1202	84	2926	0
Arrive On Green	0.13	0.13	0.13				0.00	0.74	0.00	0.05	0.81	0.00
Sat Flow, veh/h	1796	15	2842				0	3705	1615	1810	3705	0
Grp Volume(v), veh/h	123	0	300				0	800	0	59	1409	0
Grp Sat Flow(s),veh/h/ln	1810	0	1421				0	1805	1615	1810	1805	0
Q Serve(g_s), s	7.9	0.0	12.8				0.0	9.1	0.0	4.0	15.2	0.0
Cycle Q Clear(g_c), s	7.9	0.0	12.8				0.0	9.1	0.0	4.0	15.2	0.0
Prop In Lane	0.99		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	242	0	380				0	2686	1202	84	2926	0
V/C Ratio(X)	0.51	0.00	0.79				0.00	0.30	0.00	0.70	0.48	0.00
Avail Cap(c_a), veh/h	492	0	773				0	2686	1202	224	2926	0
HCM Platoon Ratio	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				0.00	1.00	0.00	0.81	0.81	0.00
Uniform Delay (d), s/veh	50.3	0.0	52.5				0.0	5.3	0.0	58.8	3.7	0.0
Incr Delay (d2), s/veh	1.2	0.0	2.8				0.0	0.3	0.0	8.4	0.5	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	4.0	0.0	5.2				0.0	4.6	0.0	2.2	7.6	0.0
LnGrp Delay(d),s/veh	51.6	0.0	55.2				0.0	5.5	0.0	67.2	4.1	0.0
LnGrp LOS	D		E					A		E	A	
Approach Vol, veh/h		423						800			1468	
Approach Delay, s/veh		54.2						5.5			6.7	
Approach LOS		D						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	8.3	97.0		19.7		105.3						
Change Period (Y+Rc), s	3.0	4.5		3.5		4.5						
Max Green Setting (Gmax), s	15.0	65.5		33.5		83.5						
Max Q Clear Time (g_c+10.0), s	10.0	11.1		14.8		17.2						
Green Ext Time (p_c), s	0.1	39.9		1.4		46.0						
Intersection Summary												
HCM 2010 Ctrl Delay			13.8									
HCM 2010 LOS			B									

Intersection							
Int Delay, s/veh	1						
Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Vol, veh/h	24	15	272	710	20	26	30
Future Vol, veh/h	24	15	272	710	20	26	30
Conflicting Peds, #/hr	0	0	0	0	0	8	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	Yield	-	None
Storage Length	-	85	-	-	-	0	0
Veh in Median Storage, #	-	-	0	0	-	0	-
Grade, %	-	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	2	2	0	0
Mvmt Flow	28	17	313	816	23	30	34
Major/Minor	Major1		Major2		Minor2		
Conflicting Flow All	-	816	0	-	0	1171	816
Stage 1	-	-	-	-	-	816	-
Stage 2	-	-	-	-	-	355	-
Critical Hdwy	-	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	-	5.4	-
Follow-up Hdwy	-	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	-	820	-	-	-	215	380
Stage 1	-	-	-	-	-	438	-
Stage 2	-	-	-	-	-	714	-
Platoon blocked, %			-	-	-		
Mov Cap-1 Maneuver	~	~	-	-	-	215	380
Mov Cap-2 Maneuver	-	-	-	-	-	215	-
Stage 1	-	-	-	-	-	438	-
Stage 2	-	-	-	-	-	714	-
Approach	EB		WB		SB		
HCM Control Delay, s			0		19.6		
HCM LOS					C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2	
Capacity (veh/h)	~	-	-	-	215	380	
HCM Lane V/C Ratio	~	-	-	-	0.139	0.091	
HCM Control Delay (s)	-	-	-	-	24.4	15.4	
HCM Lane LOS	-	-	-	-	C	C	
HCM 95th %tile Q(veh)	~	-	-	-	0.5	0.3	
Notes							
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon							

HCM 2010 TWSC
1: Lassen Rd & Spring Valley Common

Lassen Road Mixed Use TIA
Existing PM Peak Hour

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	48	35	10	5	0
Future Vol, veh/h	0	48	35	10	5	0
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	55	40	11	6	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	52	0	-	0	101	47
Stage 1	-	-	-	-	46	-
Stage 2	-	-	-	-	55	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1567	-	-	-	902	1028
Stage 1	-	-	-	-	982	-
Stage 2	-	-	-	-	973	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1566	-	-	-	902	1027
Mov Cap-2 Maneuver	-	-	-	-	902	-
Stage 1	-	-	-	-	982	-
Stage 2	-	-	-	-	973	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		9		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1566	-	-	-	902	
HCM Lane V/C Ratio	-	-	-	-	0.006	
HCM Control Delay (s)	0	-	-	-	9	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0	

Intersection											
Int Delay, s/veh	1.7										
Movement	EBL	EBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations											
Traffic Vol, veh/h	1	38	8	82	388	14	0	220	10	0	0
Future Vol, veh/h	1	38	8	82	388	14	0	220	10	0	0
Conflicting Peds, #/hr	0	0	0	3	0	0	0	0	3	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	-	None	-	-	None	-	-
Storage Length	0	-	-	88	-	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	-	0	-	-	0	-	-	-
Grade, %	0	-	-	-	0	-	-	0	-	0	-
Peak Hour Factor	92	89	89	89	89	92	92	89	89	92	92
Heavy Vehicles, %	2	0	0	0	0	2	2	0	0	2	2
Mvmt Flow	1	43	9	92	436	15	0	247	11	0	0
Major/Minor	Minor2		Major1			Major2					
Conflicting Flow All	676	132	258	261	0	0	-	-	0		
Stage 1	256	-	-	-	-	-	-	-	-		
Stage 2	420	-	-	-	-	-	-	-	-		
Critical Hdwy	6.8	6.9	6.4	4.1	-	-	-	-	-		
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-	-	-		
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-	-	-		
Follow-up Hdwy	3.5	3.3	2.5	2.2	-	-	-	-	-		
Pot Cap-1 Maneuver	391	899	994	1315	-	-	0	-	-		
Stage 1	769	-	-	-	-	-	0	-	-		
Stage 2	637	-	-	-	-	-	0	-	-		
Platoon blocked, %					-	-		-	-		
Mov Cap-1 Maneuver	389	896	1272	1272	-	-	-	-	-		
Mov Cap-2 Maneuver	389	-	-	-	-	-	-	-	-		
Stage 1	767	-	-	-	-	-	-	-	-		
Stage 2	635	-	-	-	-	-	-	-	-		
Approach	EB		NB			SB					
HCM Control Delay, s	11		1.5			0					
HCM LOS	B										
Minor Lane/Major Mvmt	NBL		NBT	NBR	EBLn1	SBT	SBR				
Capacity (veh/h)	1272		-	-	663	-	-				
HCM Lane V/C Ratio	0.079		-	-	0.09	-	-				
HCM Control Delay (s)	8.1		-	-	11	-	-				
HCM Lane LOS	A		-	-	B	-	-				
HCM 95th %tile Q(veh)	0.3		-	-	0.3	-	-				

HCM 2010 Signalized Intersection Summary

3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Existing PM Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 		 					
Traffic Volume (veh/h)	403	25	466	958	31	249		
Future Volume (veh/h)	403	25	466	958	31	249		
Number	7	14	6	16	5	2		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.97	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900		
Adj Flow Rate, veh/h	453	6	524	870	35	280		
Adj No. of Lanes	2	1	2	0	1	2		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89		
Percent Heavy Veh, %	0	0	0	0	0	0		
Cap, veh/h	649	299	1073	936	56	2452		
Arrive On Green	0.18	0.18	0.59	0.59	0.03	0.68		
Sat Flow, veh/h	3510	1615	1900	1575	1810	3705		
Grp Volume(v), veh/h	453	6	524	870	35	280		
Grp Sat Flow(s),veh/h/ln	1755	1615	1805	1575	1810	1805		
Q Serve(g_s), s	7.9	0.2	10.9	32.9	1.3	1.8		
Cycle Q Clear(g_c), s	7.9	0.2	10.9	32.9	1.3	1.8		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	649	299	1073	936	56	2452		
V/C Ratio(X)	0.70	0.02	0.49	0.93	0.62	0.11		
Avail Cap(c_a), veh/h	2171	999	1116	974	704	2452		
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	25.0	21.8	7.6	12.3	31.3	3.7		
Incr Delay (d2), s/veh	1.4	0.0	0.3	14.5	4.1	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	4.0	0.2	5.5	17.8	0.7	0.9		
LnGrp Delay(d),s/veh	26.4	21.9	7.9	26.7	35.4	3.7		
LnGrp LOS	C	C	A	C	D	A		
Approach Vol, veh/h	459		1394			315		
Approach Delay, s/veh	26.3		19.7			7.2		
Approach LOS	C		B			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		49.3		16.2	5.5	43.8		
Change Period (Y+Rc), s		5.3		4.6	4.0	5.3		
Max Green Setting (Gmax), s		40.0		40.0	25.0	40.0		
Max Q Clear Time (g_c+I1), s		3.8		9.9	3.3	34.9		
Green Ext Time (p_c), s		18.2		1.7	0.0	3.6		
Intersection Summary								
HCM 2010 Ctrl Delay			19.3					
HCM 2010 LOS			B					

Queues
3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Existing PM Peak Hour

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	453	28	1600	35	280
v/c Ratio	0.62	0.08	0.95dr	0.21	0.12
Control Delay	29.5	9.9	13.0	36.1	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	9.9	13.0	36.1	4.8
Queue Length 50th (ft)	99	0	212	15	20
Queue Length 95th (ft)	m145	m18	369	m43	m38
Internal Link Dist (ft)	302		14		205
Turn Bay Length (ft)	95	110		70	
Base Capacity (vph)	2027	934	2039	657	3388
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.22	0.03	0.78	0.05	0.08

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.
dr Defacto Right Lane. Recode with 1 though lane as a right lane.

HCM Signalized Intersection Capacity Analysis

4: Springtown Blvd & I-580 WB Ramps

Lassen Road Mixed Use TIA
Existing PM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	274	429	1351	407	245
Future Volume (vph)	0	274	429	1351	407	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	3.5	4.4	4.4
Lane Util. Factor		0.88	0.97	1.00	0.95	1.00
Frpb, ped/bikes		1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00
Frt		0.85	1.00	1.00	1.00	0.85
Flt Protected		1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)		2842	3502	1900	3610	1592
Flt Permitted		1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)		2842	3502	1900	3610	1592
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	311	488	1535	462	278
RTOR Reduction (vph)	0	253	0	0	0	0
Lane Group Flow (vph)	0	58	488	1535	463	278
Confl. Peds. (#/hr)						2
Confl. Bikes (#/hr)						5
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type		Over	Prot	NA	NA	Perm
Protected Phases		5	5	Free	6	
Permitted Phases		5				6
Actuated Green, G (s)		5.0	5.0	29.4	15.0	15.0
Effective Green, g (s)		5.5	5.5	29.4	15.5	15.5
Actuated g/C Ratio		0.19	0.19	1.00	0.53	0.53
Clearance Time (s)		4.5	4.5		4.9	4.9
Vehicle Extension (s)		3.0	3.0		0.2	0.2
Lane Grp Cap (vph)		531	655	1900	1903	839
v/s Ratio Prot		0.02	0.14	0.81	0.13	
v/s Ratio Perm						0.17
v/c Ratio		0.11	0.75	0.81	0.24	0.33
Uniform Delay, d1		9.9	11.3	0.0	3.8	4.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1	4.6	3.8	0.0	0.1
Delay (s)		10.0	15.9	3.8	3.8	4.1
Level of Service		B	B	A	A	A
Approach Delay (s)	10.0			6.7	3.9	
Approach LOS	B			A	A	
Intersection Summary						
HCM 2000 Control Delay			6.4		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			1.13			
Actuated Cycle Length (s)			29.4		Sum of lost time (s)	8.4
Intersection Capacity Utilization			74.4%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM 2010 Signalized Intersection Summary 5: First St/Springtown Blvd & I-580 EB Ramps

Lassen Road Mixed Use TIA
Existing PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	531	4	547	0	0	0	0	1249	440	21	660	0
Future Volume (veh/h)	531	4	547	0	0	0	0	1249	440	21	660	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	1900	1900				0	1900	1900	1900	1900	0
Adj Flow Rate, veh/h	610	5	629				0	1436	0	24	759	0
Adj No. of Lanes	0	1	2				0	2	1	1	2	0
Peak Hour Factor	0.87	0.87	0.87				0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	0	0				0	0	0	0	0	0
Cap, veh/h	664	5	1052				0	1932	865	39	2080	0
Arrive On Green	0.37	0.37	0.37				0.00	0.54	0.00	0.02	0.58	0.00
Sat Flow, veh/h	1796	15	2842				0	3705	1615	1810	3705	0
Grp Volume(v), veh/h	615	0	629				0	1436	0	24	759	0
Grp Sat Flow(s),veh/h/ln	1810	0	1421				0	1805	1615	1810	1805	0
Q Serve(g_s), s	42.1	0.0	23.3				0.0	39.9	0.0	1.7	14.7	0.0
Cycle Q Clear(g_c), s	42.1	0.0	23.3				0.0	39.9	0.0	1.7	14.7	0.0
Prop In Lane	0.99		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	670	0	1052				0	1932	865	39	2080	0
V/C Ratio(X)	0.92	0.00	0.60				0.00	0.74	0.00	0.61	0.36	0.00
Avail Cap(c_a), veh/h	724	0	1137				0	1932	865	160	2080	0
HCM Platoon Ratio	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				0.00	1.00	0.00	0.93	0.93	0.00
Uniform Delay (d), s/veh	39.1	0.0	33.1				0.0	23.3	0.0	63.0	14.8	0.0
Incr Delay (d2), s/veh	15.8	0.0	0.6				0.0	2.6	0.0	13.5	0.5	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	24.0	0.0	9.3				0.0	20.5	0.0	1.0	7.4	0.0
LnGrp Delay(d),s/veh	54.9	0.0	33.8				0.0	25.9	0.0	76.6	15.2	0.0
LnGrp LOS	D		C					C		E	B	
Approach Vol, veh/h		1244						1436			783	
Approach Delay, s/veh		44.2						25.9			17.1	
Approach LOS		D						C			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	5.3	73.6		51.1		78.9						
Change Period (Y+Rc), s	3.0	4.5		3.5		4.5						
Max Green Setting (Gmax), s	1.0	56.5		51.5		70.5						
Max Q Clear Time (g_c+1.3), s	13.7	41.9		44.1		16.7						
Green Ext Time (p_c), s	0.0	13.1		3.4		39.5						
Intersection Summary												
HCM 2010 Ctrl Delay			30.5									
HCM 2010 LOS			C									

Intersection							
Int Delay, s/veh	0.6						
Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Vol, veh/h	32	48	909	380	26	17	16
Future Vol, veh/h	32	48	909	380	26	17	16
Conflicting Peds, #/hr	0	0	0	0	0	8	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	Yield	-	None
Storage Length	-	85	-	-	-	0	0
Veh in Median Storage, #	-	-	0	0	-	0	-
Grade, %	-	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	2	2	0	0
Mvmt Flow	37	55	1045	437	30	20	18
Major/Minor	Major1	Major2		Minor2			
Conflicting Flow All	-	437	0	-	0	1600	437
Stage 1	-	-	-	-	-	437	-
Stage 2	-	-	-	-	-	1163	-
Critical Hdwy	-	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	-	5.4	-
Follow-up Hdwy	-	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	-	1134	-	-	-	118	624
Stage 1	-	-	-	-	-	655	-
Stage 2	-	-	-	-	-	300	-
Platoon blocked, %			-	-	-		
Mov Cap-1 Maneuver	~ -3	~ -3	-	-	-	118	624
Mov Cap-2 Maneuver	-	-	-	-	-	118	-
Stage 1	-	-	-	-	-	655	-
Stage 2	-	-	-	-	-	300	-
Approach	EB	WB		SB			
HCM Control Delay, s		0		26.7			
HCM LOS				D			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2	
Capacity (veh/h)	+	-	-	-	118	624	
HCM Lane V/C Ratio	-	-	-	-	0.166	0.029	
HCM Control Delay (s)	-	-	-	-	41.5	10.9	
HCM Lane LOS	-	-	-	-	E	B	
HCM 95th %tile Q(veh)	-	-	-	-	0.6	0.1	
Notes							
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon							

HCM 2010 TWSC
1: Lassen Rd & Spring Valley Common

Lassen Road Mixed Use TIA
Existing Plus Project AM Peak Hour

Intersection

Int Delay, s/veh 0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	115	54	5	12	1
Future Vol, veh/h	0	115	54	5	12	1
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	132	62	6	14	1

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	68	0	0 197 66
Stage 1	-	-	- 65 -
Stage 2	-	-	- 132 -
Critical Hdwy	4.1	-	- 6.4 6.2
Critical Hdwy Stg 1	-	-	- 5.4 -
Critical Hdwy Stg 2	-	-	- 5.4 -
Follow-up Hdwy	2.2	-	- 3.5 3.3
Pot Cap-1 Maneuver	1546	-	- 796 1003
Stage 1	-	-	- 963 -
Stage 2	-	-	- 899 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1545	-	- 796 1002
Mov Cap-2 Maneuver	-	-	- 796 -
Stage 1	-	-	- 963 -
Stage 2	-	-	- 899 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1545	-	-	-	809
HCM Lane V/C Ratio	-	-	-	-	0.018
HCM Control Delay (s)	0	-	-	-	9.5
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 2010 TWSC
2: Springtown Blvd & Lassen Rd

Lassen Road Mixed Use TIA
Existing Plus Project AM Peak Hour

Intersection											
Int Delay, s/veh	2.8										
Movement	EBL	EBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations											
Traffic Vol, veh/h	1	118	1	88	129	0	0	421	19	0	0
Future Vol, veh/h	1	118	1	88	129	0	0	421	19	0	0
Conflicting Peds, #/hr	0	0	0	3	0	0	0	0	3	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	-	None	-	-	None	-	-
Storage Length	0	-	-	88	-	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	-	0	-	-	0	-	-	-
Grade, %	0	-	-	-	0	-	-	0	-	0	-
Peak Hour Factor	92	89	89	89	89	92	92	89	89	92	92
Heavy Vehicles, %	2	0	0	0	0	2	2	0	0	2	2
Mvmt Flow	1	133	1	99	145	0	0	473	21	0	0
Major/Minor	Minor2		Major1			Major2					
Conflicting Flow All	759	250	494	497	0	0	-	-	0		
Stage 1	487	-	-	-	-	-	-	-	-		
Stage 2	272	-	-	-	-	-	-	-	-		
Critical Hdwy	6.8	6.9	6.4	4.1	-	-	-	-	-		
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-	-	-		
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-	-	-		
Follow-up Hdwy	3.5	3.3	2.5	2.2	-	-	-	-	-		
Pot Cap-1 Maneuver	347	756	707	1077	-	-	0	-	-		
Stage 1	589	-	-	-	-	-	0	-	-		
Stage 2	755	-	-	-	-	-	0	-	-		
Platoon blocked, %					-	-		-	-		
Mov Cap-1 Maneuver	345	754	1067	1067	-	-	-	-	-		
Mov Cap-2 Maneuver	345	-	-	-	-	-	-	-	-		
Stage 1	587	-	-	-	-	-	-	-	-		
Stage 2	753	-	-	-	-	-	-	-	-		
Approach	EB		NB			SB					
HCM Control Delay, s	11.4		3.6					0			
HCM LOS	B										
Minor Lane/Major Mvmt	NBL		NBT	NBR	EBLn1	SBT	SBR				
Capacity (veh/h)	1067		-	-	707	-	-				
HCM Lane V/C Ratio	0.094		-	-	0.2	-	-				
HCM Control Delay (s)	8.7		-	-	11.4	-	-				
HCM Lane LOS	A		-	-	B	-	-				
HCM 95th %tile Q(veh)	0.3		-	-	0.7	-	-				

HCM 2010 Signalized Intersection Summary

3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Existing Plus Project AM Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	735	30	188	278	40	534		
Future Volume (veh/h)	735	30	188	278	40	534		
Number	7	14	6	16	5	2		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.97	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900		
Adj Flow Rate, veh/h	826	22	211	87	45	600		
Adj No. of Lanes	2	1	2	0	1	2		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89		
Percent Heavy Veh, %	0	0	0	0	0	0		
Cap, veh/h	1220	561	766	304	76	1567		
Arrive On Green	0.35	0.35	0.31	0.29	0.04	0.43		
Sat Flow, veh/h	3510	1615	2597	992	1810	3705		
Grp Volume(v), veh/h	826	22	150	148	45	600		
Grp Sat Flow(s),veh/h/ln	1755	1615	1805	1689	1810	1805		
Q Serve(g_s), s	8.2	0.4	2.6	2.7	1.0	4.6		
Cycle Q Clear(g_c), s	8.2	0.4	2.6	2.7	1.0	4.6		
Prop In Lane	1.00	1.00		0.59	1.00			
Lane Grp Cap(c), veh/h	1220	561	553	517	76	1567		
V/C Ratio(X)	0.68	0.04	0.27	0.29	0.59	0.38		
Avail Cap(c_a), veh/h	3491	1606	1795	1679	1133	3590		
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	11.3	8.8	10.7	10.9	19.2	7.8		
Incr Delay (d2), s/veh	0.7	0.0	0.3	0.3	2.7	0.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	4.0	0.4	1.3	1.3	0.5	2.3		
LnGrp Delay(d),s/veh	12.0	8.8	11.0	11.2	21.9	8.0		
LnGrp LOS	B	A	B	B	C	A		
Approach Vol, veh/h	848		298			645		
Approach Delay, s/veh	11.9		11.1			8.9		
Approach LOS	B		B			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		22.5		18.2	5.2	17.3		
Change Period (Y+Rc), s		5.3		4.6	4.0	5.3		
Max Green Setting (Gmax), s		40.0		40.0	25.0	40.0		
Max Q Clear Time (g_c+I1), s		6.6		10.2	3.0	4.7		
Green Ext Time (p_c), s		6.9		3.5	0.0	7.0		
Intersection Summary								
HCM 2010 Ctrl Delay			10.7					
HCM 2010 LOS			B					

