Crestview Apartments

Draft Environmental Impact Report (DEIR)

Appendix I – Focused Traffic Analysis and Vehicle Miles Traveled Analysis

Crestview Apartments

FOCUSED TRAFFIC ANALYSIS

CITY OF RIVERSIDE

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
CA MUTCD	California Manual on Uniform Traffic Control Devices
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CMP	Congestion Management Program
DIF	Development Impact Fee
E+P	Existing Plus Project
HCM	Highway Capacity Manual
ITE	Institute of Transportation Engineers
LOS	Level of Service
NCHRP	National Cooperative Highway Research Program
NP	No Project (or Without Project)
PHF	Peak Hour Factor
Project	Crestview Apartments
RCTC	Riverside County Transportation Commission
RivTAM	Riverside County Transportation Analysis Model
RTA	Riverside Transit Authority
RTP	Regional Transportation Plan
SCAG	Southern California Association of Governments
SCS	Sustainable Communities Strategy
SHS	State Highway System
TA	Traffic Analysis
TUMF	Transportation Uniform Mitigation Fee
WP	With Project
WRCOG	Western Riverside Council of Governments

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1 SUMMARY OF FINDINGS

This report presents the results of the focused traffic analysis (TA) for the proposed Crestview Apartments development ("Project") which is located at the northwest corner of Sycamore Canyon Boulevard and Central Avenue in the City of Riverside, as shown on Exhibit 1-1.

The purpose of this traffic analysis is to evaluate the potential circulation system deficiencies that may result from the development of the proposed Project, and identify improvements necessary to achieve acceptable peak hour operations consistent with General Plan level of service goals and policies. The traffic study has been prepared in accordance with the City of Riverside Public Works Department Traffic Impact Analysis Preparation Guide (January 2016) and the California Department of Transportation (Caltrans) Guide for the Preparation of Traffic Impact Studies (December 2002), and consultation with City staff during the traffic study scoping process. (1) (2) The City approved Project Traffic Study Scoping agreement is provided in Appendix 1.1 of this TA.

1.1 PROJECT OVERVIEW

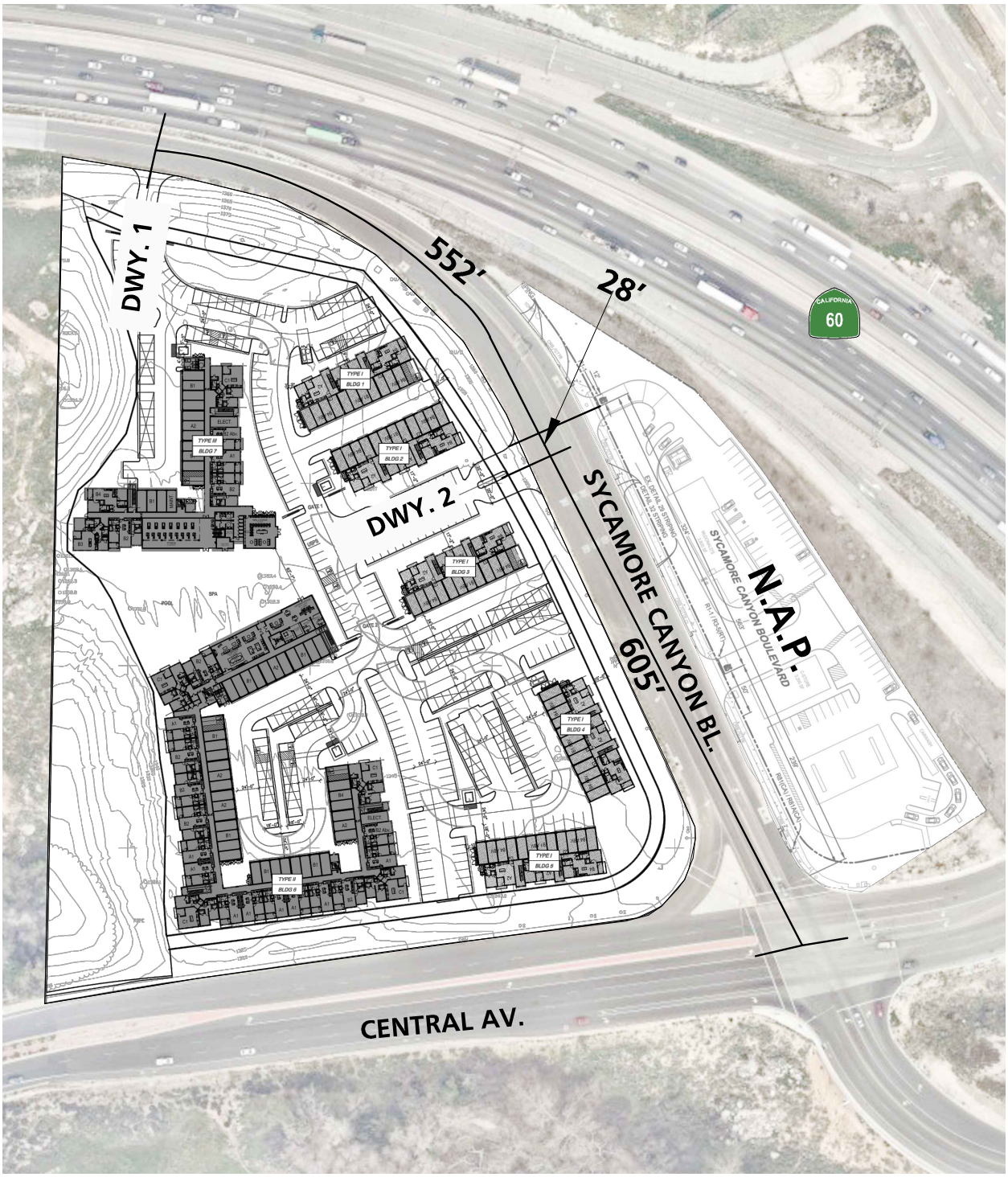
Exhibit 1-1 illustrates the preliminary Project site plan. As indicated on Exhibit 1-1, the total development is proposed to consist of up to 237 3-4-story multifamily residential dwelling units. For the purposes of this TA, the following land uses are assumed:

- Buildings 1-5 (3 Floors, 75 Units): Multifamily Housing (Low Rise)
- Buildings 6-7 (4 Floors, 162 Units): Multifamily Housing (Mid-Rise)

The Project's anticipated Opening Year is 2022. Vehicular access to the Project will be provided via Driveway 1 and Driveway 2 on Sycamore Canyon Boulevard. Driveway 2 is proposed to align, with an offset of 28-feet, with a driveway for the future Sycamore Canyon Commercial project on the east side of Sycamore Canyon Boulevard. Regional access to the site is provided via the SR-60 Freeway at Central Avenue.

Trips generated by the Project's proposed land uses have been estimated based on trip generation rates collected by the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition, 2017. (3) The Project is estimated to generate a total of 1,432 trip-ends per day on a typical weekday with approximately 93 AM peak hour trips and 114 PM peak hour trips. The assumptions and methods used to estimate the Project's trip generation characteristics are discussed in greater detail in Section 4.1 *Project Trip Generation* of this report.