Queues

3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Existing Plus Project AM Peak Hour

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	826	34	523	45	600
v/c Ratio	0.60	0.05	0.45	0.17	0.41
Control Delay	14.5	7.4	8.4	23.9	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.5	7.4	8.4	23.9	11.0
Queue Length 50th (ft)	92	2	25	11	55
Queue Length 95th (ft)	177	17	70	43	111
Internal Link Dist (ft)	302		14		205
Turn Bay Length (ft)	95	110		70	
Base Capacity (vph)	2947	1344	2766	1029	3610
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.28	0.03	0.19	0.04	0.17
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

4: Springtown Blvd & I-580 WB Ramps

Lassen Road Mixed Use TIA
Existing Plus Project AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗↘	↗↘	↑	↑↑	↗
Traffic Volume (vph)	0	479	379	435	836	433
Future Volume (vph)	0	479	379	435	836	433
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.7	3.7	3.5	4.4	4.4
Lane Util. Factor		0.88	0.97	1.00	0.95	1.00
Frpb, ped/bikes		1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00
Frt		0.85	1.00	1.00	1.00	0.85
Flt Protected		1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)		2842	3502	1900	3610	1591
Flt Permitted		1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)		2842	3502	1900	3610	1591
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	544	431	494	950	492
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	544	431	494	950	492
Confl. Peds. (#/hr)						2
Confl. Bikes (#/hr)						5
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type		Over	Prot	NA	NA	Perm
Protected Phases		5	5	Free	6	
Permitted Phases		5				6
Actuated Green, G (s)		12.5	12.5	41.5	19.9	19.9
Effective Green, g (s)		13.0	13.0	41.5	20.4	20.4
Actuated g/C Ratio		0.31	0.31	1.00	0.49	0.49
Clearance Time (s)		4.2	4.2		4.9	4.9
Vehicle Extension (s)		0.2	0.2		0.2	0.2
Lane Grp Cap (vph)		890	1097	1900	1774	782
v/s Ratio Prot		c0.19	0.12	0.26	0.26	
v/s Ratio Perm						c0.31
v/c Ratio		0.61	0.39	0.26	0.54	0.63
Uniform Delay, d1		12.1	11.2	0.0	7.3	7.8
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.9	0.1	0.3	0.2	1.1
Delay (s)		13.0	11.2	0.3	7.4	8.9
Level of Service		B	B	A	A	A
Approach Delay (s)	13.0			5.4	7.9	
Approach LOS	B			A	A	
Intersection Summary						
HCM 2000 Control Delay		8.1		HCM 2000 Level of Service		A
HCM 2000 Volume to Capacity ratio		0.62				
Actuated Cycle Length (s)		41.5		Sum of lost time (s)		8.1
Intersection Capacity Utilization		47.7%		ICU Level of Service		A
Analysis Period (min)		15				
c Critical Lane Group						

HCM 2010 Signalized Intersection Summary

5: First St/Springtown Blvd & I-580 EB Ramps

Lassen Road Mixed Use TIA
Existing Plus Project AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↩	↩↩					↩↩	↩	↩	↩↩	
Traffic Volume (veh/h)	111	1	261	0	0	0	0	703	317	55	1260	0
Future Volume (veh/h)	111	1	261	0	0	0	0	703	317	55	1260	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	1900	1900				0	1900	1900	1900	1900	0
Adj Flow Rate, veh/h	128	1	300				0	808	0	63	1448	0
Adj No. of Lanes	0	1	2				0	2	1	1	2	0
Peak Hour Factor	0.87	0.87	0.87				0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	0	0				0	0	0	0	0	0
Cap, veh/h	240	2	380				0	2675	1197	89	2925	0
Arrive On Green	0.13	0.13	0.13				0.00	0.74	0.00	0.05	0.81	0.00
Sat Flow, veh/h	1796	14	2842				0	3705	1615	1810	3705	0
Grp Volume(v), veh/h	129	0	300				0	808	0	63	1448	0
Grp Sat Flow(s), veh/h/ln	1810	0	1421				0	1805	1615	1810	1805	0
Q Serve(g_s), s	8.3	0.0	12.8				0.0	9.3	0.0	4.3	15.9	0.0
Cycle Q Clear(g_c), s	8.3	0.0	12.8				0.0	9.3	0.0	4.3	15.9	0.0
Prop In Lane	0.99		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	242	0	380				0	2675	1197	89	2925	0
V/C Ratio(X)	0.53	0.00	0.79				0.00	0.30	0.00	0.71	0.50	0.00
Avail Cap(c_a), veh/h	492	0	773				0	2675	1197	224	2925	0
HCM Platoon Ratio	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				0.00	1.00	0.00	0.80	0.80	0.00
Uniform Delay (d), s/veh	50.5	0.0	52.4				0.0	5.4	0.0	58.5	3.8	0.0
Incr Delay (d2), s/veh	1.3	0.0	2.8				0.0	0.3	0.0	8.0	0.5	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	4.2	0.0	5.1				0.0	4.7	0.0	2.4	8.0	0.0
LnGrp Delay(d),s/veh	51.8	0.0	55.2				0.0	5.7	0.0	66.6	4.2	0.0
LnGrp LOS	D		E					A		E	A	
Approach Vol, veh/h		429						808			1511	
Approach Delay, s/veh		54.2						5.7			6.8	
Approach LOS		D						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	8.6	96.6		19.7		105.3						
Change Period (Y+Rc), s	3.0	4.5		3.5		4.5						
Max Green Setting (Gmax), s	15.0	65.5		33.5		83.5						
Max Q Clear Time (g_c+10), s	10.3	11.3		14.8		17.9						
Green Ext Time (p_c), s	0.1	40.7		1.4		46.8						
Intersection Summary												
HCM 2010 Ctrl Delay			13.9									
HCM 2010 LOS			B									

Intersection							
Int Delay, s/veh	1						
Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Vol, veh/h	24	19	275	711	20	26	30
Future Vol, veh/h	24	19	275	711	20	26	30
Conflicting Peds, #/hr	0	0	0	0	0	8	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	Yield	-	None
Storage Length	-	85	-	-	-	0	0
Veh in Median Storage, #	-	-	0	0	-	0	-
Grade, %	-	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	2	2	0	0
Mvmt Flow	28	22	316	817	23	30	34
Major/Minor	Major1		Major2		Minor2		
Conflicting Flow All	-	817	0	-	0	1185	817
Stage 1	-	-	-	-	-	817	-
Stage 2	-	-	-	-	-	368	-
Critical Hdwy	-	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	-	5.4	-
Follow-up Hdwy	-	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	-	820	-	-	-	211	380
Stage 1	-	-	-	-	-	438	-
Stage 2	-	-	-	-	-	704	-
Platoon blocked, %			-	-	-		
Mov Cap-1 Maneuver	~	~	-	-	-	211	380
Mov Cap-2 Maneuver	-	-	-	-	-	211	-
Stage 1	-	-	-	-	-	438	-
Stage 2	-	-	-	-	-	704	-
Approach	EB		WB		SB		
HCM Control Delay, s			0		19.8		
HCM LOS					C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2	
Capacity (veh/h)	~	-	-	-	211	380	
HCM Lane V/C Ratio	~	-	-	-	0.142	0.091	
HCM Control Delay (s)	-	-	-	-	24.9	15.4	
HCM Lane LOS	-	-	-	-	C	C	
HCM 95th %tile Q(veh)	~	-	-	-	0.5	0.3	
Notes							
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon							

HCM 2010 TWSC
1: Lassen Rd & Spring Valley Common

Lassen Road Mixed Use TIA
Existing Plus Project PM Peak Hour

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	82	103	10	5	0
Future Vol, veh/h	0	82	103	10	5	0
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	94	118	11	6	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	130	0	-	0	218	125
Stage 1	-	-	-	-	124	-
Stage 2	-	-	-	-	94	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1468	-	-	-	775	931
Stage 1	-	-	-	-	907	-
Stage 2	-	-	-	-	935	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1467	-	-	-	775	930
Mov Cap-2 Maneuver	-	-	-	-	775	-
Stage 1	-	-	-	-	907	-
Stage 2	-	-	-	-	935	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		9.7		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1467	-	-	-	775	
HCM Lane V/C Ratio	-	-	-	-	0.007	
HCM Control Delay (s)	0	-	-	-	9.7	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile O(veh)	0	-	-	-	0	

HCM 2010 TWSC
2: Springtown Blvd & Lassen Rd

Lassen Road Mixed Use TIA
Existing Plus Project PM Peak Hour

Intersection											
Int Delay, s/veh	2.6										
Movement	EBL	EBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations											
Traffic Vol, veh/h	2	71	8	149	388	14	0	220	11	0	0
Future Vol, veh/h	2	71	8	149	388	14	0	220	11	0	0
Conflicting Peds, #/hr	0	0	0	3	0	0	0	0	3	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	-	None	-	-	None	-	-
Storage Length	0	-	-	88	-	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	-	0	-	-	0	-	-	-
Grade, %	0	-	-	-	0	-	-	0	-	0	-
Peak Hour Factor	92	89	89	89	89	92	92	89	89	92	92
Heavy Vehicles, %	2	0	0	0	0	2	2	0	0	2	2
Mvmt Flow	2	80	9	167	436	15	0	247	12	0	0
Major/Minor	Minor2		Major1			Major2					
Conflicting Flow All	827	133	259	263	0	0	-	-	0		
Stage 1	256	-	-	-	-	-	-	-	-		
Stage 2	571	-	-	-	-	-	-	-	-		
Critical Hdwy	6.8	6.9	6.4	4.1	-	-	-	-	-		
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-	-	-		
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-	-	-		
Follow-up Hdwy	3.5	3.3	2.5	2.2	-	-	-	-	-		
Pot Cap-1 Maneuver	314	898	993	1313	-	-	0	-	-		
Stage 1	769	-	-	-	-	-	0	-	-		
Stage 2	534	-	-	-	-	-	0	-	-		
Platoon blocked, %					-	-		-	-		
Mov Cap-1 Maneuver	312	895	1284	1284	-	-	-	-	-		
Mov Cap-2 Maneuver	312	-	-	-	-	-	-	-	-		
Stage 1	767	-	-	-	-	-	-	-	-		
Stage 2	532	-	-	-	-	-	-	-	-		
Approach	EB		NB			SB					
HCM Control Delay, s	11.1		2.3					0			
HCM LOS	B										
Minor Lane/Major Mvmt	NBL		NBT	NBR	EBLn1	SBT	SBR				
Capacity (veh/h)	1284		-	-	684	-	-				
HCM Lane V/C Ratio	0.137		-	-	0.143	-	-				
HCM Control Delay (s)	8.2		-	-	11.1	-	-				
HCM Lane LOS	A		-	-	B	-	-				
HCM 95th %tile Q(veh)	0.5		-	-	0.5	-	-				

HCM 2010 Signalized Intersection Summary

3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Existing Plus Project PM Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	403	32	526	958	34	279		
Future Volume (veh/h)	403	32	526	958	34	279		
Number	7	14	6	16	5	2		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.97	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900		
Adj Flow Rate, veh/h	453	7	591	894	38	313		
Adj No. of Lanes	2	1	2	0	1	2		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89		
Percent Heavy Veh, %	0	0	0	0	0	0		
Cap, veh/h	645	297	1078	940	60	2465		
Arrive On Green	0.18	0.18	0.60	0.59	0.03	0.68		
Sat Flow, veh/h	3510	1615	1900	1575	1810	3705		
Grp Volume(v), veh/h	453	7	591	894	38	313		
Grp Sat Flow(s),veh/h/ln	1755	1615	1805	1575	1810	1805		
Q Serve(g_s), s	8.1	0.2	13.1	35.4	1.4	2.0		
Cycle Q Clear(g_c), s	8.1	0.2	13.1	35.4	1.4	2.0		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	645	297	1078	940	60	2465		
V/C Ratio(X)	0.70	0.02	0.55	0.95	0.63	0.13		
Avail Cap(c_a), veh/h	2131	980	1095	956	691	2465		
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	25.5	22.3	8.1	12.8	31.8	3.7		
Incr Delay (d2), s/veh	1.4	0.0	0.6	18.3	4.0	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	4.0	0.2	6.6	19.9	0.8	1.0		
LnGrp Delay(d),s/veh	26.9	22.4	8.6	31.1	35.8	3.7		
LnGrp LOS	C	C	A	C	D	A		
Approach Vol, veh/h	460		1485			351		
Approach Delay, s/veh	26.9		22.1			7.2		
Approach LOS	C		C			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		50.4		16.4	5.7	44.6		
Change Period (Y+Rc), s		5.3		4.6	4.0	5.3		
Max Green Setting (Gmax), s		40.0		40.0	25.0	40.0		
Max Q Clear Time (g_c+I1), s		4.0		10.1	3.4	37.4		
Green Ext Time (p_c), s		19.9		1.7	0.0	1.9		
Intersection Summary								
HCM 2010 Ctrl Delay			20.8					
HCM 2010 LOS			C					

Queues

3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Existing Plus Project PM Peak Hour



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	453	36	1667	38	313
v/c Ratio	0.62	0.10	0.97dr	0.23	0.13
Control Delay	29.5	9.2	15.3	36.2	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	9.2	15.3	36.2	4.8
Queue Length 50th (ft)	99	0	250	17	22
Queue Length 95th (ft)	m145	m20	#491	m46	m42
Internal Link Dist (ft)	302		14		205
Turn Bay Length (ft)	95	110		70	
Base Capacity (vph)	2024	936	2023	657	3383
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.22	0.04	0.82	0.06	0.09

Intersection Summary

- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.
- dr Defacto Right Lane. Recode with 1 though lane as a right lane.

HCM Signalized Intersection Capacity Analysis

4: Springtown Blvd & I-580 WB Ramps

Lassen Road Mixed Use TIA
Existing Plus Project PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗↘	↗↘	↑	↑↑	↗
Traffic Volume (vph)	0	274	429	1408	425	257
Future Volume (vph)	0	274	429	1408	425	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	3.5	4.4	4.4
Lane Util. Factor		0.88	0.97	1.00	0.95	1.00
Frpb, ped/bikes		1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00
Frt		0.85	1.00	1.00	1.00	0.85
Flt Protected		1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)		2842	3502	1900	3610	1592
Flt Permitted		1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)		2842	3502	1900	3610	1592
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	311	488	1600	483	292
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	311	488	1600	483	292
Confl. Peds. (#/hr)						2
Confl. Bikes (#/hr)						5
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type		Over	Prot	NA	NA	Perm
Protected Phases		5	5	Free	6	
Permitted Phases		5				6
Actuated Green, G (s)		5.0	5.0	29.4	15.0	15.0
Effective Green, g (s)		5.5	5.5	29.4	15.5	15.5
Actuated g/C Ratio		0.19	0.19	1.00	0.53	0.53
Clearance Time (s)		4.5	4.5		4.9	4.9
Vehicle Extension (s)		3.0	3.0		0.2	0.2
Lane Grp Cap (vph)		531	655	1900	1903	839
v/s Ratio Prot		0.11	0.14	0.84	0.13	
v/s Ratio Perm						0.18
v/c Ratio		0.59	0.75	0.84	0.25	0.35
Uniform Delay, d1		10.9	11.3	0.0	3.8	4.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.7	4.6	4.7	0.0	0.1
Delay (s)		12.6	15.9	4.7	3.8	4.1
Level of Service		B	B	A	A	A
Approach Delay (s)	12.6			7.3	3.9	
Approach LOS	B			A	A	
Intersection Summary						
HCM 2000 Control Delay			7.0		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			1.18			
Actuated Cycle Length (s)			29.4		Sum of lost time (s)	8.4
Intersection Capacity Utilization			77.4%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM 2010 Signalized Intersection Summary

5: First St/Springtown Blvd & I-580 EB Ramps

Lassen Road Mixed Use TIA
Existing Plus Project PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	555	4	547	0	0	0	0	1282	440	23	676	0
Future Volume (veh/h)	555	4	547	0	0	0	0	1282	440	23	676	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	1900	1900				0	1900	1900	1900	1900	0
Adj Flow Rate, veh/h	638	5	629				0	1474	0	26	777	0
Adj No. of Lanes	0	1	2				0	2	1	1	2	0
Peak Hour Factor	0.87	0.87	0.87				0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	0	0				0	0	0	0	0	0
Cap, veh/h	685	5	1084				0	1888	845	41	2039	0
Arrive On Green	0.38	0.38	0.38				0.00	0.52	0.00	0.02	0.56	0.00
Sat Flow, veh/h	1796	14	2842				0	3705	1615	1810	3705	0
Grp Volume(v), veh/h	643	0	629				0	1474	0	26	777	0
Grp Sat Flow(s),veh/h/ln	1810	0	1421				0	1805	1615	1810	1805	0
Q Serve(g_s), s	44.3	0.0	22.9				0.0	42.8	0.0	1.9	15.5	0.0
Cycle Q Clear(g_c), s	44.3	0.0	22.9				0.0	42.8	0.0	1.9	15.5	0.0
Prop In Lane	0.99		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	690	0	1084				0	1888	845	41	2039	0
V/C Ratio(X)	0.93	0.00	0.58				0.00	0.78	0.00	0.64	0.38	0.00
Avail Cap(c_a), veh/h	724	0	1137				0	1888	845	160	2039	0
HCM Platoon Ratio	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				0.00	1.00	0.00	0.93	0.93	0.00
Uniform Delay (d), s/veh	38.6	0.0	32.0				0.0	25.0	0.0	63.0	15.7	0.0
Incr Delay (d2), s/veh	18.2	0.0	0.6				0.0	3.3	0.0	14.2	0.5	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	25.6	0.0	9.1				0.0	22.2	0.0	1.1	7.8	0.0
LnGrp Delay(d),s/veh	56.8	0.0	32.5				0.0	28.3	0.0	77.2	16.2	0.0
LnGrp LOS	E		C					C		E	B	
Approach Vol, veh/h		1272						1474			803	
Approach Delay, s/veh		44.8						28.3			18.2	
Approach LOS		D						C			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	5.4	72.0		52.6		77.4						
Change Period (Y+Rc), s	3.0	4.5		3.5		4.5						
Max Green Setting (Gmax), s	11.0	56.5		51.5		70.5						
Max Q Clear Time (g_c+1.0), s	13.9	44.8		46.3		17.5						
Green Ext Time (p_c), s	0.0	10.8		2.7		40.1						
Intersection Summary												
HCM 2010 Ctrl Delay			31.9									
HCM 2010 LOS			C									

Intersection							
Int Delay, s/veh	0.6						
Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Vol, veh/h	32	50	910	384	26	17	19
Future Vol, veh/h	32	50	910	384	26	17	19
Conflicting Peds, #/hr	0	0	0	0	0	8	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	Yield	-	None
Storage Length	-	85	-	-	-	0	0
Veh in Median Storage, #	-	-	0	0	-	0	-
Grade, %	-	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	2	2	0	0
Mvmt Flow	37	57	1046	441	30	20	22
Major/Minor	Major1		Major2		Minor2		
Conflicting Flow All	-	441	0	-	0	1610	441
Stage 1	-	-	-	-	-	441	-
Stage 2	-	-	-	-	-	1169	-
Critical Hdwy	-	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	-	5.4	-
Follow-up Hdwy	-	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	-	1130	-	-	-	116	621
Stage 1	-	-	-	-	-	653	-
Stage 2	-	-	-	-	-	298	-
Platoon blocked, %			-	-	-		
Mov Cap-1 Maneuver	~ -3	~ -3	-	-	-	116	621
Mov Cap-2 Maneuver	-	-	-	-	-	116	-
Stage 1	-	-	-	-	-	653	-
Stage 2	-	-	-	-	-	298	-
Approach	EB		WB		SB		
HCM Control Delay, s			0		25.7		
HCM LOS					D		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2	
Capacity (veh/h)	+	-	-	-	116	621	
HCM Lane V/C Ratio	-	-	-	-	0.168	0.035	
HCM Control Delay (s)	-	-	-	-	42.2	11	
HCM Lane LOS	-	-	-	-	E	B	
HCM 95th %tile Q(veh)	-	-	-	-	0.6	0.1	
Notes							
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon							

HCM 2010 TWSC
1: Lassen Rd & Spring Valley Common

Lassen Road Mixed Use TIA
Existing Plus Near Term AM Peak Hour

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	45	41	5	13	1
Future Vol, veh/h	0	45	41	5	13	1
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	52	47	6	15	1
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	53	0	-	0	102	51
Stage 1	-	-	-	-	50	-
Stage 2	-	-	-	-	52	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1566	-	-	-	901	1023
Stage 1	-	-	-	-	978	-
Stage 2	-	-	-	-	976	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1565	-	-	-	901	1022
Mov Cap-2 Maneuver	-	-	-	-	901	-
Stage 1	-	-	-	-	978	-
Stage 2	-	-	-	-	976	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		9		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1565	-	-	-	909	
HCM Lane V/C Ratio	-	-	-	-	0.018	
HCM Control Delay (s)	0	-	-	-	9	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

HCM 2010 TWSC
2: Springtown Blvd & Lassen Rd

Lassen Road Mixed Use TIA
Existing Plus Near Term AM Peak Hour

Intersection											
Int Delay, s/veh	1.8										
Movement	EBL	EBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations											
Traffic Vol, veh/h	0	50	1	78	135	0	0	442	20	0	0
Future Vol, veh/h	0	50	1	78	135	0	0	442	20	0	0
Conflicting Peds, #/hr	0	0	0	3	0	0	0	0	3	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	-	None	-	-	None	-	-
Storage Length	0	-	-	88	-	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	-	0	-	-	0	-	-	-
Grade, %	0	-	-	-	0	-	-	0	-	0	-
Peak Hour Factor	92	89	89	89	89	92	92	89	89	92	92
Heavy Vehicles, %	2	0	0	0	0	2	2	0	0	2	2
Mvmt Flow	0	56	1	88	152	0	0	497	22	0	0
Major/Minor	Minor2		Major1			Major2					
Conflicting Flow All	764	263	518	522	0	0	-	-	0		
Stage 1	511	-	-	-	-	-	-	-	-		
Stage 2	253	-	-	-	-	-	-	-	-		
Critical Hdwy	6.8	6.9	6.4	4.1	-	-	-	-	-		
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-	-	-		
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-	-	-		
Follow-up Hdwy	3.5	3.3	2.5	2.2	-	-	-	-	-		
Pot Cap-1 Maneuver	344	742	683	1055	-	-	0	-	-		
Stage 1	573	-	-	-	-	-	0	-	-		
Stage 2	772	-	-	-	-	-	0	-	-		
Platoon blocked, %					-	-		-	-		
Mov Cap-1 Maneuver	342	740	1046	1046	-	-	-	-	-		
Mov Cap-2 Maneuver	342	-	-	-	-	-	-	-	-		
Stage 1	571	-	-	-	-	-	-	-	-		
Stage 2	770	-	-	-	-	-	-	-	-		
Approach	EB		NB			SB					
HCM Control Delay, s	11.2		3.2			0					
HCM LOS	B										
Minor Lane/Major Mvmt	NBL		NBT	NBR	EBLn1	SBT	SBR				
Capacity (veh/h)	1046		-	-	647	-	-				
HCM Lane V/C Ratio	0.085		-	-	0.099	-	-				
HCM Control Delay (s)	8.8		-	-	11.2	-	-				
HCM Lane LOS	A		-	-	B	-	-				
HCM 95th %tile O(veh)	0.3		-	-	0.3	-	-				

HCM 2010 Signalized Intersection Summary

3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Existing Plus Near Term AM Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 		 			 		
Traffic Volume (veh/h)	773	30	184	292	35	495		
Future Volume (veh/h)	773	30	184	292	35	495		
Number	7	14	6	16	5	2		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.97	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900		
Adj Flow Rate, veh/h	869	23	207	97	39	556		
Adj No. of Lanes	2	1	2	0	1	2		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89		
Percent Heavy Veh, %	0	0	0	0	0	0		
Cap, veh/h	1268	583	715	321	70	1523		
Arrive On Green	0.36	0.36	0.30	0.29	0.04	0.42		
Sat Flow, veh/h	3510	1615	2494	1076	1810	3705		
Grp Volume(v), veh/h	869	23	153	151	39	556		
Grp Sat Flow(s),veh/h/ln	1755	1615	1805	1671	1810	1805		
Q Serve(g_s), s	8.6	0.4	2.7	2.9	0.9	4.3		
Cycle Q Clear(g_c), s	8.6	0.4	2.7	2.9	0.9	4.3		
Prop In Lane	1.00	1.00		0.64	1.00			
Lane Grp Cap(c), veh/h	1268	583	538	498	70	1523		
V/C Ratio(X)	0.69	0.04	0.29	0.30	0.56	0.37		
Avail Cap(c_a), veh/h	3466	1595	1782	1649	1125	3564		
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	11.1	8.5	11.0	11.2	19.4	8.1		
Incr Delay (d2), s/veh	0.7	0.0	0.3	0.3	2.6	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	4.2	0.0	1.4	1.4	0.5	2.1		
LnGrp Delay(d),s/veh	11.8	8.5	11.3	11.6	22.0	8.3		
LnGrp LOS	B	A	B	B	C	A		
Approach Vol, veh/h	892		304			595		
Approach Delay, s/veh	11.7		11.5			9.2		
Approach LOS	B		B			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		22.1		18.9	5.1	17.0		
Change Period (Y+Rc), s		5.3		4.6	4.0	5.3		
Max Green Setting (Gmax), s		40.0		40.0	25.0	40.0		
Max Q Clear Time (g_c+I1), s		6.3		10.6	2.9	4.9		
Green Ext Time (p_c), s		6.5		3.7	0.0	6.6		
Intersection Summary								
HCM 2010 Ctrl Delay			10.8					
HCM 2010 LOS			B					

Queues
3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Existing Plus Near Term AM Peak Hour

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	869	34	535	39	556
v/c Ratio	0.60	0.05	0.44	0.15	0.40
Control Delay	13.6	7.2	7.8	24.0	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	7.2	7.8	24.0	11.7
Queue Length 50th (ft)	75	2	17	9	52
Queue Length 95th (ft)	186	17	71	39	106
Internal Link Dist (ft)	302		14		205
Turn Bay Length (ft)	95	110		70	
Base Capacity (vph)	2998	1367	2801	1047	3610
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.29	0.02	0.19	0.04	0.15
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

4: Springtown Blvd & I-580 WB Ramps

Lassen Road Mixed Use TIA
Existing Plus Near Term AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗↘	↗↘	↑	↑↑	↗
Traffic Volume (vph)	0	513	508	444	840	428
Future Volume (vph)	0	513	508	444	840	428
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.7	3.7	3.5	4.4	4.4
Lane Util. Factor		0.88	0.97	1.00	0.95	1.00
Frpb, ped/bikes		1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00
Frt		0.85	1.00	1.00	1.00	0.85
Flt Protected		1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)		2842	3502	1900	3610	1591
Flt Permitted		1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)		2842	3502	1900	3610	1591
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	583	577	505	955	486
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	583	577	505	955	486
Confl. Peds. (#/hr)						2
Confl. Bikes (#/hr)						5
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type		Over	Prot	NA	NA	Perm
Protected Phases		5	5	Free	6	
Permitted Phases		5				6
Actuated Green, G (s)		13.2	13.2	42.5	20.2	20.2
Effective Green, g (s)		13.7	13.7	42.5	20.7	20.7
Actuated g/C Ratio		0.32	0.32	1.00	0.49	0.49
Clearance Time (s)		4.2	4.2		4.9	4.9
Vehicle Extension (s)		0.2	0.2		0.2	0.2
Lane Grp Cap (vph)		916	1128	1900	1758	774
v/s Ratio Prot		c0.21	0.16	0.27	0.26	
v/s Ratio Perm						c0.31
v/c Ratio		0.64	0.51	0.27	0.54	0.63
Uniform Delay, d1		12.3	11.7	0.0	7.6	8.1
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.1	0.2	0.3	0.2	1.2
Delay (s)		13.4	11.8	0.3	7.8	9.2
Level of Service		B	B	A	A	A
Approach Delay (s)	13.4			6.5	8.3	
Approach LOS	B			A	A	
Intersection Summary						
HCM 2000 Control Delay		8.6		HCM 2000 Level of Service		A
HCM 2000 Volume to Capacity ratio		0.63				
Actuated Cycle Length (s)		42.5		Sum of lost time (s)		8.1
Intersection Capacity Utilization		49.0%		ICU Level of Service		A
Analysis Period (min)		15				
c Critical Lane Group						

HCM 2010 Signalized Intersection Summary

5: First St/Springtown Blvd & I-580 EB Ramps

Lassen Road Mixed Use TIA
Existing Plus Near Term AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			 					 			 	
Traffic Volume (veh/h)	111	1	314	0	0	0	0	841	353	54	1299	0
Future Volume (veh/h)	111	1	314	0	0	0	0	841	353	54	1299	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	1900	1900				0	1900	1900	1900	1900	0
Adj Flow Rate, veh/h	128	1	361				0	967	0	62	1493	0
Adj No. of Lanes	0	1	2				0	2	1	1	2	0
Peak Hour Factor	0.87	0.87	0.87				0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	0	0				0	0	0	0	0	0
Cap, veh/h	279	2	442				0	2599	1163	88	2846	0
Arrive On Green	0.16	0.16	0.16				0.00	0.72	0.00	0.05	0.79	0.00
Sat Flow, veh/h	1796	14	2842				0	3705	1615	1810	3705	0
Grp Volume(v), veh/h	129	0	361				0	967	0	62	1493	0
Grp Sat Flow(s),veh/h/ln	1810	0	1421				0	1805	1615	1810	1805	0
Q Serve(g_s), s	8.1	0.0	15.4				0.0	12.8	0.0	4.2	18.7	0.0
Cycle Q Clear(g_c), s	8.1	0.0	15.4				0.0	12.8	0.0	4.2	18.7	0.0
Prop In Lane	0.99		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	282	0	442				0	2599	1163	88	2846	0
V/C Ratio(X)	0.46	0.00	0.82				0.00	0.37	0.00	0.71	0.52	0.00
Avail Cap(c_a), veh/h	492	0	773				0	2599	1163	224	2846	0
HCM Platoon Ratio	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				0.00	1.00	0.00	0.78	0.78	0.00
Uniform Delay (d), s/veh	48.0	0.0	51.1				0.0	6.7	0.0	58.6	4.8	0.0
Incr Delay (d2), s/veh	0.9	0.0	2.8				0.0	0.4	0.0	7.9	0.5	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	4.1	0.0	6.2				0.0	6.5	0.0	2.3	9.3	0.0
LnGrp Delay(d),s/veh	48.9	0.0	53.9				0.0	7.1	0.0	66.5	5.3	0.0
LnGrp LOS	D		D					A		E	A	
Approach Vol, veh/h		490						967			1555	
Approach Delay, s/veh		52.5						7.1			7.8	
Approach LOS		D						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	8.6	94.0		22.4		102.6						
Change Period (Y+Rc), s	3.0	4.5		3.5		4.5						
Max Green Setting (Gmax), s	15.0	65.5		33.5		83.5						
Max Q Clear Time (g_c+10), s	10.2	14.8		17.4		20.7						
Green Ext Time (p_c), s	0.1	41.6		1.6		49.5						
Intersection Summary												
HCM 2010 Ctrl Delay			14.8									
HCM 2010 LOS			B									

Intersection							
Int Delay, s/veh	1.1						
Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Vol, veh/h	25	16	286	746	21	27	32
Future Vol, veh/h	25	16	286	746	21	27	32
Conflicting Peds, #/hr	0	0	0	0	0	8	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	Yield	-	None
Storage Length	-	85	-	-	-	0	0
Veh in Median Storage, #	-	-	0	0	-	0	-
Grade, %	-	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	2	2	0	0
Mvmt Flow	29	18	329	857	24	31	37
Major/Minor	Major1		Major2		Minor2		
Conflicting Flow All	-	857	0	-	0	1231	857
Stage 1	-	-	-	-	-	857	-
Stage 2	-	-	-	-	-	374	-
Critical Hdwy	-	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	-	5.4	-
Follow-up Hdwy	-	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	-	792	-	-	-	198	360
Stage 1	-	-	-	-	-	419	-
Stage 2	-	-	-	-	-	700	-
Platoon blocked, %			-	-	-		
Mov Cap-1 Maneuver	~	~	-	-	-	198	360
Mov Cap-2 Maneuver	-	-	-	-	-	198	-
Stage 1	-	-	-	-	-	419	-
Stage 2	-	-	-	-	-	700	-
Approach	EB		WB		SB		
HCM Control Delay, s			0		20.9		
HCM LOS					C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2	
Capacity (veh/h)	~	-	-	-	198	360	
HCM Lane V/C Ratio	~	-	-	-	0.157	0.102	
HCM Control Delay (s)	-	-	-	-	26.5	16.1	
HCM Lane LOS	-	-	-	-	D	C	
HCM 95th %tile Q(veh)	~	-	-	-	0.5	0.3	
Notes							
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon							

HCM 2010 TWSC
1: Lassen Rd & Spring Valley Common

Lassen Road Mixed Use TIA
Existing Plus Near Term PM Peak Hour

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	50	37	11	5	0
Future Vol, veh/h	0	50	37	11	5	0
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	57	43	13	6	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	55	0	-	0	106	50
Stage 1	-	-	-	-	49	-
Stage 2	-	-	-	-	57	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1563	-	-	-	897	1024
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	971	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1562	-	-	-	897	1023
Mov Cap-2 Maneuver	-	-	-	-	897	-
Stage 1	-	-	-	-	979	-
Stage 2	-	-	-	-	971	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		9		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1562	-	-	-	897	
HCM Lane V/C Ratio	-	-	-	-	0.006	
HCM Control Delay (s)	0	-	-	-	9	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0	

Intersection											
Int Delay, s/veh	1.7										
Movement	EBL	EBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations											
Traffic Vol, veh/h	1	40	8	86	407	15	0	231	11	0	0
Future Vol, veh/h	1	40	8	86	407	15	0	231	11	0	0
Conflicting Peds, #/hr	0	0	0	3	0	0	0	0	3	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	-	None	-	-	None	-	-
Storage Length	0	-	-	88	-	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	-	0	-	-	0	-	-	-
Grade, %	0	-	-	-	0	-	-	0	-	0	-
Peak Hour Factor	92	89	89	89	89	92	92	89	89	92	92
Heavy Vehicles, %	2	0	0	0	0	2	2	0	0	2	2
Mvmt Flow	1	45	9	97	457	16	0	260	12	0	0
Major/Minor	Minor2		Major1			Major2					
Conflicting Flow All	709	139	271	275	0	0	-	-	0		
Stage 1	269	-	-	-	-	-	-	-	-		
Stage 2	440	-	-	-	-	-	-	-	-		
Critical Hdwy	6.8	6.9	6.4	4.1	-	-	-	-	-		
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-	-	-		
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-	-	-		
Follow-up Hdwy	3.5	3.3	2.5	2.2	-	-	-	-	-		
Pot Cap-1 Maneuver	373	890	976	1300	-	-	0	-	-		
Stage 1	758	-	-	-	-	-	0	-	-		
Stage 2	622	-	-	-	-	-	0	-	-		
Platoon blocked, %					-	-		-	-		
Mov Cap-1 Maneuver	371	887	1258	1258	-	-	-	-	-		
Mov Cap-2 Maneuver	371	-	-	-	-	-	-	-	-		
Stage 1	756	-	-	-	-	-	-	-	-		
Stage 2	620	-	-	-	-	-	-	-	-		
Approach	EB		NB			SB					
HCM Control Delay, s	11.2		1.5			0					
HCM LOS	B										
Minor Lane/Major Mvmt	NBL		NBT	NBR	EBLn1	SBT	SBR				
Capacity (veh/h)	1258		-	-	643	-	-				
HCM Lane V/C Ratio	0.084		-	-	0.098	-	-				
HCM Control Delay (s)	8.1		-	-	11.2	-	-				
HCM Lane LOS	A		-	-	B	-	-				
HCM 95th %tile O(veh)	0.3		-	-	0.3	-	-				

HCM 2010 Signalized Intersection Summary

3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Existing Plus Near Term PM Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 		 			 		
Traffic Volume (veh/h)	424	26	490	1006	33	261		
Future Volume (veh/h)	424	26	490	1006	33	261		
Number	7	14	6	16	5	2		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.97	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900		
Adj Flow Rate, veh/h	476	7	551	923	37	293		
Adj No. of Lanes	2	1	2	0	1	2		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89		
Percent Heavy Veh, %	0	0	0	0	0	0		
Cap, veh/h	667	307	1074	937	59	2451		
Arrive On Green	0.19	0.19	0.60	0.59	0.03	0.68		
Sat Flow, veh/h	3510	1615	1900	1575	1810	3705		
Grp Volume(v), veh/h	476	7	551	923	37	293		
Grp Sat Flow(s),veh/h/ln	1755	1615	1805	1575	1810	1805		
Q Serve(g_s), s	8.6	0.2	12.1	39.1	1.4	1.9		
Cycle Q Clear(g_c), s	8.6	0.2	12.1	39.1	1.4	1.9		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	667	307	1074	937	59	2451		
V/C Ratio(X)	0.71	0.02	0.51	0.98	0.63	0.12		
Avail Cap(c_a), veh/h	2089	961	1074	937	678	2451		
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	25.8	22.4	8.0	13.7	32.5	3.8		
Incr Delay (d2), s/veh	1.4	0.0	0.4	25.6	4.1	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	4.3	0.2	6.1	23.4	0.8	0.9		
LnGrp Delay(d),s/veh	27.2	22.4	8.4	39.4	36.6	3.8		
LnGrp LOS	C	C	A	D	D	A		
Approach Vol, veh/h	483		1474			330		
Approach Delay, s/veh	27.2		27.8			7.5		
Approach LOS	C		C			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		51.0		17.0	5.7	45.3		
Change Period (Y+Rc), s		5.3		4.6	4.0	5.3		
Max Green Setting (Gmax), s		40.0		40.0	25.0	40.0		
Max Q Clear Time (g_c+I1), s		3.9		10.6	3.4	41.1		
Green Ext Time (p_c), s		19.7		1.8	0.0	0.0		
Intersection Summary								
HCM 2010 Ctrl Delay			24.7					
HCM 2010 LOS			C					

Queues

3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Existing Plus Near Term PM Peak Hour



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	476	29	1681	37	293
v/c Ratio	0.63	0.08	1.01dr	0.22	0.12
Control Delay	29.6	9.8	15.3	36.6	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	29.6	9.8	15.3	36.6	5.0
Queue Length 50th (ft)	105	0	247	17	21
Queue Length 95th (ft)	m152	m18	#492	m45	m40
Internal Link Dist (ft)	302		14		205
Turn Bay Length (ft)	95	110		70	
Base Capacity (vph)	2009	927	2025	652	3369
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.24	0.03	0.83	0.06	0.09

Intersection Summary

- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.
- dr Defacto Right Lane. Recode with 1 though lane as a right lane.

HCM Signalized Intersection Capacity Analysis

4: Springtown Blvd & I-580 WB Ramps

Lassen Road Mixed Use TIA
Existing Plus Near Term PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↰↱	↰↱	↱	↱↱	↰
Traffic Volume (vph)	0	308	520	1419	428	257
Future Volume (vph)	0	308	520	1419	428	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	3.5	4.4	4.4
Lane Util. Factor		0.88	0.97	1.00	0.95	1.00
Frpb, ped/bikes		1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00
Frt		0.85	1.00	1.00	1.00	0.85
Flt Protected		1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)		2842	3502	1900	3610	1592
Flt Permitted		1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)		2842	3502	1900	3610	1592
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	350	591	1612	486	292
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	350	591	1613	486	292
Confl. Peds. (#/hr)						2
Confl. Bikes (#/hr)						5
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type		Over	Prot	NA	NA	Perm
Protected Phases		5	5	Free	6	
Permitted Phases		5				6
Actuated Green, G (s)		5.0	5.0	29.4	15.0	15.0
Effective Green, g (s)		5.5	5.5	29.4	15.5	15.5
Actuated g/C Ratio		0.19	0.19	1.00	0.53	0.53
Clearance Time (s)		4.5	4.5		4.9	4.9
Vehicle Extension (s)		3.0	3.0		0.2	0.2
Lane Grp Cap (vph)		531	655	1900	1903	839
v/s Ratio Prot		0.12	0.17	0.85	0.13	
v/s Ratio Perm						0.18
v/c Ratio		0.66	0.90	0.85	0.26	0.35
Uniform Delay, d1		11.1	11.7	0.0	3.8	4.0
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		3.0	15.7	5.0	0.0	0.1
Delay (s)		14.0	27.4	5.0	3.8	4.1
Level of Service		B	C	A	A	A
Approach Delay (s)	14.0			11.0	3.9	
Approach LOS	B			B	A	
Intersection Summary						
HCM 2000 Control Delay			9.7		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			1.19			
Actuated Cycle Length (s)			29.4		Sum of lost time (s)	8.4
Intersection Capacity Utilization			78.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

HCM 2010 Signalized Intersection Summary

5: First St/Springtown Blvd & I-580 EB Ramps

Lassen Road Mixed Use TIA
Existing Plus Near Term PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	558	4	684	0	0	0	0	1381	472	22	714	0
Future Volume (veh/h)	558	4	684	0	0	0	0	1381	472	22	714	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	1900	1900				0	1900	1900	1900	1900	0
Adj Flow Rate, veh/h	641	5	786				0	1587	0	25	821	0
Adj No. of Lanes	0	1	2				0	2	1	1	2	0
Peak Hour Factor	0.87	0.87	0.87				0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	0	0				0	0	0	0	0	0
Cap, veh/h	689	5	1090				0	1881	842	40	2031	0
Arrive On Green	0.38	0.38	0.38				0.00	0.52	0.00	0.02	0.56	0.00
Sat Flow, veh/h	1796	14	2842				0	3705	1615	1810	3705	0
Grp Volume(v), veh/h	646	0	786				0	1587	0	25	821	0
Grp Sat Flow(s),veh/h/ln	1810	0	1421				0	1805	1615	1810	1805	0
Q Serve(g_s), s	44.5	0.0	30.6				0.0	48.8	0.0	1.8	16.7	0.0
Cycle Q Clear(g_c), s	44.5	0.0	30.6				0.0	48.8	0.0	1.8	16.7	0.0
Prop In Lane	0.99		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	694	0	1090				0	1881	842	40	2031	0
V/C Ratio(X)	0.93	0.00	0.72				0.00	0.84	0.00	0.62	0.40	0.00
Avail Cap(c_a), veh/h	724	0	1137				0	1881	842	160	2031	0
HCM Platoon Ratio	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				0.00	1.00	0.00	0.91	0.91	0.00
Uniform Delay (d), s/veh	38.4	0.0	34.1				0.0	26.6	0.0	63.0	16.1	0.0
Incr Delay (d2), s/veh	18.0	0.0	2.0				0.0	4.8	0.0	13.6	0.5	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	25.7	0.0	12.3				0.0	25.5	0.0	1.0	8.5	0.0
LnGrp Delay(d),s/veh	56.4	0.0	36.2				0.0	31.4	0.0	76.6	16.6	0.0
LnGrp LOS	E		D					C		E	B	
Approach Vol, veh/h		1432						1587			846	
Approach Delay, s/veh		45.3						31.4			18.4	
Approach LOS		D						C			B	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	5.4	71.7		52.9		77.1						
Change Period (Y+Rc), s	3.0	4.5		3.5		4.5						
Max Green Setting (Gmax), s	1.0	56.5		51.5		70.5						
Max Q Clear Time (g_c+1.0), s	13.8	50.8		46.5		18.7						
Green Ext Time (p_c), s	0.0	5.4		2.9		41.9						
Intersection Summary												
HCM 2010 Ctrl Delay			33.7									
HCM 2010 LOS			C									

Intersection

Int Delay, s/veh 0.7

Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Vol, veh/h	34	50	955	399	27	18	17
Future Vol, veh/h	34	50	955	399	27	18	17
Conflicting Peds, #/hr	0	0	0	0	0	8	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	Yield	-	None
Storage Length	-	85	-	-	-	0	0
Veh in Median Storage, #	-	-	0	0	-	0	-
Grade, %	-	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	2	2	0	0
Mvmt Flow	39	57	1098	459	31	21	20