EXHIBIT 1-1: PRELIMINARY SITE PLAN



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1.2 ANALYSIS SCENARIOS

For the purposes of this traffic study, potential deficiencies to traffic and circulation have been assessed for each of the following conditions:

- Existing (2019) (1 scenario)
- Existing plus Project (E+P)
- Opening Year Cumulative (2022), Without and With Project (2 scenarios)
- Horizon Year (2040), Without and With Project (2 scenarios)

1.2.1 EXISTING (2019) CONDITIONS

Information for Existing (2019) conditions is disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared.

1.2.2 EXISTING PLUS PROJECT CONDITIONS

The Existing plus Project (E+P) analysis determines circulation system deficiencies that would occur on the existing roadway system with the addition of the Project traffic. The E+P analysis is intended to identify the project-specific traffic deficiencies associated solely with the development of the proposed Project based on a comparison of the E+P traffic conditions to Existing (2019) conditions.

1.2.3 OPENING YEAR CUMULATIVE (2022) CONDITIONS

The Opening Year Cumulative (2022) conditions analysis determines the potential near-term cumulative circulation system deficiencies. To account for background traffic growth, traffic associated with other known cumulative development projects in conjunction with an ambient growth factor from Existing conditions of 2.0% per year (compounded annually over 3 years) is included for Opening Year Cumulative (2022) traffic conditions. A comprehensive list of cumulative projects was compiled from information provided by the City of Riverside and other near-by agencies, such as the City of Moreno Valley. The County of Riverside was also contacted, however, they did not have any cumulative projects in the vicinity of the study area.

1.2.4 HORIZON YEAR (2040) CONDITIONS

Traffic projections for Horizon Year (2040) Without Project conditions were derived from the Riverside County Transportation Analysis Model (RivTAM) traffic model. The Horizon Year (2040) conditions analysis will be utilized to determine if long-range improvements funded through regional transportation mitigation fee programs, such as the City's Development Impact Fee (DIF) program, County's Transportation Uniform Mitigation Fee (TUMF) program, or other approved funding mechanisms can accommodate the long-range cumulative traffic at the target level of service (LOS) identified by the City of Riverside (lead agency). If the programmed improvements can provide the target LOS, then the Project's payment of requisite fees into established fee programs would satisfy the Project's proportional improvement requirements. Other improvements needed beyond the programmed improvements (such as localized improvements to non-DIF/TUMF facilities) are identified as such.

1.3 STUDY AREA

To ensure that this TA satisfies the City of Riverside's traffic study requirements, Urban Crossroads, Inc. prepared a project study scoping package for review by City staff prior to the preparation of this report.

1.3.1 INTERSECTIONS

The following 6 study area intersections listed in Table 1-1 and shown on Exhibit 1-2 were selected for this TA based consultation with the City of Riverside staff.

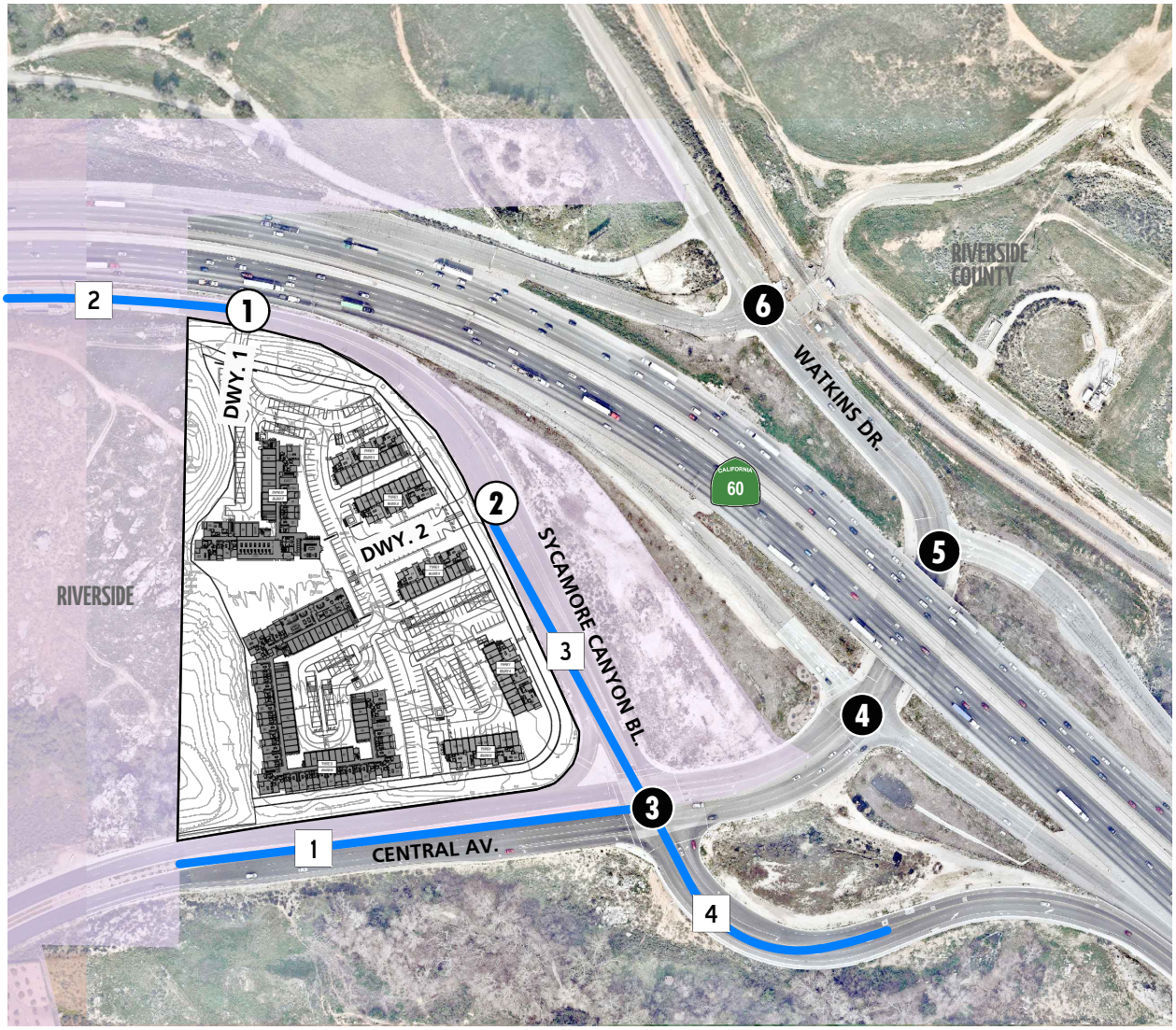
TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction	CMP?
1	Driveway 1 & Sycamore Canyon Boulevard – Future Intersection	City of Riverside	No
2	Sycamore Canyon Boulevard & Driveway 2 – Future Intersection	City of Riverside	No
3	Sycamore Canyon Boulevard & Central Avenue	City of Riverside, County of Riverside	No
4	Central Avenue & SR-60 Eastbound Ramps	County of Riverside, Caltrans	No
5	Central Avenue & SR-60 Westbound Off-Ramp	County of Riverside, Caltrans	No
6	Watkins Drive / Central Avenue & SR-60 Westbound On-Ramp	County of Riverside, Caltrans	No

The "50 peak hour trip" criterion utilized by the City of Riverside is consistent with the methodology used by the County of Riverside, and generally represents a minimum number of trips at which a typical intersection would have the potential to be substantively affect by a given development proposal. Although each intersection may have unique operating characteristics, this traffic engineering rule of thumb is a widely utilized tool for estimating a potential area of effect (i.e., study area). Other analysis intersections located in adjacent cities were not selected for evaluation as the Project is anticipated to contribute less than 50 peak hour trips. The Project is anticipated to contribute less than 50 peak hour trips to the intersections of Driveway 1 at Sycamore Canyon Boulevard, Central Avenue at SR-60 Westbound Off-Ramp, and Watkins Drive/Central Avenue at SR-60 Westbound On-Ramp. However, these intersections were evaluated at the request of City staff during the scoping process.

The intent of a Congestion Management Program (CMP) is to more directly link land use, transportation, and air quality, thereby prompting reasonable growth management programs that will effectively utilize new transportation funds, alleviate traffic congestion and related deficiencies, and improve air quality. Counties within California have developed CMPs with varying methods and strategies to meet the intent of the CMP legislation. The County of Riverside CMP became effective with the passage of Proposition 111 in 1990 and updated most recently updated in 2011. The Riverside County Transportation Commission (RCTC) adopted the 2011 CMP for the County of Riverside in December 2011. (4) There are no CMP facilities within the study area.

EXHIBIT 1-2: LOCATION MAP



LEGEND:

- 0 = EXISTING INTERSECTION ANALYSIS LOCATION
- 0 = FUTURE INTERSECTION ANALYSIS LOCATION
- 00 = ROADWAY SEGMENT ANALYSIS LOCATION

N

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URBAN CROSSROADS

1.3.2 ROADWAY SEGMENTS

At the request of City staff, the following study area roadway segments have been evaluated for the purposes of this TA (see Exhibit 1-2 and Table 1-2):

TABLE 1-2: ROADWAY SEGMENT ANALYSIS LOCATIONS

ID	Roadway Segments
1	Central Avenue, West of Sycamore Canyon Boulevard
2	Sycamore Canyon Boulevard, West of Driveway 1
3	Sycamore Canyon Boulevard, North of Central Avenue
4	Sycamore Canyon Boulevard, South of Central Avenue

1.4 PROJECT DEFICIENCIES

This section provides a summary of traffic deficiencies. Section 2 *Methodologies* provides information on the methodologies used in the analysis and Section 5 *Existing plus Project Traffic Analysis*, Section 6 *Opening Year (2022) Cumulative Traffic Analysis*, Section 7 *Horizon Year (2040) Traffic Analysis* includes the detailed analysis. A summary of LOS results for all analysis scenarios is presented on Exhibit 1-3.

E+P Conditions:

Based on a comparison of Existing to E+P traffic conditions, the addition of the Project traffic is not anticipated to result in a project-specific traffic deficiency.

Opening Year (2022) Cumulative Conditions:

The following study area intersection is anticipated to operate at a deficient LOS during one or both peak hours for Opening Year Cumulative (2022) Without Project traffic conditions:

- Sycamore Canyon Boulevard & Central Avenue (#3) – LOS E AM peak hour only

The Project is anticipated to contribute to the deficient intersection by contributing traffic (as measured by 50 or more peak hours trips) to the intersection of Sycamore Canyon Boulevard and Central Avenue, resulting in an increase to peak hour delays that exceed the City's criteria. Cumulative deficiencies would not be directly caused by the Project. The Project would, however, contribute traffic to these deficient intersections along with other cumulative development projects.

EXHIBIT 1-3: SUMMARY OF DEFICIENT INTERSECTIONS BY ANALYSIS SCENARIO

#	Intersection	Existing (2019)	E+P	Opening Year Cumulative (2022) Without Project	Opening Year Cumulative (2022) With Project	Horizon Year (2040) Without Project	Horizon Year (2040) With Project
1	Dwy. 1 & Sycamore Canyon Bl.	NA		NA		NA	
2	Sycamore Canyon Bl. & Dwy. 2	NA					
3	Sycamore Canyon Bl. & Central Av.						
4	Central Av. & SR-60 EB Ramps						
5	Watkins Dr./Central Av. & SR-60 WB Off-Ramp						
6	Watkins Dr. & SR-60 WB On-Ramp						

LEGEND:

- = AM PEAK HOUR
- = PM PEAK HOUR
- = LOS A-D
- = LOS D-E
- = LOS F
- NA = NOT AN ANALYSIS LOCATION FOR THIS SCENARIO

Horizon Year (2040) Conditions:

The following study area intersections are anticipated to operate at a deficient LOS during one or both peak hours for Horizon Year (2040) Without Project traffic conditions:

- Sycamore Canyon Boulevard & Central Avenue (#3) – LOS F AM and PM peak hours
- Central Avenue & SR-60 Eastbound Ramps (#4) – LOS E AM peak hour only
- Watkins Drive / Central Avenue & SR-60 Westbound On-Ramp (#6) – LOS F AM peak hour only

The Project is anticipated to contribute to the deficiencies by contributing traffic (as measured by 50 or more peak hours trips) to analysis intersections resulting in an increase to peak hour delays that exceed the City's criteria. Cumulative deficiencies would not be directly caused by the Project. The Project would, however, contribute traffic to these deficient intersections along with other cumulative development projects. The intersection of Central Avenue and SR-60 Eastbound Ramps (#4) is anticipated to operate at an unacceptable LOS during the peak hours under Horizon Year (2040) Without and With Project traffic conditions, however the increase in delay does not exceed the City's criteria. As such, this deficiency is not considered a project-specific deficiency.

1.5 RECOMMENDED IMPROVEMENTS TO ADDRESS CIRCULATION DEFICIENCIES

Table 1-3 lists the incremental improvements that are required for each analysis scenario from E+P to Horizon Year (2040) With Project traffic conditions to alleviate circulation system deficiencies. The regional and local transportation fee programs have each been reviewed and compared to the recommended improvements for each deficient facility. None of the recommended improvements were found to be included in the City of Riverside DIF. As such, the Project is required to contribute the associated intersection fair-share percentage toward the costs of the recommended improvements that are included within the jurisdiction of Caltrans and the County of Riverside. These fees are collected as part of a funding mechanism aimed at ensuring that regional highways and arterial expansions keep pace with the projected vehicle trip increases. It should be noted, since this traffic analysis is not a CEQA level impact analysis and since there are no opportunities for direct improvements, the City of Riverside does not have a fair share program to collect fair share payments.

The improvements listed in Table 1-3 comprise lane additions/modifications, installation of signals and signal modifications. Depending on the width of the existing pavement and right-of-way, these improvements may involve only striping modifications, or they may involve construction of additional pavement width. Additional discussion of the relevant pre-existing transportation fee programs is provided in Section 8 *Local and Regional Funding Mechanisms* of this report. Table 1-3 also summarizes the applicable cost associated with each of the recommended improvements based on the preliminary construction cost estimates found in Appendix G of the San Bernardino County CMP in conjunction with a cost escalation factor of 1.484 to reflect current (2019) costs. A rough order of magnitude cost has been prepared to determine the appropriate contribution value based upon the Project's fair share of traffic as part of the project approval process.