Major/Minor	Major1			Major2		Minor2	
Conflicting Flow All	-	459	0	-	0	1680	459
Stage 1	-	-	-	-	-	459	-
Stage 2	-	-	-	-	-	1221	-
Critical Hdwy	-	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	-	5.4	-
Follow-up Hdwy	-	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	-	1113	-	-	-	105	606
Stage 1	-	-	-	-	-	641	-
Stage 2	-	-	-	-	-	281	-
Platoon blocked, %			-	-	-		
Mov Cap-1 Maneuver	~	~	-	-	-	105	606
Mov Cap-2 Maneuver	-	-	-	-	-	105	-
Stage 1	-	-	-	-	-	641	-
Stage 2	-	-	-	-	-	281	-

Approach	EB	WB	SB
HCM Control Delay, s		0	29.8
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	~	-	-	-	105	606
HCM Lane V/C Ratio	~	-	-	-	0.197	0.032
HCM Control Delay (s)	-	-	-	-	47.5	11.1
HCM Lane LOS	-	-	-	-	E	B
HCM 95th %tile Q(veh)	~	-	-	-	0.7	0.1

Notes

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

HCM 2010 TWSC
1: Lassen Rd & Spring Valley Common

Lassen Road Mixed Use TIA
Existing Plus Project Near Term AM Peak Hour

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	117	56	5	13	1
Future Vol, veh/h	0	117	56	5	13	1
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	134	64	6	15	1
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	70	0	-	0	201	68
Stage 1	-	-	-	-	67	-
Stage 2	-	-	-	-	134	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1544	-	-	-	792	1001
Stage 1	-	-	-	-	961	-
Stage 2	-	-	-	-	897	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1543	-	-	-	792	1000
Mov Cap-2 Maneuver	-	-	-	-	792	-
Stage 1	-	-	-	-	961	-
Stage 2	-	-	-	-	897	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		9.6		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1543	-	-	-	804	
HCM Lane V/C Ratio	-	-	-	-	0.02	
HCM Control Delay (s)	0	-	-	-	9.6	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

HCM 2010 TWSC
2: Springtown Blvd & Lassen Rd

Lassen Road Mixed Use TIA
Existing Plus Project Near Term AM Peak Hour

Intersection											
Int Delay, s/veh	2.8										
Movement	EBL	EBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations											
Traffic Vol, veh/h	1	120	1	92	135	0	0	442	20	0	0
Future Vol, veh/h	1	120	1	92	135	0	0	442	20	0	0
Conflicting Peds, #/hr	0	0	0	3	0	0	0	0	3	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	-	None	-	-	None	-	-
Storage Length	0	-	-	88	-	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	-	0	-	-	0	-	-	-
Grade, %	0	-	-	-	0	-	-	0	-	0	-
Peak Hour Factor	92	89	89	89	89	92	92	89	89	92	92
Heavy Vehicles, %	2	0	0	0	0	2	2	0	0	2	2
Mvmt Flow	1	135	1	103	152	0	0	497	22	0	0
Major/Minor	Minor2		Major1			Major2					
Conflicting Flow All	796	263	518	522	0	0	-	-	0		
Stage 1	511	-	-	-	-	-	-	-	-		
Stage 2	285	-	-	-	-	-	-	-	-		
Critical Hdwy	6.8	6.9	6.4	4.1	-	-	-	-	-		
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-	-	-		
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-	-	-		
Follow-up Hdwy	3.5	3.3	2.5	2.2	-	-	-	-	-		
Pot Cap-1 Maneuver	328	742	683	1055	-	-	0	-	-		
Stage 1	573	-	-	-	-	-	0	-	-		
Stage 2	744	-	-	-	-	-	0	-	-		
Platoon blocked, %					-	-		-	-		
Mov Cap-1 Maneuver	326	740	1046	1046	-	-	-	-	-		
Mov Cap-2 Maneuver	326	-	-	-	-	-	-	-	-		
Stage 1	571	-	-	-	-	-	-	-	-		
Stage 2	742	-	-	-	-	-	-	-	-		
Approach	EB		NB			SB					
HCM Control Delay, s	11.6		3.6					0			
HCM LOS	B										
Minor Lane/Major Mvmt	NBL		NBT	NBR	EBLn1	SBT	SBR				
Capacity (veh/h)	1046		-	-	692	-	-				
HCM Lane V/C Ratio	0.1		-	-	0.208	-	-				
HCM Control Delay (s)	8.8		-	-	11.6	-	-				
HCM Lane LOS	A		-	-	B	-	-				
HCM 95th %tile Q(veh)	0.3		-	-	0.8	-	-				

HCM 2010 Signalized Intersection Summary

3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Existing Plus Project Near Term AM Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 		 			 		
Traffic Volume (veh/h)	772	31	197	292	42	557		
Future Volume (veh/h)	772	31	197	292	42	557		
Number	7	14	6	16	5	2		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.97	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900		
Adj Flow Rate, veh/h	867	23	221	93	47	626		
Adj No. of Lanes	2	1	2	0	1	2		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89		
Percent Heavy Veh, %	0	0	0	0	0	0		
Cap, veh/h	1251	576	768	311	78	1568		
Arrive On Green	0.36	0.36	0.31	0.30	0.04	0.43		
Sat Flow, veh/h	3510	1615	2580	1006	1810	3705		
Grp Volume(v), veh/h	867	23	158	156	47	626		
Grp Sat Flow(s),veh/h/ln	1755	1615	1805	1686	1810	1805		
Q Serve(g_s), s	9.0	0.4	2.8	3.0	1.1	5.0		
Cycle Q Clear(g_c), s	9.0	0.4	2.8	3.0	1.1	5.0		
Prop In Lane	1.00	1.00		0.60	1.00			
Lane Grp Cap(c), veh/h	1251	576	558	521	78	1568		
V/C Ratio(X)	0.69	0.04	0.28	0.30	0.60	0.40		
Avail Cap(c_a), veh/h	3342	1538	1719	1605	1085	3437		
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	11.7	8.9	11.1	11.3	20.0	8.2		
Incr Delay (d2), s/veh	0.7	0.0	0.3	0.3	2.8	0.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	4.5	0.4	1.4	1.4	0.6	2.5		
LnGrp Delay(d),s/veh	12.4	9.0	11.4	11.6	22.8	8.4		
LnGrp LOS	B	A	B	B	C	A		
Approach Vol, veh/h	890		314			673		
Approach Delay, s/veh	12.3		11.5			9.4		
Approach LOS	B		B			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		23.3		19.3	5.3	17.9		
Change Period (Y+Rc), s		5.3		4.6	4.0	5.3		
Max Green Setting (Gmax), s		40.0		40.0	25.0	40.0		
Max Q Clear Time (g_c+I1), s		7.0		11.0	3.1	5.0		
Green Ext Time (p_c), s		7.3		3.7	0.0	7.4		
Intersection Summary								
HCM 2010 Ctrl Delay			11.1					
HCM 2010 LOS			B					

Queues

3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Existing Plus Project Near Term AM Peak Hour

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	867	36	549	47	626
v/c Ratio	0.62	0.06	0.47	0.19	0.43
Control Delay	14.8	7.5	8.8	25.1	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.8	7.5	8.8	25.1	11.7
Queue Length 50th (ft)	100	3	27	12	60
Queue Length 95th (ft)	191	18	76	45	122
Internal Link Dist (ft)	302		14		205
Turn Bay Length (ft)	95	110		70	
Base Capacity (vph)	2888	1318	2717	992	3610
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.30	0.03	0.20	0.05	0.17
Intersection Summary					

HCM Signalized Intersection Capacity Analysis

4: Springtown Blvd & I-580 WB Ramps

Lassen Road Mixed Use TIA
Existing Plus Project Near Term AM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗↘	↗↘	↑	↑↑	↗
Traffic Volume (vph)	0	513	508	456	876	453
Future Volume (vph)	0	513	508	456	876	453
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.7	3.7	3.5	4.4	4.4
Lane Util. Factor		0.88	0.97	1.00	0.95	1.00
Frpb, ped/bikes		1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00
Frt		0.85	1.00	1.00	1.00	0.85
Flt Protected		1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)		2842	3502	1900	3610	1591
Flt Permitted		1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)		2842	3502	1900	3610	1591
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	583	577	518	995	515
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	583	577	518	995	515
Confl. Peds. (#/hr)						2
Confl. Bikes (#/hr)						5
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type		Over	Prot	NA	NA	Perm
Protected Phases		5	5	Free	6	
Permitted Phases		5				6
Actuated Green, G (s)		13.8	13.8	44.1	21.2	21.2
Effective Green, g (s)		14.3	14.3	44.1	21.7	21.7
Actuated g/C Ratio		0.32	0.32	1.00	0.49	0.49
Clearance Time (s)		4.2	4.2		4.9	4.9
Vehicle Extension (s)		0.2	0.2		0.2	0.2
Lane Grp Cap (vph)		921	1135	1900	1776	782
v/s Ratio Prot		c0.21	0.16	0.27	0.28	
v/s Ratio Perm						c0.32
v/c Ratio		0.63	0.51	0.27	0.56	0.66
Uniform Delay, d1		12.7	12.1	0.0	7.9	8.4
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.1	0.1	0.4	0.2	1.5
Delay (s)		13.7	12.2	0.4	8.1	10.0
Level of Service		B	B	A	A	A
Approach Delay (s)	13.7			6.6	8.7	
Approach LOS	B			A	A	
Intersection Summary						
HCM 2000 Control Delay		8.9		HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio		0.65				
Actuated Cycle Length (s)		44.1		Sum of lost time (s)	8.1	
Intersection Capacity Utilization		50.3%		ICU Level of Service	A	
Analysis Period (min)		15				
c Critical Lane Group						

HCM 2010 Signalized Intersection Summary

5: First St/Springtown Blvd & I-580 EB Ramps

Lassen Road Mixed Use TIA
Existing Plus Project Near Term AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			 					 			 	
Traffic Volume (veh/h)	116	1	314	0	0	0	0	848	353	58	1331	0
Future Volume (veh/h)	116	1	314	0	0	0	0	848	353	58	1331	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	1900	1900				0	1900	1900	1900	1900	0
Adj Flow Rate, veh/h	133	1	361				0	975	0	67	1530	0
Adj No. of Lanes	0	1	2				0	2	1	1	2	0
Peak Hour Factor	0.87	0.87	0.87				0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	0	0				0	0	0	0	0	0
Cap, veh/h	280	2	443				0	2586	1157	94	2846	0
Arrive On Green	0.16	0.16	0.16				0.00	0.72	0.00	0.05	0.79	0.00
Sat Flow, veh/h	1797	14	2842				0	3705	1615	1810	3705	0
Grp Volume(v), veh/h	134	0	361				0	975	0	67	1530	0
Grp Sat Flow(s),veh/h/ln	1810	0	1421				0	1805	1615	1810	1805	0
Q Serve(g_s), s	8.4	0.0	15.4				0.0	13.1	0.0	4.6	19.5	0.0
Cycle Q Clear(g_c), s	8.4	0.0	15.4				0.0	13.1	0.0	4.6	19.5	0.0
Prop In Lane	0.99		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	282	0	443				0	2586	1157	94	2846	0
V/C Ratio(X)	0.48	0.00	0.82				0.00	0.38	0.00	0.71	0.54	0.00
Avail Cap(c_a), veh/h	492	0	773				0	2586	1157	224	2846	0
HCM Platoon Ratio	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				0.00	1.00	0.00	0.77	0.77	0.00
Uniform Delay (d), s/veh	48.1	0.0	51.0				0.0	6.9	0.0	58.3	4.9	0.0
Incr Delay (d2), s/veh	0.9	0.0	2.8				0.0	0.4	0.0	7.6	0.6	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	4.3	0.0	6.2				0.0	6.7	0.0	2.5	9.8	0.0
LnGrp Delay(d),s/veh	49.0	0.0	53.8				0.0	7.3	0.0	65.9	5.4	0.0
LnGrp LOS	D		D					A		E	A	
Approach Vol, veh/h		495						975			1597	
Approach Delay, s/veh		52.5						7.3			8.0	
Approach LOS		D						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	9.0	93.6		22.5		102.5						
Change Period (Y+Rc), s	3.0	4.5		3.5		4.5						
Max Green Setting (Gmax), s	15.0	65.5		33.5		83.5						
Max Q Clear Time (g_c+10), s	10.6	15.1		17.4		21.5						
Green Ext Time (p_c), s	0.1	42.0		1.6		49.9						
Intersection Summary												
HCM 2010 Ctrl Delay			14.9									
HCM 2010 LOS			B									

HCM 2010 TWSC
6: Bluebell Dr & Larkspur Dr

Lassen Road Mixed Use TIA
Existing Plus Project Near Term AM Peak Hour

Intersection							
Int Delay, s/veh	1.1						
Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Vol, veh/h	25	20	289	747	21	27	33
Future Vol, veh/h	25	20	289	747	21	27	33
Conflicting Peds, #/hr	0	0	0	0	0	8	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	Yield	-	None
Storage Length	-	85	-	-	-	0	0
Veh in Median Storage, #	-	-	0	0	-	0	-
Grade, %	-	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	2	2	0	0
Mvmt Flow	29	23	332	859	24	31	38
Major/Minor	Major1		Major2		Minor2		
Conflicting Flow All	-	859	0	-	0	1245	859
Stage 1	-	-	-	-	-	859	-
Stage 2	-	-	-	-	-	386	-
Critical Hdwy	-	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	-	5.4	-
Follow-up Hdwy	-	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	-	791	-	-	-	194	359
Stage 1	-	-	-	-	-	418	-
Stage 2	-	-	-	-	-	691	-
Platoon blocked, %			-	-	-		
Mov Cap-1 Maneuver	~	~	-	-	-	194	359
Mov Cap-2 Maneuver	-	-	-	-	-	194	-
Stage 1	-	-	-	-	-	418	-
Stage 2	-	-	-	-	-	691	-
Approach	EB		WB		SB		
HCM Control Delay, s			0		21.1		
HCM LOS					C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2	
Capacity (veh/h)	~	-	-	-	194	359	
HCM Lane V/C Ratio	~	-	-	-	0.16	0.106	
HCM Control Delay (s)	-	-	-	-	27.1	16.2	
HCM Lane LOS	-	-	-	-	D	C	
HCM 95th %tile Q(veh)	~	-	-	-	0.6	0.4	
Notes							
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon							

HCM 2010 TWSC
1: Lassen Rd & Spring Valley Common

Lassen Road Mixed Use TIA
Existing Plus Project Near Term PM Peak Hour

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	84	105	11	5	0
Future Vol, veh/h	0	84	105	11	5	0
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	97	121	13	6	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	133	0	-	0	224	128
Stage 1	-	-	-	-	127	-
Stage 2	-	-	-	-	97	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1464	-	-	-	769	927
Stage 1	-	-	-	-	904	-
Stage 2	-	-	-	-	932	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1463	-	-	-	769	926
Mov Cap-2 Maneuver	-	-	-	-	769	-
Stage 1	-	-	-	-	904	-
Stage 2	-	-	-	-	932	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		9.7		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1463	-	-	-	769	
HCM Lane V/C Ratio	-	-	-	-	0.007	
HCM Control Delay (s)	0	-	-	-	9.7	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile O(veh)	0	-	-	-	0	

HCM 2010 TWSC
2: Springtown Blvd & Lassen Rd

Lassen Road Mixed Use TIA
Existing Plus Project Near Term PM Peak Hour

Intersection											
Int Delay, s/veh	2.6										
Movement	EBL	EBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations											
Traffic Vol, veh/h	2	73	8	153	407	15	0	231	12	0	0
Future Vol, veh/h	2	73	8	153	407	15	0	231	12	0	0
Conflicting Peds, #/hr	0	0	0	3	0	0	0	0	3	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	-	None	-	-	None	-	-
Storage Length	0	-	-	88	-	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	-	0	-	-	0	-	-	-
Grade, %	0	-	-	-	0	-	-	0	-	0	-
Peak Hour Factor	92	89	89	89	89	92	92	89	89	92	92
Heavy Vehicles, %	2	0	0	0	0	2	2	0	0	2	2
Mvmt Flow	2	82	9	172	457	16	0	260	13	0	0
Major/Minor	Minor2		Major1			Major2					
Conflicting Flow All	859	140	272	276	0	0	-	-	0		
Stage 1	269	-	-	-	-	-	-	-	-		
Stage 2	590	-	-	-	-	-	-	-	-		
Critical Hdwy	6.8	6.9	6.4	4.1	-	-	-	-	-		
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-	-	-		
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-	-	-		
Follow-up Hdwy	3.5	3.3	2.5	2.2	-	-	-	-	-		
Pot Cap-1 Maneuver	299	889	974	1299	-	-	0	-	-		
Stage 1	758	-	-	-	-	-	0	-	-		
Stage 2	522	-	-	-	-	-	0	-	-		
Platoon blocked, %					-	-		-	-		
Mov Cap-1 Maneuver	297	886	1270	1270	-	-	-	-	-		
Mov Cap-2 Maneuver	297	-	-	-	-	-	-	-	-		
Stage 1	756	-	-	-	-	-	-	-	-		
Stage 2	521	-	-	-	-	-	-	-	-		
Approach	EB		NB			SB					
HCM Control Delay, s	11.4		2.3					0			
HCM LOS	B										
Minor Lane/Major Mvmt	NBL		NBT	NBR	EBLn1	SBT	SBR				
Capacity (veh/h)	1270		-	-	662	-	-				
HCM Lane V/C Ratio	0.142		-	-	0.153	-	-				
HCM Control Delay (s)	8.3		-	-	11.4	-	-				
HCM Lane LOS	A		-	-	B	-	-				
HCM 95th %tile Q(veh)	0.5		-	-	0.5	-	-				

HCM 2010 Signalized Intersection Summary

3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Existing Plus Project Near Term PM Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations	 		 			 		
Traffic Volume (veh/h)	423	33	550	1006	36	291		
Future Volume (veh/h)	423	33	550	1006	36	291		
Number	7	14	6	16	5	2		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.97	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900		
Adj Flow Rate, veh/h	475	8	618	945	40	327		
Adj No. of Lanes	2	1	2	0	1	2		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89		
Percent Heavy Veh, %	0	0	0	0	0	0		
Cap, veh/h	666	306	1072	935	63	2454		
Arrive On Green	0.19	0.19	0.59	0.59	0.03	0.68		
Sat Flow, veh/h	3510	1615	1900	1575	1810	3705		
Grp Volume(v), veh/h	475	8	618	945	40	327		
Grp Sat Flow(s),veh/h/ln	1755	1615	1805	1575	1810	1805		
Q Serve(g_s), s	8.6	0.3	14.4	40.5	1.5	2.2		
Cycle Q Clear(g_c), s	8.6	0.3	14.4	40.5	1.5	2.2		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	666	306	1072	935	63	2454		
V/C Ratio(X)	0.71	0.03	0.58	1.01	0.64	0.13		
Avail Cap(c_a), veh/h	2084	959	1072	935	676	2454		
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	25.9	22.5	8.6	14.1	32.5	3.8		
Incr Delay (d2), s/veh	1.4	0.0	0.8	32.1	3.9	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	4.3	0.3	7.3	25.7	0.8	1.1		
LnGrp Delay(d),s/veh	27.3	22.5	9.3	46.2	36.4	3.9		
LnGrp LOS	C	C	A	F	D	A		
Approach Vol, veh/h	483		1563			367		
Approach Delay, s/veh	27.3		31.6			7.4		
Approach LOS	C		C			A		
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4	5	6		
Phs Duration (G+Y+Rc), s		51.2		17.0	5.9	45.3		
Change Period (Y+Rc), s		5.3		4.6	4.0	5.3		
Max Green Setting (Gmax), s		40.0		40.0	25.0	40.0		
Max Q Clear Time (g_c+I1), s		4.2		10.6	3.5	42.5		
Green Ext Time (p_c), s		21.4		1.8	0.0	0.0		
Intersection Summary								
HCM 2010 Ctrl Delay			27.1					
HCM 2010 LOS			C					

Queues

3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Existing Plus Project Near Term PM Peak Hour



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	475	37	1748	40	327
v/c Ratio	0.63	0.10	1.02dr	0.24	0.14
Control Delay	29.7	9.1	18.0	36.6	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	29.7	9.1	18.0	36.6	5.0
Queue Length 50th (ft)	105	0	288	18	24
Queue Length 95th (ft)	m152	m20	#547	m48	m45
Internal Link Dist (ft)	302		14		205
Turn Bay Length (ft)	95	110		70	
Base Capacity (vph)	2009	930	2012	652	3364
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.24	0.04	0.87	0.06	0.10

Intersection Summary

- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.
- dr Defacto Right Lane. Recode with 1 though lane as a right lane.

HCM Signalized Intersection Capacity Analysis

4: Springtown Blvd & I-580 WB Ramps

Lassen Road Mixed Use TIA
Existing Plus Project Near Term PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗↘	↗↘	↑	↑↑	↗
Traffic Volume (vph)	0	308	520	1476	445	269
Future Volume (vph)	0	308	520	1476	445	269
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	3.5	4.4	4.4
Lane Util. Factor		0.88	0.97	1.00	0.95	1.00
Frpb, ped/bikes		1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00
Frt		0.85	1.00	1.00	1.00	0.85
Flt Protected		1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)		2842	3502	1900	3610	1592
Flt Permitted		1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)		2842	3502	1900	3610	1592
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	350	591	1677	506	306
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	350	591	1677	506	306
Confl. Peds. (#/hr)						2
Confl. Bikes (#/hr)						5
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type		Over	Prot	NA	NA	Perm
Protected Phases		5	5	Free	6	
Permitted Phases		5				6
Actuated Green, G (s)		5.0	5.0	29.4	15.0	15.0
Effective Green, g (s)		5.5	5.5	29.4	15.5	15.5
Actuated g/C Ratio		0.19	0.19	1.00	0.53	0.53
Clearance Time (s)		4.5	4.5		4.9	4.9
Vehicle Extension (s)		3.0	3.0		0.2	0.2
Lane Grp Cap (vph)		531	655	1900	1903	839
v/s Ratio Prot		0.12	0.17	0.88	0.14	
v/s Ratio Perm						0.19
v/c Ratio		0.66	0.90	0.88	0.27	0.36
Uniform Delay, d1		11.1	11.7	0.0	3.8	4.1
Progression Factor		1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		3.0	15.7	6.4	0.0	0.1
Delay (s)		14.0	27.4	6.4	3.8	4.2
Level of Service		B	C	A	A	A
Approach Delay (s)	14.0			11.8	4.0	
Approach LOS	B			B	A	
Intersection Summary						
HCM 2000 Control Delay		10.2		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		1.24				
Actuated Cycle Length (s)		29.4		Sum of lost time (s)		8.4
Intersection Capacity Utilization		81.0%		ICU Level of Service		D
Analysis Period (min)		15				
c Critical Lane Group						

HCM 2010 Signalized Intersection Summary

5: First St/Springtown Blvd & I-580 EB Ramps

Lassen Road Mixed Use TIA
Existing Plus Project Near Term PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	582	4	684	0	0	0	0	1414	472	24	729	0
Future Volume (veh/h)	582	4	684	0	0	0	0	1414	472	24	729	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	1900	1900				0	1900	1900	1900	1900	0
Adj Flow Rate, veh/h	669	5	786				0	1625	0	28	838	0
Adj No. of Lanes	0	1	2				0	2	1	1	2	0
Peak Hour Factor	0.87	0.87	0.87				0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	0	0	0				0	0	0	0	0	0
Cap, veh/h	706	5	1117				0	1843	825	42	1998	0
Arrive On Green	0.39	0.39	0.39				0.00	0.51	0.00	0.02	0.55	0.00
Sat Flow, veh/h	1797	13	2842				0	3705	1615	1810	3705	0
Grp Volume(v), veh/h	674	0	786				0	1625	0	28	838	0
Grp Sat Flow(s),veh/h/ln	1810	0	1421				0	1805	1615	1810	1805	0
Q Serve(g_s), s	46.8	0.0	30.2				0.0	52.1	0.0	2.0	17.6	0.0
Cycle Q Clear(g_c), s	46.8	0.0	30.2				0.0	52.1	0.0	2.0	17.6	0.0
Prop In Lane	0.99		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	711	0	1117				0	1843	825	42	1998	0
V/C Ratio(X)	0.95	0.00	0.70				0.00	0.88	0.00	0.66	0.42	0.00
Avail Cap(c_a), veh/h	724	0	1137				0	1843	825	160	1998	0
HCM Platoon Ratio	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				0.00	1.00	0.00	0.91	0.91	0.00
Uniform Delay (d), s/veh	38.2	0.0	33.1				0.0	28.3	0.0	63.0	16.9	0.0
Incr Delay (d2), s/veh	21.3	0.0	1.8				0.0	6.5	0.0	14.7	0.6	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	27.6	0.0	12.1				0.0	27.6	0.0	1.2	8.9	0.0
LnGrp Delay(d),s/veh	59.5	0.0	34.9				0.0	34.8	0.0	77.6	17.5	0.0
LnGrp LOS	E		C					C		E	B	
Approach Vol, veh/h	1460						1625			866		
Approach Delay, s/veh	46.3						34.8			19.4		
Approach LOS	D						C			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	5.6	70.4		54.1		75.9						
Change Period (Y+Rc), s	3.0	4.5		3.5		4.5						
Max Green Setting (Gmax), s	11.0	56.5		51.5		70.5						
Max Q Clear Time (g_c+1.0), s	14.0	54.1		48.8		19.6						
Green Ext Time (p_c), s	0.0	2.4		1.7		42.2						
Intersection Summary												
HCM 2010 Ctrl Delay			35.7									
HCM 2010 LOS			D									

HCM 2010 TWSC
6: Bluebell Dr & Larkspur Dr

Lassen Road Mixed Use TIA
Existing Plus Project Near Term PM Peak Hour

Intersection							
Int Delay, s/veh	0.7						
Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Vol, veh/h	34	52	956	402	27	18	20
Future Vol, veh/h	34	52	956	402	27	18	20
Conflicting Peds, #/hr	0	0	0	0	0	8	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	Yield	-	None
Storage Length	-	85	-	-	-	0	0
Veh in Median Storage, #	-	-	0	0	-	0	-
Grade, %	-	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	2	2	0	0
Mvmt Flow	39	60	1099	462	31	21	23
Major/Minor	Major1		Major2		Minor2		
Conflicting Flow All	-	462	0	-	0	1688	462
Stage 1	-	-	-	-	-	462	-
Stage 2	-	-	-	-	-	1226	-
Critical Hdwy	-	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	-	5.4	-
Follow-up Hdwy	-	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	-	1110	-	-	-	104	604
Stage 1	-	-	-	-	-	638	-
Stage 2	-	-	-	-	-	280	-
Platoon blocked, %			-	-	-		
Mov Cap-1 Maneuver	~ -3	~ -3	-	-	-	104	604
Mov Cap-2 Maneuver	-	-	-	-	-	104	-
Stage 1	-	-	-	-	-	638	-
Stage 2	-	-	-	-	-	280	-
Approach	EB		WB		SB		
HCM Control Delay, s			0		28.6		
HCM LOS					D		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2	
Capacity (veh/h)	+	-	-	-	104	604	
HCM Lane V/C Ratio	-	-	-	-	0.199	0.038	
HCM Control Delay (s)	-	-	-	-	48	11.2	
HCM Lane LOS	-	-	-	-	E	B	
HCM 95th %tile Q(veh)	-	-	-	-	0.7	0.1	
Notes							
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon							

HCM 2010 TWSC
1: Lassen Rd & Spring Valley Common

Lassen Road Mixed Use TIA
Cumulative No Project AM Peak Hour

Intersection

Int Delay, s/veh 2.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	60	50	20	30	10
Future Vol, veh/h	0	60	50	20	30	10
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	69	57	23	34	11

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	80	0	138
Stage 1	-	-	69
Stage 2	-	-	69
Critical Hdwy	4.1	-	6.4
Critical Hdwy Stg 1	-	-	5.4
Critical Hdwy Stg 2	-	-	5.4
Follow-up Hdwy	2.2	-	3.5
Pot Cap-1 Maneuver	1531	-	860
Stage 1	-	-	959
Stage 2	-	-	959
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1530	-	860
Mov Cap-2 Maneuver	-	-	860
Stage 1	-	-	959
Stage 2	-	-	959

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1530	-	-	-	891
HCM Lane V/C Ratio	-	-	-	-	0.052
HCM Control Delay (s)	0	-	-	-	9.3
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection										
Int Delay, s/veh	2									
Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations										
Traffic Vol, veh/h	10	70	100	170	0	0	520	20	0	0
Future Vol, veh/h	10	70	100	170	0	0	520	20	0	0
Conflicting Peds, #/hr	0	0	3	0	0	0	0	3	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	-	None	-	-
Storage Length	0	-	88	-	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	-	-	0	-	-	-
Grade, %	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	92	89	89	89	92	92	89	89	92	92
Heavy Vehicles, %	2	0	0	0	2	2	0	0	2	2
Mvmt Flow	11	79	112	191	0	0	584	22	0	0

Major/Minor	Minor2	Major1			Major2			
Conflicting Flow All	919	306	610	0	0	-	-	0
Stage 1	599	-	-	-	-	-	-	-
Stage 2	320	-	-	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-	-	-
Pot Cap-1 Maneuver	274	696	979	-	-	0	-	-
Stage 1	517	-	-	-	-	0	-	-
Stage 2	715	-	-	-	-	0	-	-
Platoon blocked, %				-	-	-	-	-
Mov Cap-1 Maneuver	241	694	979	-	-	-	-	-
Mov Cap-2 Maneuver	241	-	-	-	-	-	-	-
Stage 1	516	-	-	-	-	-	-	-
Stage 2	631	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11	3.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBT	SBR
Capacity (veh/h)	979	-	-	694	-	-
HCM Lane V/C Ratio	0.115	-	-	0.129	-	-
HCM Control Delay (s)	9.2	-	-	11	-	-
HCM Lane LOS	A	-	-	B	-	-
HCM 95th %tile Q(veh)	0.4	-	-	0.4	-	-

HCM 2010 Signalized Intersection Summary

3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Cumulative No Project AM Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	800	40	230	320	50	540		
Future Volume (veh/h)	800	40	230	320	50	540		
Number	7	14	6	16	5	2		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.97	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900		
Adj Flow Rate, veh/h	899	32	258	95	56	607		
Adj No. of Lanes	2	1	2	1	1	2		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89		
Percent Heavy Veh, %	0	0	0	0	0	0		
Cap, veh/h	1290	594	1052	1013	90	1528		
Arrive On Green	0.37	0.37	0.29	0.28	0.05	0.42		
Sat Flow, veh/h	3510	1615	3705	1566	1810	3705		
Grp Volume(v), veh/h	899	32	258	95	56	607		
Grp Sat Flow(s),veh/h/ln	1755	1615	1805	1566	1810	1805		
Q Serve(g_s), s	9.3	0.5	2.3	1.0	1.3	5.0		
Cycle Q Clear(g_c), s	9.3	0.5	2.3	1.0	1.3	5.0		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	1290	594	1052	1013	90	1528		
V/C Ratio(X)	0.70	0.05	0.25	0.09	0.62	0.40		
Avail Cap(c_a), veh/h	3339	1536	3433	2045	1084	3433		
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	11.4	8.7	11.5	3.0	19.8	8.5		
Incr Delay (d2), s/veh	0.7	0.0	0.1	0.0	2.6	0.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	4.5	0.6	1.2	0.9	0.7	2.5		
LnGrp Delay(d),s/veh	12.1	8.7	11.6	3.1	22.4	8.7		
LnGrp LOS	B	A	B	A	C	A		
Approach Vol, veh/h	931		353			663		
Approach Delay, s/veh	12.0		9.3			9.8		
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		22.8		19.8	5.6	17.2		
Change Period (Y+Rc), s		5.3		4.6	4.0	5.3		
Max Green Setting (Gmax), s		40.0		40.0	25.0	40.0		
Max Q Clear Time (g_c+I1), s		7.0		11.3	3.3	4.3		
Green Ext Time (p_c), s		7.2		3.9	0.1	7.3		
Intersection Summary								
HCM 2010 Ctrl Delay			10.8					
HCM 2010 LOS			B					

Queues
3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Cumulative No Project AM Peak Hour

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	899	45	258	360	56	607
v/c Ratio	0.59	0.06	0.28	0.30	0.22	0.44
Control Delay	13.3	6.5	19.2	1.1	25.0	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.3	6.5	19.2	1.1	25.0	13.2
Queue Length 50th (ft)	104	4	35	0	15	64
Queue Length 95th (ft)	174	19	77	15	50	128
Internal Link Dist (ft)	302		446			205
Turn Bay Length (ft)	95	110			70	
Base Capacity (vph)	2855	1303	2942	1505	969	3610
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.03	0.09	0.24	0.06	0.17
Intersection Summary						

HCM 2010 Signalized Intersection Summary

4: Springtown Blvd & I-580 WB On Ramps/I-580 WB Off Ramps

Lassen Road Mixed Use TIA
Cumulative No Project AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	530	0	40	0	510	540	0	870	470
Future Volume (veh/h)	0	0	0	530	0	40	0	510	540	0	870	470
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				1845	1845	1900	0	1845	1845	0	1845	1845
Adj Flow Rate, veh/h				605	0	0	0	554	0	0	946	0
Adj No. of Lanes				2	1	0	0	3	1	0	3	1
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				3	3	3	0	3	3	0	3	3
Cap, veh/h				795	418	0	0	2525	761	0	2525	786
Arrive On Green				0.23	0.00	0.00	0.00	0.50	0.00	0.00	0.50	0.00
Sat Flow, veh/h				3514	1845	0	0	5202	1568	0	5202	1568
Grp Volume(v), veh/h				605	0	0	0	554	0	0	946	0
Grp Sat Flow(s),veh/h/ln				1757	1845	0	0	1679	1568	0	1679	1568
Q Serve(g_s), s				5.1	0.0	0.0	0.0	1.9	0.0	0.0	3.6	0.0
Cycle Q Clear(g_c), s				5.1	0.0	0.0	0.0	1.9	0.0	0.0	3.6	0.0
Prop In Lane				1.00		0.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				795	418	0	0	2525	761	0	2525	786
V/C Ratio(X)				0.76	0.00	0.00	0.00	0.22	0.00	0.00	0.37	0.00
Avail Cap(c_a), veh/h				4448	2335	0	0	8049	2481	0	8049	2506
HCM Platoon Ratio				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	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				11.4	0.0	0.0	0.0	4.4	0.0	0.0	4.8	0.0
Incr Delay (d2), s/veh				0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				2.5	0.0	0.0	0.0	0.9	0.0	0.0	1.7	0.0
LnGrp Delay(d),s/veh				12.0	0.0	0.0	0.0	4.4	0.0	0.0	4.9	0.0
LnGrp LOS				B				A			A	
Approach Vol, veh/h					605			554			946	
Approach Delay, s/veh					12.0			4.4			4.9	
Approach LOS					B			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		20.2		11.4		20.2						
Change Period (Y+Rc), s		4.9		* 4.2		4.9						
Max Green Setting (Gmax), s		50.0		* 40		50.0						
Max Q Clear Time (g_c+I1), s		3.9		7.1		5.6						
Green Ext Time (p_c), s		2.6		0.1		2.6						
Intersection Summary												
HCM 2010 Ctrl Delay				6.8								
HCM 2010 LOS				A								
Notes												

HCM 2010 Signalized Intersection Summary 5: First St/Springtown Blvd & I-580 EB Ramps

Lassen Road Mixed Use TIA
Cumulative No Project AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	0	360	0	0	0	0	890	370	0	1320	80
Future Volume (veh/h)	160	0	360	0	0	0	0	890	370	0	1320	80
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	1845	1845	1845				0	1845	1845	0	1845	1845
Adj Flow Rate, veh/h	184	0	414				0	1023	0	0	1517	0
Adj No. of Lanes	2	0	1				0	3	1	0	3	1
Peak Hour Factor	0.87	0.87	0.87				0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	3	3	3				0	3	3	0	3	3
Cap, veh/h	1081	0	482				0	2919	909	0	2919	896
Arrive On Green	0.31	0.00	0.31				0.00	0.58	0.00	0.00	0.58	0.00
Sat Flow, veh/h	3514	0	1568				0	5202	1568	0	5202	1568
Grp Volume(v), veh/h	184	0	414				0	1023	0	0	1517	0
Grp Sat Flow(s),veh/h/ln	1757	0	1568				0	1679	1568	0	1679	1568
Q Serve(g_s), s	2.4	0.0	15.4				0.0	6.6	0.0	0.0	11.2	0.0
Cycle Q Clear(g_c), s	2.4	0.0	15.4				0.0	6.6	0.0	0.0	11.2	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	1081	0	482				0	2919	909	0	2919	896
V/C Ratio(X)	0.17	0.00	0.86				0.00	0.35	0.00	0.00	0.52	0.00
Avail Cap(c_a), veh/h	1473	0	658				0	2919	909	0	2919	896
HCM Platoon Ratio	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				0.00	1.00	0.00	0.00	0.88	0.00
Uniform Delay (d), s/veh	15.7	0.0	20.2				0.0	6.9	0.0	0.0	7.8	0.0
Incr Delay (d2), s/veh	0.1	0.0	7.6				0.0	0.3	0.0	0.0	0.6	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	1.2	0.0	7.7				0.0	3.1	0.0	0.0	5.2	0.0
LnGrp Delay(d),s/veh	15.7	0.0	27.8				0.0	7.2	0.0	0.0	8.4	0.0
LnGrp LOS	B		C					A			A	
Approach Vol, veh/h		598						1023			1517	
Approach Delay, s/veh		24.1						7.2			8.4	
Approach LOS		C						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		39.9		22.1		39.9						
Change Period (Y+Rc), s		4.5		3.5		4.5						
Max Green Setting (Gmax), s		28.5		25.5		28.5						
Max Q Clear Time (g_c+I1), s		8.6		17.4		13.2						
Green Ext Time (p_c), s		18.2		1.2		14.2						
Intersection Summary												
HCM 2010 Ctrl Delay			11.0									
HCM 2010 LOS			B									
Notes												

Intersection						
Int Delay, s/veh	1.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	50	320	800	30	30	40
Future Vol, veh/h	50	320	800	30	30	40
Conflicting Peds, #/hr	0	0	0	0	8	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	85	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	0	2	2	0	0
Mvmt Flow	57	368	920	34	34	46
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	920	0	-	0	1411	920
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	491	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	750	-	-	-	154	331
Stage 1	-	-	-	-	392	-
Stage 2	-	-	-	-	619	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	750	-	-	-	142	331
Mov Cap-2 Maneuver	-	-	-	-	142	-
Stage 1	-	-	-	-	392	-
Stage 2	-	-	-	-	572	-
Approach	EB		WB		SB	
HCM Control Delay, s	1.4		0		26.5	
HCM LOS					D	
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	750	-	-	-	142	331
HCM Lane V/C Ratio	0.077	-	-	-	0.243	0.139
HCM Control Delay (s)	10.2	-	-	-	38.3	17.6
HCM Lane LOS	B	-	-	-	E	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.9	0.5

HCM 2010 TWSC
1: Lassen Rd & Spring Valley Common

Lassen Road Mixed Use TIA
Cumulative No Project PM Peak Hour

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	60	50	30	10	10
Future Vol, veh/h	0	60	50	30	10	10
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	69	57	34	11	11
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	92	0	-	0	144	76
Stage 1	-	-	-	-	75	-
Stage 2	-	-	-	-	69	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1515	-	-	-	853	991
Stage 1	-	-	-	-	953	-
Stage 2	-	-	-	-	959	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1514	-	-	-	853	990
Mov Cap-2 Maneuver	-	-	-	-	853	-
Stage 1	-	-	-	-	953	-
Stage 2	-	-	-	-	959	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		9		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1514	-	-	-	916	
HCM Lane V/C Ratio	-	-	-	-	0.025	
HCM Control Delay (s)	0	-	-	-	9	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

Intersection										
Int Delay, s/veh	1.8									
Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations										
Traffic Vol, veh/h	10	70	110	440	0	0	270	20	0	0
Future Vol, veh/h	10	70	110	440	0	0	270	20	0	0
Conflicting Peds, #/hr	0	0	3	0	0	0	0	3	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	-	None	-	-
Storage Length	0	-	88	-	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	-	-	0	-	-	-
Grade, %	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	92	89	89	89	92	92	89	89	92	92
Heavy Vehicles, %	2	0	0	0	2	2	0	0	2	2
Mvmt Flow	11	79	124	494	0	0	303	22	0	0
Major/Minor	Minor2		Major1		Major2					
Conflicting Flow All	812	166	329	0	0	-	-	0		
Stage 1	318	-	-	-	-	-	-	-		
Stage 2	494	-	-	-	-	-	-	-		
Critical Hdwy	6.8	6.9	4.1	-	-	-	-	-		
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-	-		
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-	-		
Follow-up Hdwy	3.5	3.3	2.2	-	-	-	-	-		
Pot Cap-1 Maneuver	321	856	1242	-	-	0	-	-		
Stage 1	716	-	-	-	-	0	-	-		
Stage 2	584	-	-	-	-	0	-	-		
Platoon blocked, %				-	-	-	-			
Mov Cap-1 Maneuver	287	854	1242	-	-	-	-	-		
Mov Cap-2 Maneuver	287	-	-	-	-	-	-	-		
Stage 1	714	-	-	-	-	-	-	-		
Stage 2	524	-	-	-	-	-	-	-		
Approach	EB		NB		SB					
HCM Control Delay, s	9.7		1.6		0					
HCM LOS	A									
Minor Lane/Major Mvmt	NBL		NBT	NBR	EBLn1	SBT	SBR			
Capacity (veh/h)	1242		-	-	854	-	-			
HCM Lane V/C Ratio	0.1		-	-	0.105	-	-			
HCM Control Delay (s)	8.2		-	-	9.7	-	-			
HCM Lane LOS	A		-	-	A	-	-			
HCM 95th %tile O(veh)	0.3		-	-	0.4	-	-			

HCM 2010 Signalized Intersection Summary

3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Cumulative No Project PM Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	460	40	510	1050	40	300		
Future Volume (veh/h)	460	40	510	1050	40	300		
Number	7	14	6	16	5	2		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.97	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900		
Adj Flow Rate, veh/h	517	20	573	936	45	337		
Adj No. of Lanes	2	1	2	1	1	2		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89		
Percent Heavy Veh, %	0	0	0	0	0	0		
Cap, veh/h	732	337	2004	1185	70	2346		
Arrive On Green	0.21	0.21	0.56	0.55	0.04	0.65		
Sat Flow, veh/h	3510	1615	3705	1574	1810	3705		
Grp Volume(v), veh/h	517	20	573	936	45	337		
Grp Sat Flow(s),veh/h/ln	1755	1615	1805	1574	1810	1805		
Q Serve(g_s), s	8.6	0.6	5.3	23.2	1.5	2.3		
Cycle Q Clear(g_c), s	8.6	0.6	5.3	23.2	1.5	2.3		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	732	337	2004	1185	70	2346		
V/C Ratio(X)	0.71	0.06	0.29	0.79	0.64	0.14		
Avail Cap(c_a), veh/h	2263	1041	2328	1326	735	2346		
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	23.1	19.9	7.4	4.9	29.7	4.2		
Incr Delay (d2), s/veh	1.3	0.1	0.1	3.0	3.5	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	4.3	0.6	2.6	16.8	0.8	1.1		
LnGrp Delay(d),s/veh	24.3	20.0	7.5	7.9	33.3	4.3		
LnGrp LOS	C	B	A	A	C	A		
Approach Vol, veh/h	537		1509			382		
Approach Delay, s/veh	24.2		7.7			7.7		
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		45.6		17.2	5.9	39.7		
Change Period (Y+Rc), s		5.3		4.6	4.0	5.3		
Max Green Setting (Gmax), s		40.0		40.0	25.0	40.0		
Max Q Clear Time (g_c+I1), s		4.3		10.6	3.5	25.2		
Green Ext Time (p_c), s		14.8		2.0	0.0	9.1		
Intersection Summary								
HCM 2010 Ctrl Delay			11.4					
HCM 2010 LOS			B					