Table 1-3

Summary of Improvements and Rough Order of Magnitude Costs

#	Intersection Location	Jurisdiction	E+P	2022 With Project	2040 With Project	Improvements in DIF/TUMF Fee Program?[1]	Project Responsibility[5]	Estimated Total Cost[2]	2022 Estimated Fair Share Cost[4]	2040 Fair Share %[3]	2040 Estimated Fair Share Cost[4]
3	Sycamore Canyon Bl. & Central Av.	City of Riverside, County of Riverside	None	Modify the traffic signal to implement overlap phasing on the NB right turn lane	Same	No	Fair Share	$75,000	--[9]	8.6%	--
					2nd NB right turn lane	No	Fair Share	$74,200	--		$6,405
					Modify the traffic signal to implement overlap phasing on the EB right turn lane	No	Fair Share	$75,000	--		--[9]
							Total	**$224,200**	**$0**		**$6,405**
6	Watkins Dr. & SR-60 WB On-Ramp	Caltrans, County of Riverside	None	None	Install a traffic signal	No	Fair Share	$340,000	--	4.2%	$14,144
					2nd NB left turn lane	No	Fair Share	$74,200	--		$3,087
					2nd SB through lane	No	Fair Share	$267,120	--		$11,112
							Total	**$681,320**	**$0**		**$28,343**
Total Costs for Improvements[6]								**$905,520**	**$0**		**$34,748**
Total Fair Share Contribution to the County of Riverside[7]								**$623,420**	**$0**		**$27,676**
Total Fair Share Contribution to Caltrans[8]								**$170,000**	**$0**		**$7,072**

[1] Improvements included in City of Riverside DIF or County of Riverside TUMF program for local and regional components.

[2] Costs have been estimated using the data provided in Appendix "G" of the CMP (2003 Update) for preliminary construction costs. Appendix "G" costs escalated by a factor of 1.484, except Traffic Signals, to reflect 2019 costs.

[3] Program improvements constructed by project may be eligible for fee credit, at discretion of City. See Table 8-1 for Opening Year Cumulative Fair Share Calculations and Table 8-2 for Horizon Year Fair Share Calculations.

[4] Rough order of magnitude cost estimate.

[5] Identifies the Project's responsibility to construct an improvement or contribute fair share or fee payments towards the implementation of the improvement shown.

[6] It should be noted, since this traffic analysis is not a CEQA level impact analysis and since there are no opportunities for direct improvements, the City of Riverside does not have a fair share program to collect fair share fee payments.

[7] Total project fair share contribution consists of the improvements which are not already included in a fee program for those intersections wholly or partially within the County of Riverside's jurisdiction.

[8] Total project fair share contribution consists of the improvements which are not already included in a fee program for those intersections wholly or partially within Caltrans' jurisdiction.

[9] Improvement will be constructed by the adjacent Sycamore Commercial Development. Per the City of Riverside, the proposed Project will not be conditioned for these improvements.

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Based on the Project fair share percentages, the Project's fair share cost is estimated at $34,748. These estimates are a rough order of magnitude only as they are intended only for discussion purposes and do not imply any legal responsibility or formula for contributions.

1.6 RECOMMENDED OFF-SITE IMPROVEMENTS

The following recommendations are based on the off-site improvements needed under Opening Year Cumulative (2022) and Horizon Year (2040) traffic conditions. The improvements needed to address Opening Year Cumulative deficiencies are typically a sub-set of those improvements recommended under Horizon Year (2040) traffic conditions.

Recommendation 1.1 – Prior to the issuance of building permits, the Project Applicant shall participate in the City's city-wide DIF program by paying the requisite DIF fee. DIF fees may be reduced or off-set based on the cost of DIF eligible facilities constructed by the Project Applicant.

Recommendation 2.1 – Table 1-3 of the TA includes intersections that either share a mutual border with or are wholly located within the County of Riverside and Caltrans that have recommended improvements which are not covered by DIF. The Project will pay the fair share contribution amount identified for the County of Riverside and Caltrans, as identified in Table 1-3. The Project's fair-share amount for the intersections that either share a mutual border with or are wholly located within the County of Riverside and Caltrans that have recommended improvements which are not covered by DIF are as follows:

- County of Riverside: $27,676
- Caltrans: $7,072

1.7 RECOMMENDED ON-SITE ROADWAY AND SITE ACCESS IMPROVEMENTS

This section summarizes Project site access and on-site circulation recommendations. The Project is proposed to have access on Sycamore Canyon Boulevard via the following driveways:

- Driveway 1 & Sycamore Canyon Boulevard – Egress access only
- Sycamore Canyon Boulevard & Driveway 2 – Full access driveway (proposed to align, with an offset of 28-feet, with the future driveway for the Sycamore Canyon Commercial use)

Regional access to the Project site is provided via the SR-60 Freeway. Roadway improvements necessary to provide site access and on-site circulation are assumed to be constructed in conjunction with site development and are described below. These improvements are required to be in place prior to occupancy.

1.7.1 RECOMMENDED SITE ADJACENT ROADWAY IMPROVEMENTS

The recommended site-adjacent roadway improvements for the Project are described below. These improvements need to be incorporated into the Project description prior to Project approval or imposed as conditions of approval as part of the Project approval. Construction of on-site and site adjacent improvements are recommended to occur in conjunction with adjacent Project development activity or as needed for Project access purposes. Ultimate improvements along Sycamore Canyon Boulevard and the intersection of

Sycamore Canyon Boulevard at Central Avenue are consistent with the City of Riverside General Plan and are shown on Exhibit 1-4.

Sycamore Canyon Boulevard – Sycamore Canyon Boulevard is a north-south oriented roadway located along the Project's eastern boundary. According to the City of Riverside General Plan Circulation Element, Sycamore Canyon Boulevard is built to its ultimate half-section width as a collector (66-foot right-of-way). The Project will construct sidewalk improvements and modifications to the existing curb and gutter to accommodate the Project driveways in compliance with applicable City of Riverside General Plan standards.