Queues
3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Cumulative No Project PM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	517	53	640	1180	48	371
v/c Ratio	0.37	0.08	0.52	0.85	0.22	0.24
Control Delay	14.9	5.4	21.2	8.9	35.4	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.9	5.4	21.2	8.9	35.4	12.4
Queue Length 50th (ft)	76	1	98	30	17	36
Queue Length 95th (ft)	132	21	214	81	60	93
Internal Link Dist (ft)	302		446			205
Turn Bay Length (ft)	95	110			70	
Base Capacity (vph)	2454	1132	2530	1506	844	3327
Starvation Cap Reductn	0	0	0	1	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.05	0.25	0.78	0.06	0.11
Intersection Summary						

HCM 2010 Signalized Intersection Summary

4: Springtown Blvd & I-580 WB On Ramps/I-580 WB Off Ramps

Lassen Road Mixed Use TIA

Cumulative No Project PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	510	0	90	0	1470	590	0	480	280
Future Volume (veh/h)	0	0	0	510	0	90	0	1470	590	0	480	280
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				1845	1845	1900	0	1845	1845	0	1845	1845
Adj Flow Rate, veh/h				632	0	0	0	1598	0	0	522	0
Adj No. of Lanes				2	1	0	0	3	1	0	3	1
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				3	3	3	0	3	3	0	3	3
Cap, veh/h				820	431	0	0	2503	755	0	2503	779
Arrive On Green				0.23	0.00	0.00	0.00	0.50	0.00	0.00	0.50	0.00
Sat Flow, veh/h				3514	1845	0	0	5202	1568	0	5202	1568
Grp Volume(v), veh/h				632	0	0	0	1598	0	0	522	0
Grp Sat Flow(s),veh/h/ln				1757	1845	0	0	1679	1568	0	1679	1568
Q Serve(g_s), s				5.4	0.0	0.0	0.0	7.5	0.0	0.0	1.9	0.0
Cycle Q Clear(g_c), s				5.4	0.0	0.0	0.0	7.5	0.0	0.0	1.9	0.0
Prop In Lane				1.00		0.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				820	431	0	0	2503	755	0	2503	779
V/C Ratio(X)				0.77	0.00	0.00	0.00	0.64	0.00	0.00	0.21	0.00
Avail Cap(c_a), veh/h				4407	2314	0	0	7975	2458	0	7975	2483
HCM Platoon Ratio				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	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				11.4	0.0	0.0	0.0	5.9	0.0	0.0	4.5	0.0
Incr Delay (d2), s/veh				0.6	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				2.6	0.0	0.0	0.0	3.4	0.0	0.0	0.8	0.0
LnGrp Delay(d),s/veh				12.0	0.0	0.0	0.0	6.0	0.0	0.0	4.5	0.0
LnGrp LOS				B				A			A	
Approach Vol, veh/h				632				1598			522	
Approach Delay, s/veh				12.0				6.0			4.5	
Approach LOS				B				A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		20.2		11.6		20.2						
Change Period (Y+Rc), s		4.9		* 4.2		4.9						
Max Green Setting (Gmax), s		50.0		* 40		50.0						
Max Q Clear Time (g_c+I1), s		9.5		7.4		3.9						
Green Ext Time (p_c), s		4.2		0.1		4.2						
Intersection Summary												
HCM 2010 Ctrl Delay			7.1									
HCM 2010 LOS			A									
Notes												

HCM 2010 Signalized Intersection Summary 5: First St/Springtown Blvd & I-580 EB Ramps

Lassen Road Mixed Use TIA
Cumulative No Project PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	580	0	700	0	0	0	0	1480	490	0	950	40
Future Volume (veh/h)	580	0	700	0	0	0	0	1480	490	0	950	40
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	1845	1845	1845				0	1845	1845	0	1845	1845
Adj Flow Rate, veh/h	667	0	805				0	1701	0	0	1092	0
Adj No. of Lanes	2	0	1				0	3	1	0	3	1
Peak Hour Factor	0.87	0.87	0.87				0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	3	3	3				0	3	3	0	3	3
Cap, veh/h	1473	0	658				0	2356	733	0	2356	721
Arrive On Green	0.42	0.00	0.42				0.00	0.47	0.00	0.00	0.47	0.00
Sat Flow, veh/h	3514	0	1568				0	5202	1568	0	5202	1568
Grp Volume(v), veh/h	667	0	805				0	1701	0	0	1092	0
Grp Sat Flow(s),veh/h/ln	1757	0	1568				0	1679	1568	0	1679	1568
Q Serve(g_s), s	8.4	0.0	26.0				0.0	16.8	0.0	0.0	9.1	0.0
Cycle Q Clear(g_c), s	8.4	0.0	26.0				0.0	16.8	0.0	0.0	9.1	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	1473	0	658				0	2356	733	0	2356	721
V/C Ratio(X)	0.45	0.00	1.22				0.00	0.72	0.00	0.00	0.46	0.00
Avail Cap(c_a), veh/h	1473	0	658				0	2356	733	0	2356	721
HCM Platoon Ratio	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				0.00	1.00	0.00	0.00	0.93	0.00
Uniform Delay (d), s/veh	12.9	0.0	18.0				0.0	13.3	0.0	0.0	11.2	0.0
Incr Delay (d2), s/veh	0.2	0.0	114.1				0.0	2.0	0.0	0.0	0.6	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	4.1	0.0	32.0				0.0	8.1	0.0	0.0	4.3	0.0
LnGrp Delay(d),s/veh	13.1	0.0	132.1				0.0	15.2	0.0	0.0	11.8	0.0
LnGrp LOS	B		F					B			B	
Approach Vol, veh/h	1472						1701			1092		
Approach Delay, s/veh	78.2						15.2			11.8		
Approach LOS	E						B			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2		4		6							
Phs Duration (G+Y+Rc), s	33.0		29.0		33.0							
Change Period (Y+Rc), s	4.5		3.5		4.5							
Max Green Setting (Gmax), s	28.5		25.5		28.5							
Max Q Clear Time (g_c+I1), s	18.8		28.0		11.1							
Green Ext Time (p_c), s	9.4		0.0		16.5							
Intersection Summary												
HCM 2010 Ctrl Delay	36.1											
HCM 2010 LOS	D											
Notes												

Intersection						
Int Delay, s/veh	2.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	130	960	480	30	20	20
Future Vol, veh/h	130	960	480	30	20	20
Conflicting Peds, #/hr	0	0	0	0	8	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	85	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	0	2	2	0	0
Mvmt Flow	149	1103	552	34	23	23
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	552	0	-	0	1962	552
Stage 1	-	-	-	-	552	-
Stage 2	-	-	-	-	1410	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1028	-	-	-	70	537
Stage 1	-	-	-	-	581	-
Stage 2	-	-	-	-	228	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1028	-	-	-	60	537
Mov Cap-2 Maneuver	-	-	-	-	60	-
Stage 1	-	-	-	-	581	-
Stage 2	-	-	-	-	195	-
Approach	EB		WB		SB	
HCM Control Delay, s	1.1		0		55.2	
HCM LOS	F					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1028	-	-	-	60	537
HCM Lane V/C Ratio	0.145	-	-	-	0.383	0.043
HCM Control Delay (s)	9.1	-	-	-	98.3	12
HCM Lane LOS	A	-	-	-	F	B
HCM 95th %tile O(veh)	0.5	-	-	-	1.4	0.1

Intersection

Int Delay, s/veh 1.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	132	65	20	30	10
Future Vol, veh/h	0	132	65	20	30	10
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	152	75	23	34	11

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	98	0	0 238 87
Stage 1	-	-	- 86 -
Stage 2	-	-	- 152 -
Critical Hdwy	4.1	-	- 6.4 6.2
Critical Hdwy Stg 1	-	-	- 5.4 -
Critical Hdwy Stg 2	-	-	- 5.4 -
Follow-up Hdwy	2.2	-	- 3.5 3.3
Pot Cap-1 Maneuver	1508	-	- 755 977
Stage 1	-	-	- 942 -
Stage 2	-	-	- 881 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1507	-	- 755 976
Mov Cap-2 Maneuver	-	-	- 755 -
Stage 1	-	-	- 942 -
Stage 2	-	-	- 881 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1507	-	-	-	800
HCM Lane V/C Ratio	-	-	-	-	0.057
HCM Control Delay (s)	0	-	-	-	9.8
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection										
Int Delay, s/veh	2.9									
Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations										
Traffic Vol, veh/h	11	140	114	170	0	0	520	20	0	0
Future Vol, veh/h	11	140	114	170	0	0	520	20	0	0
Conflicting Peds, #/hr	0	0	3	0	0	0	0	3	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	-	None	-	-	None	-	-
Storage Length	0	-	88	-	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	-	-	0	-	-	-
Grade, %	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	92	89	89	89	92	92	89	89	92	92
Heavy Vehicles, %	2	0	0	0	2	2	0	0	2	2
Mvmt Flow	12	157	128	191	0	0	584	22	0	0
Major/Minor	Minor2		Major1		Major2					
Conflicting Flow All	951	306	610	0	0	-	-	0		
Stage 1	599	-	-	-	-	-	-	-		
Stage 2	352	-	-	-	-	-	-	-		
Critical Hdwy	6.8	6.9	4.1	-	-	-	-	-		
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-	-		
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-	-		
Follow-up Hdwy	3.5	3.3	2.2	-	-	-	-	-		
Pot Cap-1 Maneuver	262	696	979	-	-	0	-	-		
Stage 1	517	-	-	-	-	0	-	-		
Stage 2	689	-	-	-	-	0	-	-		
Platoon blocked, %				-	-	-	-	-		
Mov Cap-1 Maneuver	226	694	979	-	-	-	-	-		
Mov Cap-2 Maneuver	226	-	-	-	-	-	-	-		
Stage 1	516	-	-	-	-	-	-	-		
Stage 2	597	-	-	-	-	-	-	-		
Approach	EB		NB		SB					
HCM Control Delay, s	11.9		3.7		0					
HCM LOS	B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	SBT	SBR				
Capacity (veh/h)	979	-	-	694	-	-				
HCM Lane V/C Ratio	0.131	-	-	0.244	-	-				
HCM Control Delay (s)	9.2	-	-	11.9	-	-				
HCM Lane LOS	A	-	-	B	-	-				
HCM 95th %tile Q(veh)	0.5	-	-	1	-	-				

HCM 2010 Signalized Intersection Summary

3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Cumulative Plus Project AM Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	800	41	243	320	57	603		
Future Volume (veh/h)	800	41	243	320	57	603		
Number	7	14	6	16	5	2		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.97	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900		
Adj Flow Rate, veh/h	899	33	273	238	64	678		
Adj No. of Lanes	2	1	2	1	1	2		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89		
Percent Heavy Veh, %	0	0	0	0	0	0		
Cap, veh/h	1266	582	1206	1041	81	1681		
Arrive On Green	0.36	0.36	0.33	0.31	0.04	0.47		
Sat Flow, veh/h	3510	1615	3705	1567	1810	3705		
Grp Volume(v), veh/h	899	33	273	238	64	678		
Grp Sat Flow(s),veh/h/ln	1755	1615	1805	1567	1810	1805		
Q Serve(g_s), s	10.1	0.6	2.5	2.9	1.6	5.7		
Cycle Q Clear(g_c), s	10.1	0.6	2.5	2.9	1.6	5.7		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	1266	582	1206	1041	81	1681		
V/C Ratio(X)	0.71	0.06	0.23	0.23	0.79	0.40		
Avail Cap(c_a), veh/h	3095	1424	3238	1923	982	3238		
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	12.7	9.6	11.0	3.3	21.8	8.1		
Incr Delay (d2), s/veh	0.7	0.0	0.1	0.1	6.4	0.2		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	5.0	0.7	1.3	2.5	0.9	2.9		
LnGrp Delay(d),s/veh	13.4	9.6	11.1	3.4	28.2	8.3		
LnGrp LOS	B	A	B	A	C	A		
Approach Vol, veh/h	932		511			742		
Approach Delay, s/veh	13.3		7.5			10.0		
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		25.4		20.6	6.1	19.4		
Change Period (Y+Rc), s		5.3		4.6	4.0	5.3		
Max Green Setting (Gmax), s		40.0		40.0	25.0	40.0		
Max Q Clear Time (g_c+I1), s		7.7		12.1	3.6	4.9		
Green Ext Time (p_c), s		8.8		3.9	0.1	9.0		
Intersection Summary								
HCM 2010 Ctrl Delay			10.8					
HCM 2010 LOS			B					

Queues

3: Springtown Blvd & Bluebell Dr

01/29/2018



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	899	46	273	360	64	678
v/c Ratio	0.59	0.07	0.27	0.30	0.26	0.46
Control Delay	13.6	6.4	19.0	1.0	26.8	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	6.4	19.0	1.0	26.8	13.2
Queue Length 50th (ft)	106	4	37	0	18	74
Queue Length 95th (ft)	179	20	83	16	57	146
Internal Link Dist (ft)	302		446			205
Turn Bay Length (ft)	95	110			70	
Base Capacity (vph)	2780	1270	2903	1484	906	3610
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.04	0.09	0.24	0.07	0.19
Intersection Summary						

HCM 2010 Signalized Intersection Summary

Lassen Road Mixed Use TIA

4: Springtown Blvd & I-580 WB On Ramps/I-580 WB Off Ramps

Cumulative Plus Project AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	530	0	40	0	523	540	0	908	495
Future Volume (veh/h)	0	0	0	530	0	40	0	523	540	0	908	495
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				1845	1845	1900	0	1845	1845	0	1845	1845
Adj Flow Rate, veh/h				594	0	0	0	568	0	0	987	0
Adj No. of Lanes				2	1	0	0	3	1	0	3	1
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				3	3	3	0	3	3	0	3	3
Cap, veh/h				804	410	0	0	2602	765	0	2602	765
Arrive On Green				0.23	0.00	0.00	0.00	0.52	0.00	0.00	0.52	0.00
Sat Flow, veh/h				3514	1845	0	0	5202	1568	0	5202	1568
Grp Volume(v), veh/h				594	0	0	0	568	0	0	987	0
Grp Sat Flow(s),veh/h/ln				1757	1845	0	0	1679	1568	0	1679	1568
Q Serve(g_s), s				4.9	0.0	0.0	0.0	1.9	0.0	0.0	3.7	0.0
Cycle Q Clear(g_c), s				4.9	0.0	0.0	0.0	1.9	0.0	0.0	3.7	0.0
Prop In Lane				1.00		0.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				804	410	0	0	2602	765	0	2602	765
V/C Ratio(X)				0.74	0.00	0.00	0.00	0.22	0.00	0.00	0.38	0.00
Avail Cap(c_a), veh/h				4493	2347	0	0	8154	2494	0	8154	2494
HCM Platoon Ratio				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	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				11.2	0.0	0.0	0.0	4.1	0.0	0.0	4.6	0.0
Incr Delay (d2), s/veh				0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				2.4	0.0	0.0	0.0	0.9	0.0	0.0	1.7	0.0
LnGrp Delay(d),s/veh				11.8	0.0	0.0	0.0	4.2	0.0	0.0	4.6	0.0
LnGrp LOS				B				A			A	
Approach Vol, veh/h				594				568			987	
Approach Delay, s/veh				11.8				4.2			4.6	
Approach LOS				B				A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		20.2		11.2		20.2						
Change Period (Y+Rc), s		4.9		* 4.2		4.9						
Max Green Setting (Gmax), s		50.0		* 40		50.0						
Max Q Clear Time (g_c+I1), s		3.9		6.9		5.7						
Green Ext Time (p_c), s		2.7		0.1		2.7						
Intersection Summary												
HCM 2010 Ctrl Delay				6.5								
HCM 2010 LOS				A								
Notes												

HCM 2010 Signalized Intersection Summary 5: First St/Springtown Blvd & I-580 EB Ramps

Lassen Road Mixed Use TIA
Cumulative Plus Project AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	166	0	360	0	0	0	0	897	370	0	1354	84
Future Volume (veh/h)	166	0	360	0	0	0	0	897	370	0	1354	84
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	1845	1845	1845				0	1845	1845	0	1845	1845
Adj Flow Rate, veh/h	191	0	414				0	1031	0	0	1556	0
Adj No. of Lanes	2	0	1				0	3	1	0	3	1
Peak Hour Factor	0.87	0.87	0.87				0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	3	3	3				0	3	3	0	3	3
Cap, veh/h	1039	0	464				0	2897	889	0	2897	889
Arrive On Green	0.30	0.00	0.30				0.00	0.58	0.00	0.00	0.58	0.00
Sat Flow, veh/h	3514	0	1568				0	5202	1568	0	5202	1568
Grp Volume(v), veh/h	191	0	414				0	1031	0	0	1556	0
Grp Sat Flow(s),veh/h/ln	1757	0	1568				0	1679	1568	0	1679	1568
Q Serve(g_s), s	2.5	0.0	15.7				0.0	6.8	0.0	0.0	11.8	0.0
Cycle Q Clear(g_c), s	2.5	0.0	15.7				0.0	6.8	0.0	0.0	11.8	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	1039	0	464				0	2897	889	0	2897	889
V/C Ratio(X)	0.18	0.00	0.89				0.00	0.36	0.00	0.00	0.54	0.00
Avail Cap(c_a), veh/h	1417	0	632				0	2897	889	0	2897	889
HCM Platoon Ratio	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				0.00	1.00	0.00	0.00	0.76	0.00
Uniform Delay (d), s/veh	16.3	0.0	20.9				0.0	7.0	0.0	0.0	8.1	0.0
Incr Delay (d2), s/veh	0.1	0.0	11.1				0.0	0.3	0.0	0.0	0.5	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	1.2	0.0	8.2				0.0	3.1	0.0	0.0	5.5	0.0
LnGrp Delay(d),s/veh	16.3	0.0	32.0				0.0	7.4	0.0	0.0	8.6	0.0
LnGrp LOS	B		C					A			A	
Approach Vol, veh/h		605						1031			1556	
Approach Delay, s/veh		27.0						7.4			8.6	
Approach LOS		C						A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		39.7		22.3		39.7						
Change Period (Y+Rc), s		4.5		3.5		4.5						
Max Green Setting (Gmax), s		28.5		25.5		28.5						
Max Q Clear Time (g_c+I1), s		8.8		17.7		13.8						
Green Ext Time (p_c), s		18.2		1.2		13.8						
Intersection Summary												
HCM 2010 Ctrl Delay			11.7									
HCM 2010 LOS			B									
Notes												

Intersection						
Int Delay, s/veh	1.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	53	324	800	30	30	41
Future Vol, veh/h	53	324	800	30	30	41
Conflicting Peds, #/hr	0	0	0	0	8	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	85	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	0	2	2	0	0
Mvmt Flow	61	372	920	34	34	47
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	920	0	-	0	1422	920
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	502	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	750	-	-	-	152	331
Stage 1	-	-	-	-	392	-
Stage 2	-	-	-	-	612	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	750	-	-	-	140	331
Mov Cap-2 Maneuver	-	-	-	-	140	-
Stage 1	-	-	-	-	392	-
Stage 2	-	-	-	-	562	-
Approach	EB		WB		SB	
HCM Control Delay, s	1.4		0		26.7	
HCM LOS					D	
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	750	-	-	-	140	331
HCM Lane V/C Ratio	0.081	-	-	-	0.246	0.142
HCM Control Delay (s)	10.2	-	-	-	38.9	17.7
HCM Lane LOS	B	-	-	-	E	C
HCM 95th %tile Q(veh)	0.3	-	-	-	0.9	0.5

HCM 2010 TWSC
1: Lassen Rd & Spring Valley Common

Lassen Road Mixed Use TIA
Cumulative Plus Project PM Peak Hour

Intersection						
Int Delay, s/veh	0.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	94	118	30	10	10
Future Vol, veh/h	0	94	118	30	10	10
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	108	136	34	11	11
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	170	0	-	0	261	154
Stage 1	-	-	-	-	153	-
Stage 2	-	-	-	-	108	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1420	-	-	-	732	897
Stage 1	-	-	-	-	880	-
Stage 2	-	-	-	-	921	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1419	-	-	-	732	896
Mov Cap-2 Maneuver	-	-	-	-	732	-
Stage 1	-	-	-	-	880	-
Stage 2	-	-	-	-	921	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		9.6		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1419	-	-	-	806	
HCM Lane V/C Ratio	-	-	-	-	0.029	
HCM Control Delay (s)	0	-	-	-	9.6	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

Intersection											
Int Delay, s/veh	2.6										
Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR	
Lane Configurations											
Traffic Vol, veh/h	11	103	177	440	0	0	270	20	0	0	
Future Vol, veh/h	11	103	177	440	0	0	270	20	0	0	
Conflicting Peds, #/hr	0	0	3	0	0	0	0	3	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop	
RT Channelized	-	None	-	-	None	-	-	None	-	-	
Storage Length	0	-	88	-	-	-	-	-	-	-	
Veh in Median Storage, #	0	-	-	0	-	-	0	-	-	-	
Grade, %	0	-	-	0	-	-	0	-	0	-	
Peak Hour Factor	92	89	89	89	92	92	89	89	92	92	
Heavy Vehicles, %	2	0	0	0	2	2	0	0	2	2	
Mvmt Flow	12	116	199	494	0	0	303	22	0	0	
Major/Minor	Minor2		Major1		Major2						
Conflicting Flow All	963	166	329	0	0	-	-	0			
Stage 1	318	-	-	-	-	-	-	-			
Stage 2	645	-	-	-	-	-	-	-			
Critical Hdwy	6.8	6.9	4.1	-	-	-	-	-			
Critical Hdwy Stg 1	5.8	-	-	-	-	-	-	-			
Critical Hdwy Stg 2	5.8	-	-	-	-	-	-	-			
Follow-up Hdwy	3.5	3.3	2.2	-	-	-	-	-			
Pot Cap-1 Maneuver	257	856	1242	-	-	0	-	-			
Stage 1	716	-	-	-	-	0	-	-			
Stage 2	490	-	-	-	-	0	-	-			
Platoon blocked, %				-	-	-	-				
Mov Cap-1 Maneuver	215	854	1242	-	-	-	-	-			
Mov Cap-2 Maneuver	215	-	-	-	-	-	-	-			
Stage 1	714	-	-	-	-	-	-	-			
Stage 2	410	-	-	-	-	-	-	-			
Approach	EB		NB		SB						
HCM Control Delay, s	10		2.4		0						
HCM LOS	B										
Minor Lane/Major Mvmt	NBL		NBT	NBR	EBLn1	SBT	SBR				
Capacity (veh/h)	1242		-	-	854	-	-				
HCM Lane V/C Ratio	0.16		-	-	0.15	-	-				
HCM Control Delay (s)	8.4		-	-	10	-	-				
HCM Lane LOS	A		-	-	B	-	-				
HCM 95th %tile O(veh)	0.6		-	-	0.5	-	-				