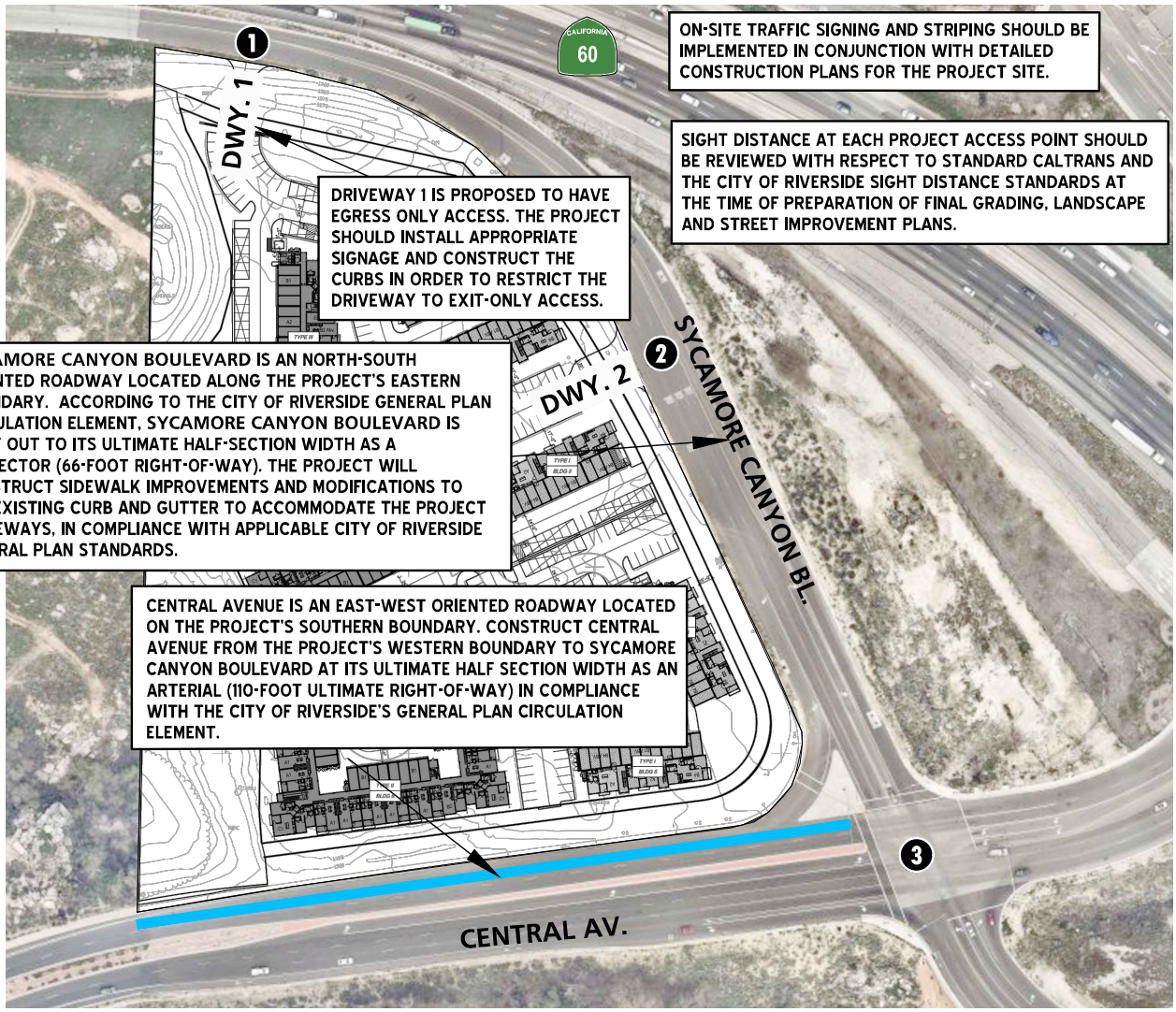
Central Avenue – Central Avenue is an east-west oriented roadway located along the Project's southern boundary. Construct Central Avenue from the Project's western boundary to Sycamore Canyon Boulevard at its ultimate half-section width as an arterial (110-foot ultimate right-of-way) in compliance with the City of Riverside's General Plan Circulation Element.

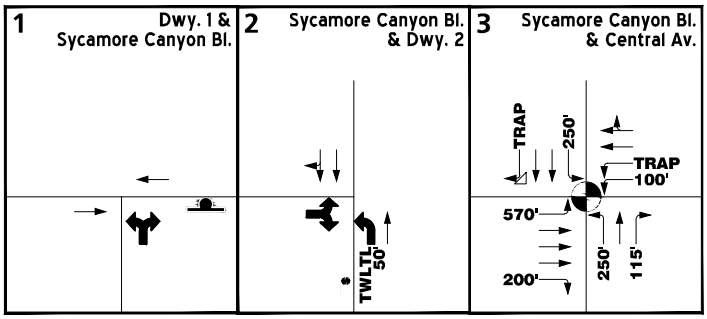
Driveway 1 is proposed to have egress only access. The Project should install appropriate signage and construct the curbs in order to restrict the driveway to exit-only access.

On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the Project site.

Sight distance at each project access point should be reviewed with respect to standard Caltrans and City of Riverside sight distance standards at the time of preparation of final grading, landscape and street improvement plans.

EXHIBIT 1-4: SITE ADJACENT ROADWAY AND SITE ACCESS RECOMMENDATIONS





LEGEND:

- = TRAFFIC SIGNAL
- = STOP SIGN
- = EXISTING LANE
- = LANE IMPROVEMENT
- = CHANNELIZED YIELD
- TWLTL = TWO WAY LEFT TURN LANE
- 150' = MINIMUM TURN POCKET LENGTH
- = ARTERIAL (110' R.O.W.)

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1.7.2 RECOMMENDED SITE ACCESS IMPROVEMENTS

Exhibit 1-4 also shows the site access improvements at each applicable Project driveway. Construction of on-site and site adjacent improvements shall occur in conjunction with adjacent Project development activity or as needed for Project access purposes.

A queuing analysis was conducted along the site adjacent roadways of Sycamore Canyon Boulevard for Horizon Year (2040) traffic conditions to determine the turn pocket lengths necessary to accommodate long-range 95th percentile queues. The analysis was conducted for the weekday AM and weekday PM peak hours. The storage length recommendations for the turning movements at the Project were shown previously on Exhibit 1-4. The Horizon Year (2040) queuing results are provided in Appendix 1.2 of this report.

Wherever necessary, roadways adjacent to the Project, site access points and site-adjacent intersections will be constructed to be consistent with the identified roadway classifications and respective cross-sections in the City of Riverside General Plan Circulation Element.

1.8 PEDESTRIAN AND BICYCLE ACCOMMODATIONS

The Project will construct its ultimate half-section of Central Avenue including curb and gutter and sidewalk improvements and its curb and gutter and sidewalk improvements along Sycamore Canyon Boulevard. Consistent with the City's General Plan Circulation Element, there are Class II bike lanes proposed along Central Avenue and Sycamore Canyon Boulevard along the Project's frontage.

It should be noted, the Project will install a pedestrian gate at the southeast corner of the Project site, in order to provide access to the opposing development.

1.9 SIGHT DISTANCE ANALYSIS

Vertical and Horizontal Sight distance for southbound traffic has been evaluated for both Project driveways along Sycamore Canyon Boulevard. As defined by the California Department of Transportation (Caltrans) Highway Design Manual, sight distance is the continuous length of highway ahead visible to the driver.

At unsignalized intersections, corner sight distance must provide a substantially clear line of sight between the driver of the vehicle waiting on the minor road (driveway) and the driver of an approaching vehicle. For the purposes of this analysis, a 7 ½ second criterion has been applied to the outside travel lanes in either direction to provide the most conservative sight distance. The 7 ½ second criterion allows waiting vehicles to either cross all lanes of through traffic by turning left or cross the near lanes by turning right without requiring through traffic to radically alter their speed. Vertical sight distance has been evaluated utilizing a 3.5-foot eye height and a 4.25-foot object height.

Adequate visibility for vehicular and pedestrian traffic can be provided at each Project driveway by limiting sight obstructions within the limited use area. Any landscaping/hardscape within the limited use area should not exceed 30-inches (2.5-feet) in height. The limited use area should be kept clear of any landscaping or any other obstructions that may impede the visibility of the driver, including on-street parking. Minimum vertical and horizontal sight distances for the Project driveways are illustrated on Exhibit 1-5 for Driveway 1 and Exhibit 1-6 for Driveway 2, however, sight distance should be re-evaluated in the field once the driveway has been constructed.