HCM 2010 Signalized Intersection Summary

3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Cumulative Plus Project PM Peak Hour

								
Movement	WBL	WBR	NBT	NBR	SBL	SBT		
Lane Configurations								
Traffic Volume (veh/h)	460	47	570	1050	43	330		
Future Volume (veh/h)	460	47	570	1050	43	330		
Number	7	14	6	16	5	2		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00	1.00		0.97	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900		
Adj Flow Rate, veh/h	517	23	640	950	48	371		
Adj No. of Lanes	2	1	2	1	1	2		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89		
Percent Heavy Veh, %	0	0	0	0	0	0		
Cap, veh/h	728	335	2015	1189	74	2360		
Arrive On Green	0.21	0.21	0.56	0.55	0.04	0.65		
Sat Flow, veh/h	3510	1615	3705	1574	1810	3705		
Grp Volume(v), veh/h	517	23	640	950	48	371		
Grp Sat Flow(s),veh/h/ln	1755	1615	1805	1574	1810	1805		
Q Serve(g_s), s	8.8	0.7	6.1	24.4	1.7	2.5		
Cycle Q Clear(g_c), s	8.8	0.7	6.1	24.4	1.7	2.5		
Prop In Lane	1.00	1.00		1.00	1.00			
Lane Grp Cap(c), veh/h	728	335	2015	1189	74	2360		
V/C Ratio(X)	0.71	0.07	0.32	0.80	0.65	0.16		
Avail Cap(c_a), veh/h	2217	1020	2280	1304	719	2360		
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	23.6	20.4	7.6	5.1	30.3	4.3		
Incr Delay (d2), s/veh	1.3	0.1	0.1	3.3	3.5	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	4.4	0.7	3.0	17.7	0.9	1.2		
LnGrp Delay(d),s/veh	24.9	20.5	7.7	8.4	33.7	4.3		
LnGrp LOS	C	C	A	A	C	A		
Approach Vol, veh/h	540		1590			419		
Approach Delay, s/veh	24.7		8.1			7.7		
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		46.7		17.4	6.1	40.6		
Change Period (Y+Rc), s		5.3		4.6	4.0	5.3		
Max Green Setting (Gmax), s		40.0		40.0	25.0	40.0		
Max Q Clear Time (g_c+I1), s		4.5		10.8	3.7	26.4		
Green Ext Time (p_c), s		16.3		2.0	0.0	8.9		
Intersection Summary								
HCM 2010 Ctrl Delay			11.6					
HCM 2010 LOS			B					

Queues
3: Springtown Blvd & Bluebell Dr

Lassen Road Mixed Use TIA
Cumulative No Project PM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	517	53	640	1180	48	371
v/c Ratio	0.37	0.08	0.52	0.85	0.22	0.24
Control Delay	14.9	5.4	21.2	8.9	35.4	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.9	5.4	21.2	8.9	35.4	12.4
Queue Length 50th (ft)	76	1	98	30	17	36
Queue Length 95th (ft)	132	21	214	81	60	93
Internal Link Dist (ft)	302		446			205
Turn Bay Length (ft)	95	110			70	
Base Capacity (vph)	2454	1132	2530	1506	844	3327
Starvation Cap Reductn	0	0	0	1	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.05	0.25	0.78	0.06	0.11
Intersection Summary						

HCM 2010 Signalized Intersection Summary

Lassen Road Mixed Use TIA

4: Springtown Blvd & I-580 WB On Ramps/I-580 WB Off Ramps

Cumulative Plus Project PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	510	0	93	0	1527	590	0	498	292
Future Volume (veh/h)	0	0	0	510	0	93	0	1527	590	0	498	292
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				1845	1845	1900	0	1845	1845	0	1845	1845
Adj Flow Rate, veh/h				635	0	0	0	1660	0	0	541	0
Adj No. of Lanes				2	1	0	0	3	1	0	3	1
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				3	3	3	0	3	3	0	3	3
Cap, veh/h				823	432	0	0	2500	754	0	2500	778
Arrive On Green				0.23	0.00	0.00	0.00	0.50	0.00	0.00	0.50	0.00
Sat Flow, veh/h				3514	1845	0	0	5202	1568	0	5202	1568
Grp Volume(v), veh/h				635	0	0	0	1660	0	0	541	0
Grp Sat Flow(s),veh/h/ln				1757	1845	0	0	1679	1568	0	1679	1568
Q Serve(g_s), s				5.4	0.0	0.0	0.0	7.9	0.0	0.0	1.9	0.0
Cycle Q Clear(g_c), s				5.4	0.0	0.0	0.0	7.9	0.0	0.0	1.9	0.0
Prop In Lane				1.00		0.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				823	432	0	0	2500	754	0	2500	778
V/C Ratio(X)				0.77	0.00	0.00	0.00	0.66	0.00	0.00	0.22	0.00
Avail Cap(c_a), veh/h				4403	2311	0	0	7966	2456	0	7966	2480
HCM Platoon Ratio				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	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				11.4	0.0	0.0	0.0	6.0	0.0	0.0	4.5	0.0
Incr Delay (d2), s/veh				0.6	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				2.6	0.0	0.0	0.0	3.6	0.0	0.0	0.9	0.0
LnGrp Delay(d),s/veh				12.0	0.0	0.0	0.0	6.2	0.0	0.0	4.6	0.0
LnGrp LOS				B				A			A	
Approach Vol, veh/h				635				1660			541	
Approach Delay, s/veh				12.0				6.2			4.6	
Approach LOS				B				A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		20.2		11.7		20.2						
Change Period (Y+Rc), s		4.9		* 4.2		4.9						
Max Green Setting (Gmax), s		50.0		* 40		50.0						
Max Q Clear Time (g_c+I1), s		9.9		7.4		3.9						
Green Ext Time (p_c), s		4.5		0.1		4.5						
Intersection Summary												
HCM 2010 Ctrl Delay			7.2									
HCM 2010 LOS			A									
Notes												

HCM 2010 Signalized Intersection Summary 5: First St/Springtown Blvd & I-580 EB Ramps

Lassen Road Mixed Use TIA
Cumulative Plus Project PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	604	0	700	0	0	0	0	1513	490	0	966	42
Future Volume (veh/h)	604	0	700	0	0	0	0	1513	490	0	966	42
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	1845	1845	1845				0	1845	1845	0	1845	1845
Adj Flow Rate, veh/h	694	0	805				0	1739	0	0	1110	0
Adj No. of Lanes	2	0	1				0	3	1	0	3	1
Peak Hour Factor	0.87	0.87	0.87				0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	3	3	3				0	3	3	0	3	3
Cap, veh/h	1473	0	658				0	2356	733	0	2356	721
Arrive On Green	0.42	0.00	0.42				0.00	0.47	0.00	0.00	0.47	0.00
Sat Flow, veh/h	3514	0	1568				0	5202	1568	0	5202	1568
Grp Volume(v), veh/h	694	0	805				0	1739	0	0	1110	0
Grp Sat Flow(s),veh/h/ln	1757	0	1568				0	1679	1568	0	1679	1568
Q Serve(g_s), s	8.9	0.0	26.0				0.0	17.4	0.0	0.0	9.3	0.0
Cycle Q Clear(g_c), s	8.9	0.0	26.0				0.0	17.4	0.0	0.0	9.3	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	1473	0	658				0	2356	733	0	2356	721
V/C Ratio(X)	0.47	0.00	1.22				0.00	0.74	0.00	0.00	0.47	0.00
Avail Cap(c_a), veh/h	1473	0	658				0	2356	733	0	2356	721
HCM Platoon Ratio	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				0.00	1.00	0.00	0.00	0.93	0.00
Uniform Delay (d), s/veh	13.0	0.0	18.0				0.0	13.4	0.0	0.0	11.3	0.0
Incr Delay (d2), s/veh	0.2	0.0	114.1				0.0	2.1	0.0	0.0	0.6	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	4.3	0.0	32.0				0.0	8.4	0.0	0.0	4.5	0.0
LnGrp Delay(d),s/veh	13.2	0.0	132.1				0.0	15.5	0.0	0.0	11.9	0.0
LnGrp LOS	B		F					B			B	
Approach Vol, veh/h	1499						1739			1110		
Approach Delay, s/veh	77.1						15.5			11.9		
Approach LOS	E						B			B		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	2		4		6							
Phs Duration (G+Y+Rc), s	33.0		29.0		33.0							
Change Period (Y+Rc), s	4.5		3.5		4.5							
Max Green Setting (Gmax), s	28.5		25.5		28.5							
Max Q Clear Time (g_c+I1), s	19.4		28.0		11.3							
Green Ext Time (p_c), s	8.8		0.0		16.4							
Intersection Summary												
HCM 2010 Ctrl Delay	35.8											
HCM 2010 LOS	D											
Notes												

Intersection						
Int Delay, s/veh	2.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	132	961	484	30	20	23
Future Vol, veh/h	132	961	484	30	20	23
Conflicting Peds, #/hr	0	0	0	0	8	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	85	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	0	0	2	2	0	0
Mvmt Flow	152	1105	556	34	23	26
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	556	0	-	0	1972	556
Stage 1	-	-	-	-	556	-
Stage 2	-	-	-	-	1416	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1025	-	-	-	69	534
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	226	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1025	-	-	-	59	534
Mov Cap-2 Maneuver	-	-	-	-	59	-
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	192	-
Approach	EB		WB		SB	
HCM Control Delay, s	1.1		0		53.3	
HCM LOS					F	
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1025	-	-	-	59	534
HCM Lane V/C Ratio	0.148	-	-	-	0.39	0.05
HCM Control Delay (s)	9.1	-	-	-	100.6	12.1
HCM Lane LOS	A	-	-	-	F	B
HCM 95th %tile Q(veh)	0.5	-	-	-	1.4	0.2

Appendix C:

Approved/Pending Project Information



City of Livermore
Community Development Department
Summary of Major Development Projects
925-960-4400

Project Location	Project Description	Status	Project Name/Applicant	Applicant Telephone	Activity Number	Staff	Map
Commercial/Industrial							
1000 Airway Boulevard	Demolish Existing Residence Inn and Replace with New 122 Room Hyatt House and 119 Room Hyatt Place	Under Review	Hyatt Michael W.N. Chiu Prima Diva Hotels	650-941-4885	SPDR16-009 CUPM16-002	Planner Scott Lee	Location Map
4696 Bennett Drive	437 Residential Subdivision with mixed unit types	Scheduled to City Council July 24	Arroyo Vista Neighborhood Project Summerhill Homes	925-244-7513	SUB16-010 SPDR16-027	Planner Lori Parks Engineer/Tech Mike Pato	Location Map
6755 Brisa Street	Warehouse/Manufacturing Building 127,226 sq. ft.	Under Construction	Warehouse/Manufacturing Steven D. Geoffrion	562-948-4349	CB160007 SPDR16-001	Planner Scott Lee Engineer/Tech Mike Pato Plan Checker Blake Warmerdam	Location Map
801 Challenger Street	Tenant Improvement 295,000 sq. ft.	Under Construction	Draexlmaier John Thorn Ice Builders	714-491-1317	TI160073	Plan Checker Blake Warmerdam	Location Map
4500 Contractors Place	4.28 acre site with mixed use of self storage and industrial/commercial	Under Review	Proforma Construcion Jeff Antrim	925-980-9977	SPDR16-023	Planner Turhan Sonmez/Scott Lee	Location Map
201 Discovery Drive	Distribution Center	Under Construction	Tesla Motors Joe Cavanagh Tesla Motors	415-786-8634	TI160031	Planner Frank Guido Engineer Debbie Salgado Plan Checker Blake Warmerdam Inspector Steve Pierson	Location Map
451 Discovery Drive	New Bus Manufacturing Facility 3 Buildings 647,000 sq. ft.	Under Construction	Gillig Bus Company Paul Norcross Ware Malcomb	925-244-9620	CB150003-5 G150005 CUP14-006 SPDR14-018	Planner Christine Rodrigues Engineer Debbie Salgado Plan Checker Blake Warmerdam Inspector Franc Moufarrej	Location Map
3010 Jack London Blvd	New Retail Center	First Building Ready to be Issued	Shoppes at Livermore Stephen Reynolds Kier and Wright	925-245-8788	CB170001 G160003	Planner Ben Murray Engineer/Tech Mike Pato Plan Checker Blake Warmerdam Planner Scott Lee	Location Map
2620 First Street	Dental Office 3,388 sq. ft.	Under Construction	Sycamore Family Dentistry Morgan Davis Blue Northern Builders	916-772-4192	CB150013 DDR15-015	Engineer/Tech Mike Pato Plan Checker Blake Warmerdam Inspector John Cardwell	Location Map

City of Livermore
Community Development Department
Summary of Major Development Projects
925-960-4400

Project Location	Project Description	Status	Project Name/Applicant	Applicant Telephone	Activity Number	Staff	Map
4707 First Street	Demolish and Replace Gas Station	Under Construction	Chevron Gas Muthana Ibrahim MI Architects	925-287-1174	CB160001 SPAM14-001	Planner Scott Lee Engineer/Tech Mike Pato Plan Checker Blake Warmerdam	Location Map
2000 Freisman Road	Approximately 244,152 square feet of retail uses in 12 separate buildings on an approximately 24-acre site. Uses include retail, restaurants, an auto dealership, and a hotel.	Under Review	Crosswinds Commercial Kelly Erardi Livermore Associates LLC	kerardi@republic-urban.com	SUB16-005 SPDR16-013 CUP16-005	Planner Ben Murray Engineer/Tech Mike Pato	Location Map
2000 Freisman Road	122 Room Hotel	Under Reivew	Don Cape Tharaldson Hospitality Development LLC	702-385-4988	CB170007	Planner Ben Murray Engineer/Tech Mike Pato Plan Checker Blake Warmerdam	Location Map
225 Greenville Road	New 268,670 sq. ft. spec industrial building	Under Review	Exeter on Greenville Road Teresa Goodwin HPA Inc	949-862-2111	SPDR16-024	Planner Turhan Sonmez/Scott Lee	Location Map
7600 Hawthorne Avenue	Warehouse/Manufacturing Building 241,545sq. ft.	Under Construction	Majestic Livermore Partners Warehouse Steven Geoffrion	562-699-0453	CB160006 SPDR15-018	Planner Scott Lee Engineer/Tech Hamm Inthavong Plan Checker Blake Warmerdam	Location Map
740 Holmes Street	24 Bed Residential Care Facility	Under Construction	Tiffany Gardens 2 Rolando Loera	408-506-6202	CB150009 SPDR14-017 COA14-009 VAR14-002 CUP14-004	Planner Frank Guido Engineer/Tech Hamm Inthavong Plan Checker Blake Warmerdam Inspector Steve Pierson	Location Map
625 W Jack London Blvd	New 83,600 sq ft industrial building	Under Review	The Oaks Lot 6 Teresa Goodwin	925-413-6896	SPDR17-005	Planner Ben Murray	Location Map
2901 Las Positas Road	Preschool and Daycare 11,811 sq.ft.	Under Construction	Primrose School Primrose Schools	770-310-8755	CB150007	Planner Andy Ross Engineer/Tech Mike Pato Plan Checker Franc Moufarrej	Location Map
1754 North Livermore Avenue	New 4,634 sq. ft. restaurant and drive through	Under Review	Chick-fil-A Steve Schwartz	303-519-7206	CUP16-012 SPDR16-022 LLA16-002 GPA16-004 DA16-001	Planner Andy Ross Engineer Plam Lung	Location Map
7551 Longard Drive	New 90,500 sq ft warehouse/industrial building	Under Review	Jeff Hill Crow Holdings Industrial	949-698-8482	SPDR17-010 CB170012	Planner Ashley McBride Engineer/Tech Mike Pato Plan Checker Blake Warmerdam	Location Map

City of Livermore
Community Development Department
Summary of Major Development Projects
925-960-4400

Project Location	Project Description	Status	Project Name/Applicant	Applicant Telephone	Activity Number	Staff	Map
Naylor Avenue	Office Building 5,704 sq. ft.	Under Review	Aqua Gunit Office A.J. Biswas BGV International	559-217-6908	SPDR15-024	Planner Frank Guido Engineer Debbie Salgado	Location Map
2160 Railroad Avenue	Market and bistro, including an outdoor dining area in the rear.	Under Construction	Range Life Market Bistro Waine Longwell	917-587-3722	TI170014 CUP16-002	Planner Scott Lee Engineer/Tech Mike Pato Plan Checker Blake Warmerdam	Location Map
5835 Southfront Road	Three-story hotel with 58 rooms	Under Review	Mission Boutique Hotel Hakam Mission	925-915-0805	SPDR17-004	Planner Frank Guido	Location Map
7300 Southfront Road	New Chevron Gas Station and Extra Mile Mini Mart	Under Review	Chevron Gas Station Gurpreet Randhawa Southfront Enterprises, Inc.	510-364-8974	SPDR15-017	Planner Andy Ross Engineer/Tech Mike Pato	Location Map
7300 Southfront Road	2680sq ft quick service restaurant with drive through	Under Review	Jadwinder Singh Gateway Investments LP	510-448-8599	SPDR17-020	TBD	Location Map
203 Vallecitos Road	Winery, wellness center, bed & breakfast, and single-family residence	Under Review	Kaushik JoshiRumaani Holdings, LLC	408-429-4376	SUB17-001 SPDR17-002 CUP17-002	Planner Turhan Sonmez	Location Map
1601 North Vasco Road	Retail Building 5,688 sq.ft.	Under Construction	Scenic Plaza Michael Blau Ferrari & Blau	916-417-7001	CB150006 SPDRM14-004	Planner Andy Ross Engineer Debbie Salgado Plan Checker Franc Moufarrej Inspector John Cardwell	Location Map

City of Livermore
Community Development Department
Summary of Major Development Projects
925-960-4400

Project Location	Project Description	Status	Project Name/Applicant	Applicant Telephone	Activity Number	Staff	Map
Residential							
Brisa Street and South Vasco Road	246 Single Family Detached Dwellings, 48 Townhomes.	Townhouses Under Construction	Vineyard Crossing Charlie Hazelbaker	925-983-4526	MSTR0073/74/81 EM15005	Planner Steve Stewart Engineer/Tech Mike Pato	Location Map
Brisa Street and South Vasco Road	Grading and Underground Utilities for Apartment Complex	Ready to Issue	Ageno Apartments Ryan Hansen CBG	925-866-0322	D161612 G160002	Planner Steve Stewart Engineer/Tech Mike Pato Plan Checker Blake Warmerdam Inspector John Cardwell	Location Map
Catalina Drive and Barcelona Street	31 Townhomes	Under Construction	Coopers Place Jason Cole Tri Pointe Homes	925-804-2230	MSTR0083 SUB13-006 GPA13-006 ZMA13-001 SPDR13-015 VAR13-006	Planner Scott Lee Engineer/Tech Mike Pato Plan Checker Blake Warmerdam Inspector Greg Diktakis	Location Map
Lots 2 & 3, Parcel Map 8882, on Catalina Court	Five Townhomes on 2 Parcels	Under Review	Townhomes Doug Harwood	925-787-4993	SPDR15-019	Planner Frank Guido Engineer/Tech Mike Pato	Location Map
Central Avenue, south of Flora Common	49 Two-Story Homes on 5.2 acres	Approved	Central Crossing Stephen Miller Signature Homes	925-463-1122	MSTR0086 VTTM 8277 SUB15-004 GPA15-004, PD-R15-001, SPDR15-014, DA15-002	Planner Ben Murray Engineer/Tech Mike Pato Plan Checker Blake Warmerdam	Location Map
Chestnut and N. P Street	116 Affordable Rental Housing Units (for seniors and families) and 44 market-rate Townhouses	Senior Apartments Under Review	Chestnut Housing Polo Munoz MidPen Housing	650-393-3023	D170935 SUB15-010	Planner Lori Parks Engineer Debbie Salgado Plan Checker Blake Warmerdam	Location Map
3258/3322 East Avenue	Three-story 33 Unit Residential Care Facility	Under Review	Arpad Nagy Bethany Homes	925-640-6403	CUP16-007 CB170004	Planner Scott Lee Engineer/Tech Mike Pato Plan Checker Blake Warmerdam	Location Map
3356 East Avenue	Addition to Existing Senior Living Facility 7668 sq. ft. 13 New Beds	Under Review	Livermore Valley Senior Living Ajay Dhillon	925-351-4874	SPDRM15-035	Planner Christine Rodrigues Engineer Debbie Salgado	Location Map
East Avenue and S. Vasco Road	49 Two Story Homes on 4.9 acres	Under Construction	The Vines Jeff Schroeder Ponderosa Homes	925-460-8900	MSTR0082 SUB14-011 SPDR14-022 COA14-011 GPA14-002 PD14-005 DA15-001	Planner Frank Guido Engineer/Tech Hamm Inthavong Plan Checker Blake Warmerdam Inspector Colin Barnham	Location Map