1.10 OFF-SITE IMPROVEMENTS

A conceptual striping plan has been provided for each of the intersections with recommended off-site improvements, as identified previously on Table 1-3. The conceptual striping plan for the intersections of Sycamore Canyon Boulevard & Central Avenue (#3) and Watkins Drive & SR-60 WB On-Ramp (#6) are shown on Exhibit 1-7.

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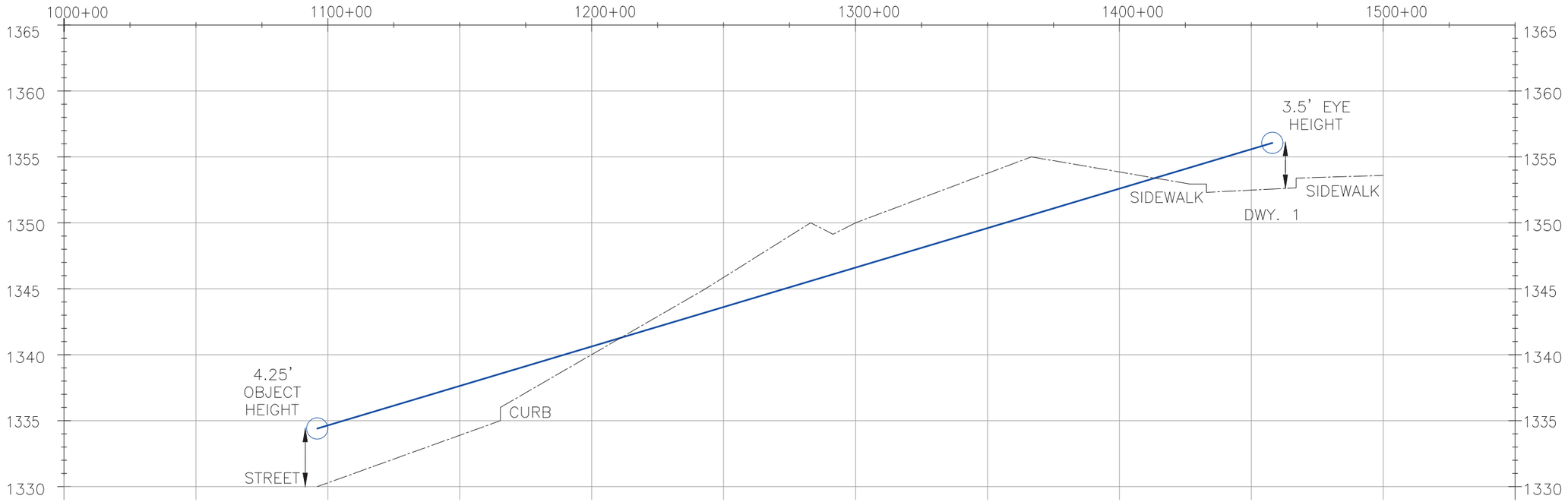
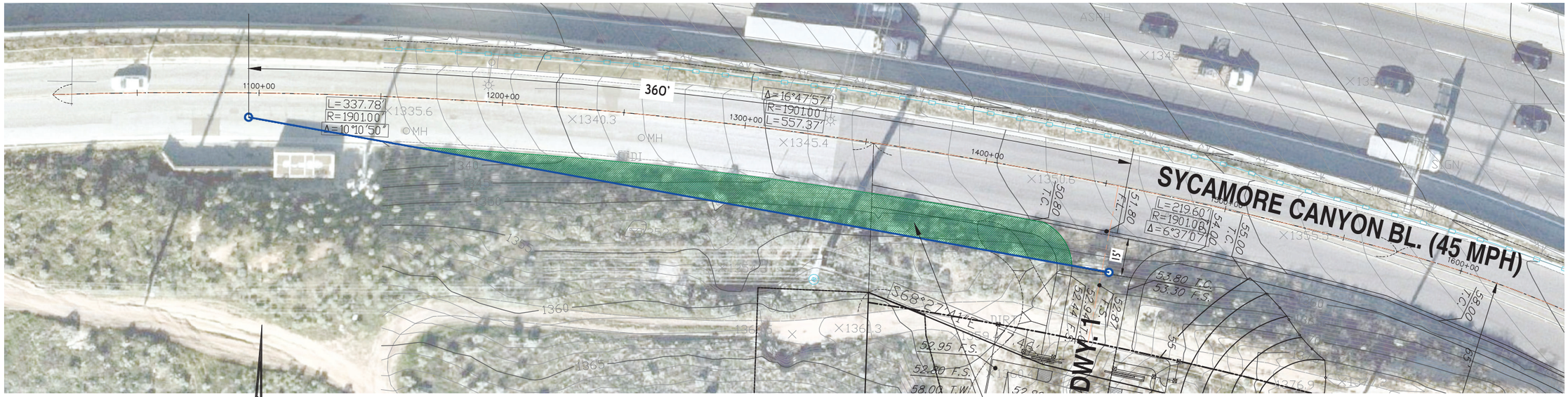
VERTICAL SIGHT DISTANCE

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 4'



HORIZONTAL SIGHT DISTANCE

HORIZONTAL SCALE: 1"=20'