City of Livermore
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Summary of Major Development Projects
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Project Location	Project Description	Status	Project Name/Applicant	Applicant Telephone	Activity Number	Staff	Map
2321 First Street	3,597 sq. ft. Addition	Under Construction	Peever Pie LLC		DDR16-040 TI170050	Planner Turhan Sonmez Engineer/Tech Mike Pato Plan Checker Blake Warmerdam	Location Map
3733 First Street	101 Townhomes	Under Review	Doug Rich Valley Oak Partners	408-282-0995	SUB16-006 SPDR16-014 ZMA16-002 DCA16-002	Planner Frank Guido	Location Map
4260 First Street	6 New Apartment Buildings 44 Units	Approved by City Council March 13, 2017	Sunflower Hill Nesreen Kavar MidPen Housing	650-393-3601	SUB16-007 GPA16-003 SPDR16-015 ZMA16-003 COA16-018	Planner Ben Murray	Location Map
2855 Old First Street	Subdivide 2 Parcels to Build 9 Units	Approved by City Council October 24, 2016	Brighton Mike Serpa Concentric Development Group	925-389-1675	SUB15-009 DDR15-025	Planner Scott Lee Engineer/Tech Mike Pato	Location Map
2855 Old First Street	Subdivide 2 Parcels to Build 8 Units	Approved by City Council October 24, 2016	Brighton Mike Serpa Concentric Development Group	925-389-1675	SUB15-008 DDR15-024	Planner Scott Lee Engineer/Tech Mike Pato	Location Map
2787 Old First Street	Subdivide 2 Parcels to Build 7 Units	Approved by City Council October 24, 2016	Brighton Mike Serpa Concentric Development Group	925-389-1675	SUBA15-001 DDR15-023	Planner Scott Lee Engineer/Tech Mike Pato	Location Map
3134 Gardella Plaza	27 Townhomes	Under Construction	Gardella Plaza Nuvera Construction	925-309-8888	MSTR0085 SUBA14-004 SPDRM14-006 FM14007 PD07-002 DA07-005	Planner Scott Lee Engineer Debbie Salgado Plan Checker Blake Warmerdam	Location Map
732 N K Street	6 Three-Bedroom, Two-Car Garage Apartments	Under Review	Wallanus Apartment Homes Julie Wallanus	925-200-9990	SPDR15-001 D161570	Planner Frank Guido Plan Checker Blake Warmerdam	Location Map
1591 Lomitas Avenue	10 New Single Family Homes on a new cul-de-sac	Under Review	Lomitas Jeff Schroeder Ponderosa Homes	925-460-8910	MSTR0088 VTTM 8290 SUB15-007 HIP15-001 SPDR15-022,	Planner Ben Murray Plan Checker Blake Warmerdam	Location Map

City of Livermore
Community Development Department
Summary of Major Development Projects
925-960-4400

Project Location	Project Description	Status	Project Name/Applicant	Applicant Telephone	Activity Number	Staff	Map
341 N N Street	Two Story Triplex	Under Construction	Feidsine Triplex David and Mary Feidsine	925-519-8751	D151350 SPDR15-007	Planner Scott Lee Engineer/Tech Hamm Inthavong Plan Checker Blake Warmerdam	Location Map
2458 Portola Avenue	Parcel Map to subdivide into three residential lots. Development Code Amendment to rezone approximately one-acre site from PD to T3N.	Under Review	Parcel Map Marty Bettis	925-525-2255	SUB16-001	Planner Frank Guido Engineer/Tech Hamm Inthavong	Location Map
Portola Avenue and Isabel Avenue	476 Attached Townhomes and Condos	Under Construction	Shea Sage David Best Shea Homes	925-245-3636	MSTR077-80	Planner Christine Rodrigues Engineer Debbie Salgado Plan Checker Blake Warmerdam Inspector Steve Pierson	Location Map
783 Rincon Avenue	Mixed-use development with 91 townhome residential units.	Under Review	Leah Beniston The True Life Companies	925-380-1699	SUB17-004 SPDR17-18	Planner Ashley McBride	Location Map
1587 Second Street. Corner of Second and P.	4 New Two-Story Duets	Under Review	Doug Harwood	925-787-4993	D170003 COA06-15 DR06-065	Planner Frank Guido Engineer Bashir Anastas Plan Checker Blake Warmerdam	Location Map
543 Sonoma Avenue	54 Two-Story Single Family Homes on 9 acres	Under Construction	Steve Jones/Scott Roylance William Lyon Homes, Inc.	925-463-1122	MSTR0087 VTTM8343 SUB16-003 GPA16-002 SPDR16-011 COA16-011 ZMA16-001	Planner Frank Guido Engineer/Tech Mike Pato Plan Checker Blake Warmerdam	Location Map
2125 Walnut Street	New duplex apartment building on existing property with a duplex.	Under Review	Malkeet Gill Owner	510-746-6033	SPDRM16-016	Planner Frank Guido Engineer/Tech Mike Pato	Location Map

Public Improvements

City of Livermore
Community Development Department
Summary of Major Development Projects
925-960-4400

Project Location	Project Description	Status	Project Name/Applicant	Applicant Telephone	Activity Number	Staff	Map
1043 Geneva Street	New Pump Station Building	Under Construction	Cal Water Pump Station California Water Service	408-371-5510	CB140018	Planner Alison Mitchell Engineer/Tech Hamm Inthavong	Location Map
1519 Juniper Street	Replace 50,000 Gallon Redwood Tank with 50,000 Gallon Steel Tank	Under Review	Cal Water Storage Tank Philip Sipat California Water Service	925-373-1347	CUPM16-001	Planner Andy Ross Engineer/Tech Hamm Inthavong	Location Map
1016 S. Livermore Avenue	Demolish Former Main Library and Construct New Civic Center Meeting Hall 6500 sq. ft.	Permit Issued	New Civic Center Meeting Hall Mike Cavalieri City of Livermore	925-960-4511	CB160008 SPDR16-010	Planner Scott Lee Engineer Mike Cavalieri Plan Checker Blake Warmerdam	Location Map
831 Olivina Avenue	New Chloromination Building	Under Construction	Cal Water Chloromination Building Phillip Sipat California Water Service	925-373-1347	CB150011 SPDRM15-022	Planner Steve Stewart Engineer/Tech Mike Pato Plan Checker Blake Warmerdam Inspector Steve Pierson	Location Map
New Location LAVTA /ACE Station Downtown	Relocation and Rehabilitation of Railroad Depot Building	Under Construction	Southern Pacific Railroad Depot Debbie Bell City of Livermore	925-960-4400	DDR16-009, MOVE16-001, COA09-004	Planner Debbie Bell	Location Map
700 Terminal Circle	Two New Buildings and Taxi Ways	Under Review	Five Rivers Aviation Expansion Peter Sandhu Fiver Rivers Aviation	318-759-7838	SPDRM15-028	Planner Lori Parks Engineer Debbie Salgado	Location Map

Appendix D:

Approved/Pending Project Trip Generation



Traffic Studies Used for Approved Project Trip Generation, Distribution and Assignment

Project No. (refer to Chapter 5/Figure 7) and associated study:

1. Fehr & Peers. *Pell Property Site Access Assessment* (November 22, 2016)
2. KD Anderson & Associates, Inc. *Traffic Impact Study for 4500 Contractors Place* (October 24, 2016)
3. Hexagon Transportation Consultants, Inc. *First Street Corridor General Plan Amendment/Auburn Grove Residential Development Transportation Impact Analysis* (March 28, 2017)
4. Kittelson & Associates, Inc. *Sunflower Hill Livermore Traffic Study* (August 8, 2016)
5. No study provided; Fehr & Peers estimated the trip generation for this 27-townhome project and assigned 5 percent of the trips through the I-580 interchange ramp intersections.

Appendix E:

Signal Warrant Worksheets





Major Street Springtown Boulevard
 Minor Street Lassen Road

Project Lassen Rd TIA
 Scenario Cumulative Plus Project
 Peak Hour AM

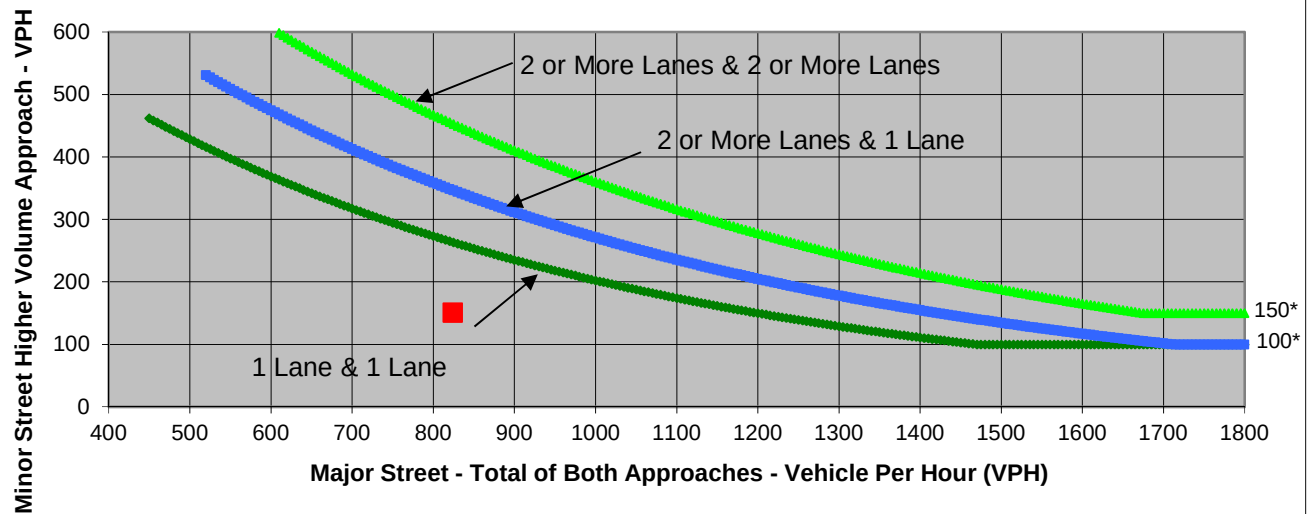
Turn Movement Volumes

	NB	SB	EB	WB
Left	114	0	11	
Through	170	520	0	
Right	0	20	140	
Total	284	540	151	0

Major Street Direction

x	North/South
	East/West

Warrant 3B, Peak Hour



* Note: 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 approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Springtown Boulevard	Lassen Road	
Number of Approach Lanes	1	1	<u>NO</u>
Traffic Volume (VPH) *	824	151	
* Note: Traffic Volume for Major Street is Total Volume of Both Approches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			



Major Street Springtown Boulevard
 Minor Street Lassen Road

Project Lassen Rd TIA
 Scenario Cumulative Plus Project
 Peak Hour AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	114	0	11	0
Through	170	520	0	0
Right	0	20	140	0
Total	284	540	151	0

Major Street Direction

x	North/South
	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	3

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	11.9
Approach with Worst Case Delay	EB
Total Vehicles on Approach	151

Warrant 3A, Peak Hour			
	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Served (vph)
Cumulative Plus Project	0.5	151	975
Limiting Value	4	100	650
Condition Satisfied?	Not Met	Met	Met
Warrant Met	<u>NO</u>		



Major Street Springtown Boulevard
 Minor Street Lassen Road

Project Lassen Rd TIA
 Scenario Cumulative Plus Project
 Peak Hour PM

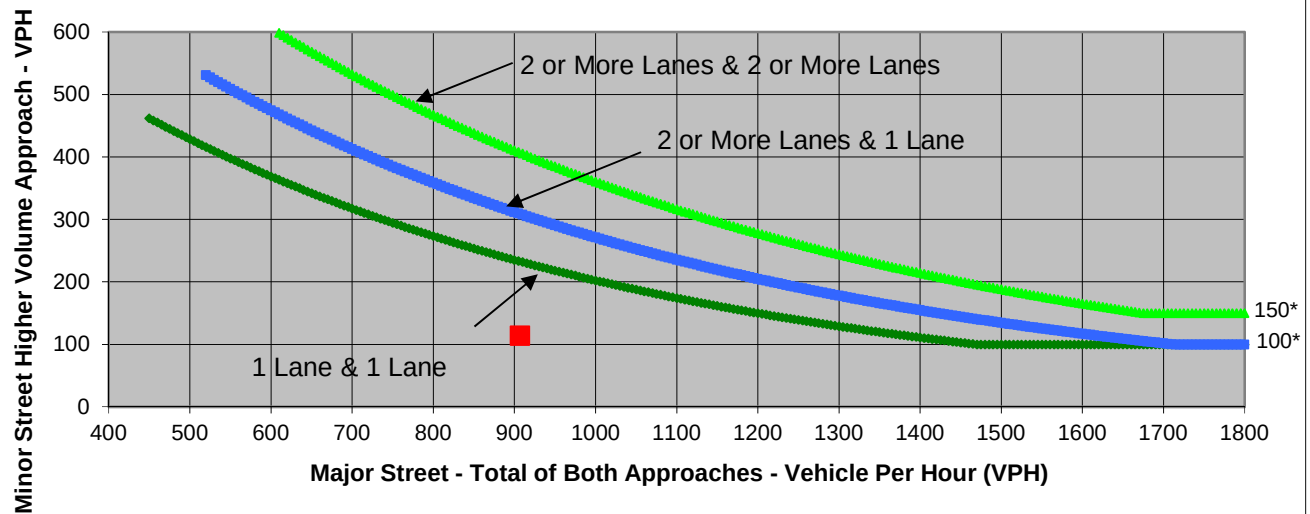
Turn Movement Volumes

	NB	SB	EB	WB
Left	177	0	11	
Through	440	270	0	
Right	0	20	103	
Total	617	290	114	0

Major Street Direction

x	North/South
	East/West

Warrant 3B, Peak Hour



* Note: 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 approach with one lane.

Source: *California Manual on Uniform Traffic Control Devices*, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Springtown Boulevard	Lassen Road	
Number of Approach Lanes	1	1	<u>NO</u>
Traffic Volume (VPH) *	907	114	
* Note: Traffic Volume for Major Street is Total Volume of Both Approches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			



Major Street	Springtown Boulevard
Minor Street	Lassen Road

Project	Lassen Rd TIA
Scenario	Cumulative Plus Project
Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	177	0	11	0
Through	440	270	0	0
Right	0	20	103	0
Total	617	290	114	0

Major Street Direction

x	North/South
	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	3

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	10
Approach with Worst Case Delay	EB
Total Vehicles on Approach	114

Warrant 3A, Peak Hour			
	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Served (vph)
Cumulative Plus Project	0.3	114	1,021
Limiting Value	4	100	650
Condition Satisfied?	Not Met	Met	Met
Warrant Met	<u>NO</u>		



Major Street Bluebell Dr
 Minor Street Lakespur Dr

Project Lassen Rd TIA
 Scenario Cumulative Plus Project
 Peak Hour AM

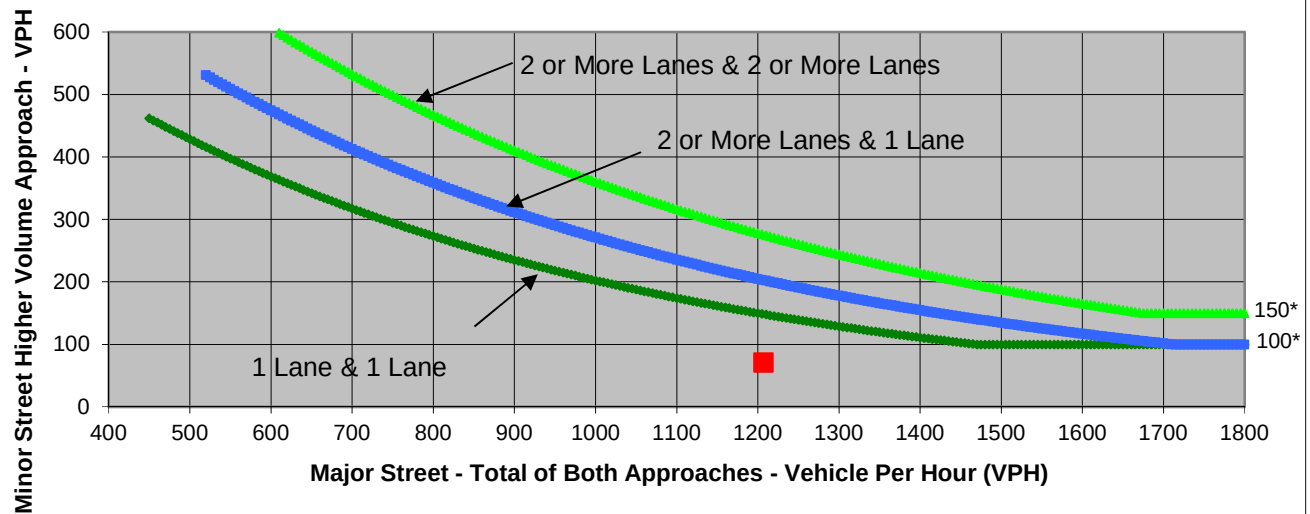
Turn Movement Volumes

	NB	SB	EB	WB
Left		30	53	0
Through			324	800
Right		41	0	30
Total	0	71	377	830

Major Street Direction

	North/South
x	East/West

Warrant 3B, Peak Hour



* Note: 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 approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Bluebell Dr	Lakespur Dr	
Number of Approach Lanes	1	1	<u>NO</u>
Traffic Volume (VPH) *	1,207	71	

* Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
 Traffic Volume for Minor Street is the Volume of High Volume Approach.



Major Street	Bluebell Dr
Minor Street	Lakespur Dr

Project	Lassen Rd TIA
Scenario	Cumulative Plus Project
Peak Hour	AM

Turn Movement Volumes

	NB	SB	EB	WB
Left	0	30	53	0
Through	0	0	324	800
Right	0	41	0	30
Total	0	71	377	830

Major Street Direction

	North/South
x	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	3

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	26.7
Approach with Worst Case Delay	SB
Total Vehicles on Approach	71

Warrant 3A, Peak Hour			
	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Served (vph)
Cumulative Plus Project	0.5	71	1,278
Limiting Value	4	100	650
Condition Satisfied?	Not Met	Not Met	Met
Warrant Met	<u>NO</u>		



Major Street Bluebell Dr
 Minor Street Lakespur Dr

Project Lassen Rd TIA
 Scenario Cumulative Plus Project
 Peak Hour PM

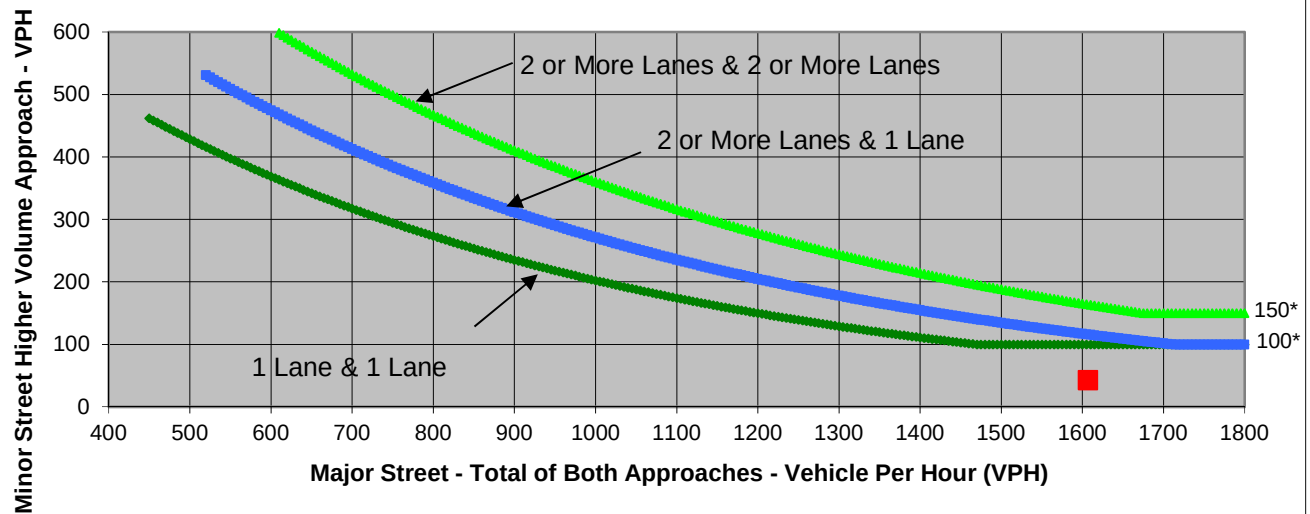
Turn Movement Volumes

	NB	SB	EB	WB
Left		20	132	0
Through			961	484
Right		23	0	30
Total	0	43	1,093	514

Major Street Direction

	North/South
x	East/West

Warrant 3B, Peak Hour



* Note: 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 approach with one lane.

Source: California Manual on Uniform Traffic Control Devices, Caltrans, 2014

	Major Street	Minor Street	Warrant Met
	Bluebell Dr	Lakespur Dr	
Number of Approach Lanes	1	1	<u>NO</u>
Traffic Volume (VPH) *	1,607	43	
* Note: Traffic Volume for Major Street is Total Volume of Both Approches. Traffic Volume for Minor Street is the Volume of High Volume Approach.			



Major Street	Bluebell Dr
Minor Street	Lakespur Dr

Project	Lassen Rd TIA
Scenario	Cumulative Plus Project
Peak Hour	PM

Turn Movement Volumes

	NB	SB	EB	WB
Left	0	20	132	0
Through	0	0	961	484
Right	0	23	0	30
Total	0	43	1,093	514

Major Street Direction

	North/South
x	East/West

Intersection Geometry

Number of Approach Lanes for Minor Street	1
Total Approaches	3

Worst Case Delay for Minor Street

Stopped Delay (seconds per vehicle)	53.3
Approach with Worst Case Delay	SB
Total Vehicles on Approach	43

Warrant 3A, Peak Hour			
	Peak Hour Delay on Minor Approach (vehicle-hours)	Peak Hour Volume on Minor Approach (vph)	Peak Hour Entering Volume Served (vph)
Cumulative Plus Project	0.6	43	1,650
Limiting Value	4	100	650
Condition Satisfied?	Not Met	Not Met	Met
Warrant Met	<u>NO</u>		

Appendix F:

I-580 Interchange Design



PRELIMINARY PLANS
SUBJECT TO REVISION

PRELIMINARY PLANS
SUBJECT TO REVISION
EXHIBIT 1

COLOR CODE

YELLOW	HIGHWAY PAVEMENT
RED	RAMP
LIGHT RED	FRONTAGE & CROSS RD.
BLUE	EXISTING ROADS
GREEN	SHOULDERS (ROADWAY)
BROWN	STRUCTURES (BRIDGE)
BLACK	WALL & MISC. STR.
ORANGE	CURB AND GUTTER
HELIOTROPE	SIDEWALKS
DASHED RED	TOP OF CUT SLOPES
BRIGHT GREEN	TOE OF FILL SLOPES