SCALE: 1" = 20' (ON 36" x 24" SHEET)
0 10 20 40 60 80

EXHIBIT 1-5:
SYCAMORE CANYON BOULEVARD AT DRIVEWAY 1 INTERSECTION SIGHT DISTANCE

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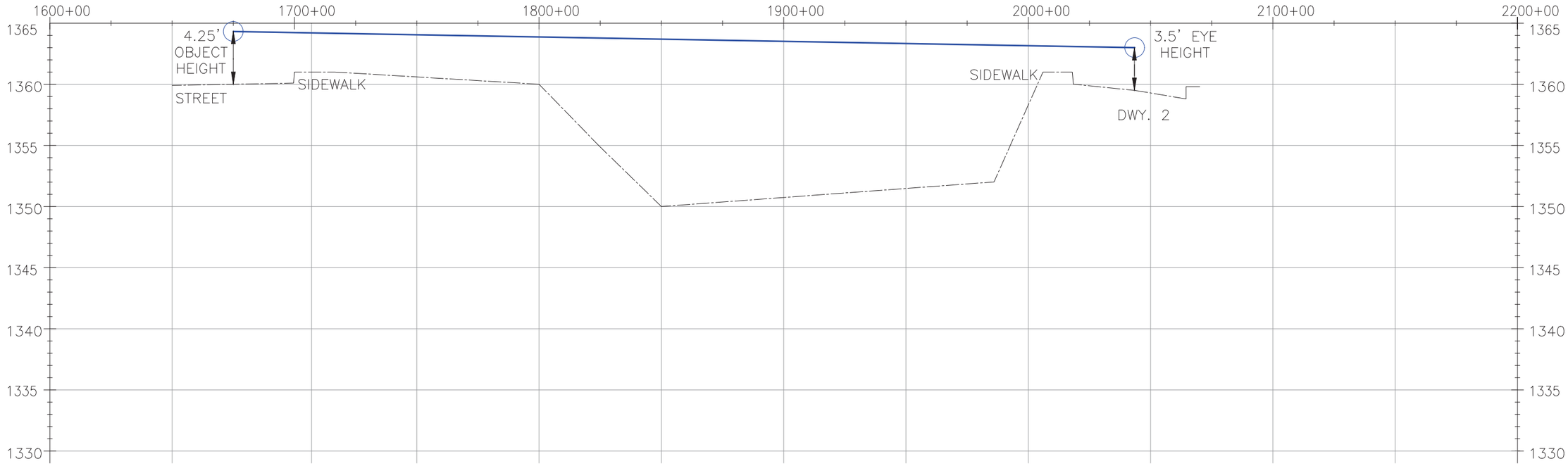
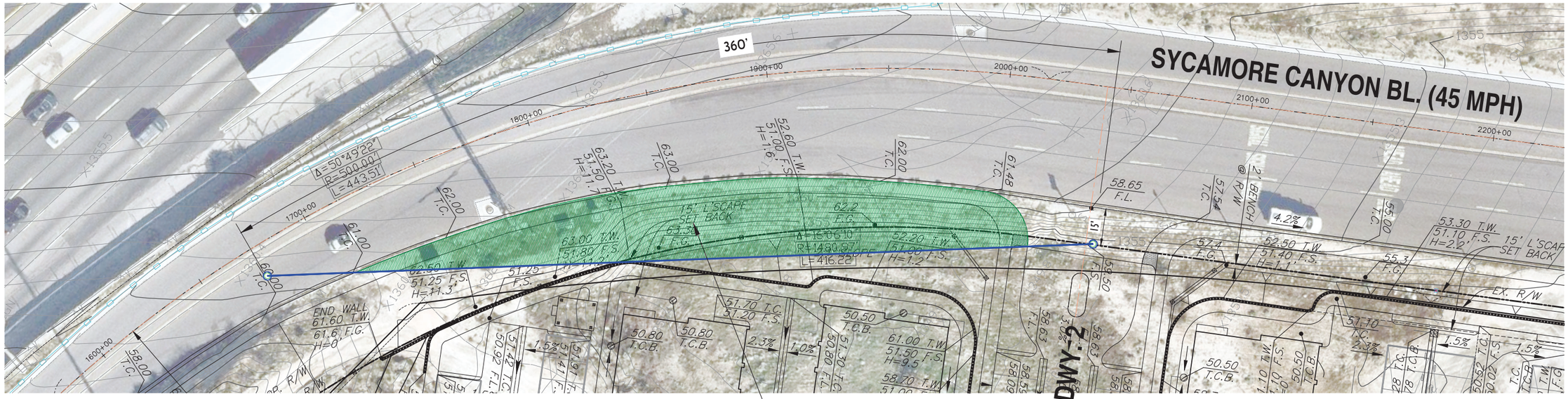
VERTICAL SIGHT DISTANCE

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 4'



HORIZONTAL SIGHT DISTANCE

HORIZONTAL SCALE: 1"=20'



SCALE: 1" = 20' (ON 36" x 24" SHEET)
0 10 20 40 60 80

EXHIBIT 1-6:
SYCAMORE CANYON BOULEVARD AT DRIVEWAY 2 INTERSECTION SIGHT DISTANCE

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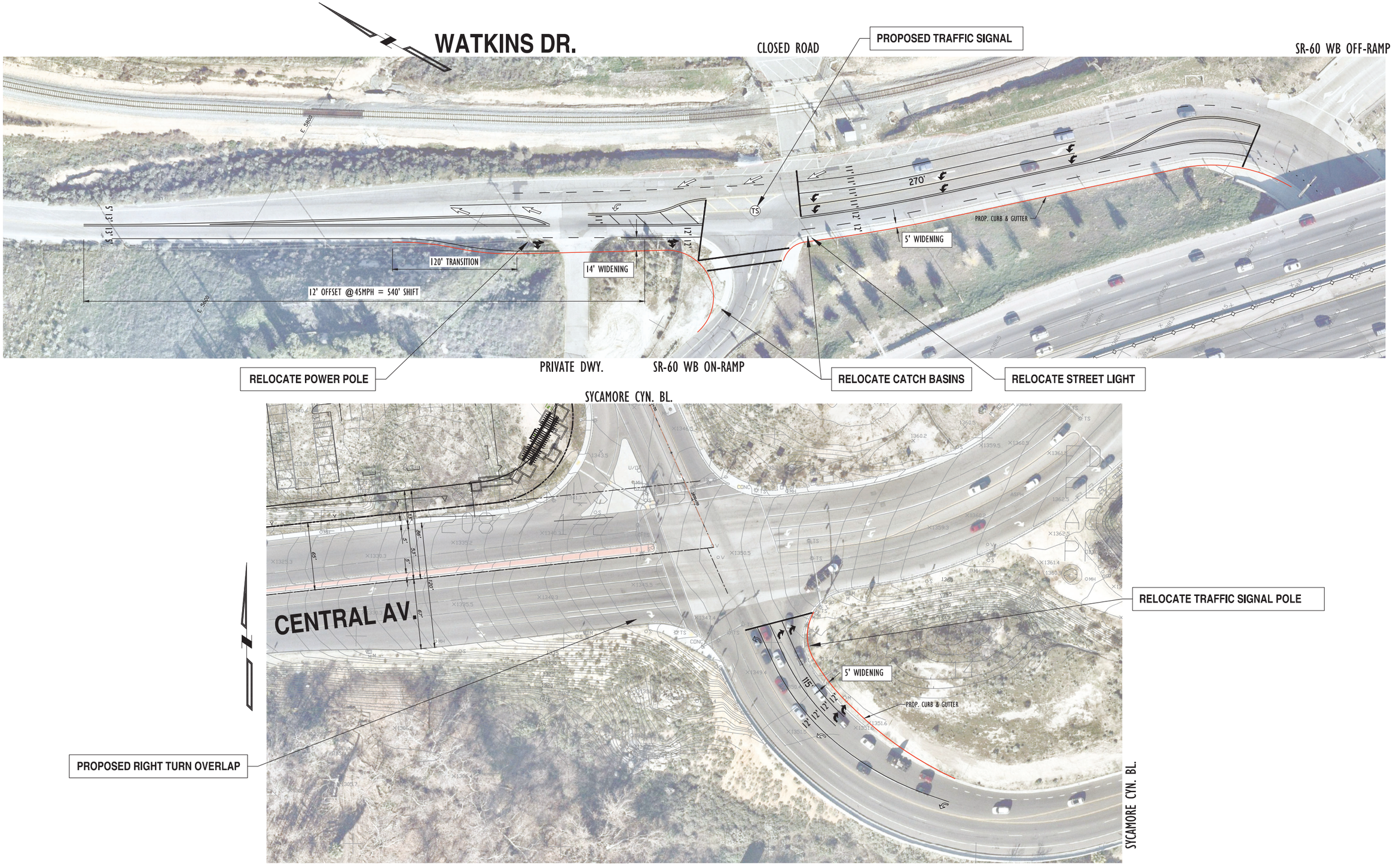

SCALE: 1" = 40' (ON 36" x 24" SHEET)

0 20 40 80 120 160

EXHIBIT 1-7: WATKINS DRIVE AT SR-60 WB ON-RAMP & SYCAMORE CANYON BOULEVARD AT CENTRAL AVENUE CONCEPT STRIPING

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2 METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are generally consistent with City of Riverside traffic study guidelines.

2.1 LEVEL OF SERVICE

Traffic operations of roadway facilities are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on several factors such as speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

2.2 INTERSECTION CAPACITY ANALYSIS

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The Highway Capacity Manual (HCM) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. (5) The HCM uses different procedures depending on the type of intersection control.

2.2.1 SIGNALIZED INTERSECTIONS

City of Riverside, County of Riverside

The City of Riverside and County of Riverside require signalized intersection operations analysis based on the methodology described in the HCM. (5) Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections LOS is directly related to the average control delay per vehicle and is correlated to a LOS designation as described in Table 2-1. Study area intersections have been evaluated using the Synchro software package (Version 10).

TABLE 2-1: SIGNALIZED INTERSECTION LOS CRITERA

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Operations with very low delay occurring with favorable progression and/or short cycle length.	0 to 10.00	A	F
Operations with low delay occurring with good progression and/or short cycle lengths.	10.01 to 20.00	B	F

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.01 to 35.00	C	F
Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.01 to 55.00	D	F
Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.01 to 80.00	E	F
Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	80.01 and up	F	F

Source: HCM 6th Edition

The traffic modeling and signal timing optimization software package Synchro (Version 10) has been utilized to analyze signalized intersections within the City of Riverside and County of Riverside. Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

The peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15-minute volumes. Common practice for LOS analysis is to use a peak 15-minute rate of flow. However, flow rates are typically expressed in vehicles per hour. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume (e.g. PHF = [Hourly Volume] / [4 x Peak 15-minute Flow Rate]). The use of a 15-minute PHF produces a more detailed analysis as compared to analyzing vehicles per hour. Existing PHFs have been used for all analysis scenarios. Per the HCM, PHF values over 0.95 often are indicative of high traffic volumes with capacity constraints on peak hour flows while lower PHF values are indicative of greater variability of flow during the peak hour. (5)

California Department of Transportation (Caltrans)

Per the Caltrans Guide for the Preparation of Traffic Impact Studies, the traffic modeling and signal timing optimization software package Synchro (Version 10) has also been utilized to analyze signalized intersections under Caltrans' jurisdiction, which include interchange to arterial ramps (i.e. SR-60 Freeway ramps at Central Avenue). (2) Signal timing for the freeway arterial-to-ramp intersections have been obtained from Caltrans District 8 and were utilized for the purposes of this analysis.

2.2.2 UNSIGNALIZED INTERSECTIONS

The City of Riverside and County of Riverside require the operations of unsignalized intersections be evaluated using the methodology described the HCM. (5) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2).

TABLE 2-2: UNSIGNALIZED INTERSECTION LOS CRITERIA

Description	Average Control Delay Per Vehicle (Seconds)	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Little or no delays.	0 to 10.00	A	F
Short traffic delays.	10.01 to 15.00	B	F
Average traffic delays.	15.01 to 25.00	C	F
Long traffic delays.	25.01 to 35.00	D	F
Very long traffic delays.	35.01 to 50.00	E	F
Extreme traffic delays with intersection capacity exceeded.	> 50.00	F	F

Source: HCM 6th Edition

At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. For all-way stop controlled intersections, LOS is computed for the intersection as a whole.

2.3 ROADWAY SEGMENT CAPACITY ANALYSIS METHODOLOGY

Roadway segment operations have been evaluated using the applicable average daily traffic (ADT) roadway capacity values provided in the City of Riverside Traffic Study Guidelines (see Exhibit D). The roadway capacities utilized for the purposes of this analysis are considered "rule of thumb" estimates for planning purposes and are affected by such factors as intersections (spacing, configuration and control features), degree of access control, roadway grades, design geometrics (horizontal and vertical alignment standards), sight distance, vehicle mix (truck and bus traffic) and pedestrian bicycle traffic.

While using ADT for planning purposes is suitable with regards to evaluating potential volume to capacity with future forecasts, it is not suitable for operational analysis because it does not account for the factors listed previously. As such, where the ADT based roadway segment analysis indicates a deficiency (unacceptable LOS), a review of the more detailed peak hour intersection analysis and progression analysis are undertaken. The more detailed peak hour intersection analysis explicitly accounts for factors that affect roadway capacity. Therefore, roadway segment widening is typically only recommended if the peak hour intersection analysis indicates the need for additional through lanes.

2.4 FREEWAY OFF-RAMP QUEUING ANALYSIS

The study area for this TA includes the freeway-to-arterial interchanges of the SR-60 Freeway ramps at Central Avenue. Consistent with Caltrans requirements, the 95th percentile queuing of

vehicles has been assessed at the off-ramps to determine potential queuing deficiencies at the freeway ramp intersections on Central Avenue. Specifically, the queuing analysis is utilized to identify any potential queuing and "spill back" onto the SR-60 Freeway mainline from the off-ramps.

The traffic progression analysis tool and HCM intersection analysis program, Synchro, has been used to assess the potential deficiencies/needs of the intersections with traffic added from the proposed Project. Storage (turn-pocket) length recommendations at the ramps have been based upon the 95th percentile queue resulting from the Synchro progression analysis. A vehicle is considered queued whenever it is traveling at less than 10 feet/second. The 95th percentile queue is the maximum back of queue with 95th percentile traffic volumes. In other words, if traffic were observed for 100 cycles, the 95th percentile queue would be the queue experienced with the 95th busiest cycle (or 5% of the time). The queue length reported is for the lane with the highest queue in the lane group. The 95th percentile queue is not necessarily ever observed it is simply based on statistical calculations.

A Synchro footnote indicates if the 95th percentile cycle exceeds capacity. Traffic is simulated for two complete cycles of the 95th percentile traffic in Synchro in order to account for the effects of spillover between cycles. In practice, the 95th percentile queue shown will rarely be exceeded and the queues shown with the footnote are acceptable for the design of storage bays.

2.5 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term "signal warrants" refers to the list of established criteria used by Caltrans and other public agencies to quantitatively justify or ascertain the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TA uses the signal warrant criteria presented in the latest edition of the Caltrans California Manual on Uniform Traffic Control Devices *(*CA MUTCD*)*, for all study area intersections. (6)

The signal warrant criteria for Existing study area intersections are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. The CA MUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (6) Specifically, this TA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing traffic conditions. Warrant 3 is appropriate to use for this TA because it provides specialized warrant criteria for intersections with rural characteristics (e.g. located in communities with populations of less than 10,000 persons or with adjacent major streets operating above 40 miles per hour). For the purposes of this study, the speed limit of the study intersection approaches was the basis for determining whether Urban or Rural warrants were used for a given intersection.

Future unsignalized intersections, that currently do not exist, have been assessed regarding the potential need for new traffic signals based on future average daily traffic (ADT) volumes, using the Caltrans planning level ADT-based signal warrant analysis worksheets.

As shown in Table 2-3, traffic signal warrant analyses were performed for the following unsignalized study area intersections during the peak weekday conditions wherein the Project is anticipated to contribute the highest trips:

TABLE 2-3: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction	CMP?
1	Driveway 1 & Sycamore Canyon Boulevard	City of Riverside	No
2	Sycamore Canyon Boulevard & Driveway 2	City of Riverside	No

The Existing conditions traffic signal warrant analysis is presented in the subsequent section, Section 3 *Area Conditions* of this report. The traffic signal warrant analyses for future conditions are presented in Section 5 *Existing plus Project Traffic Analysis,* Section 6 *Opening Year Cumulative (2022) Traffic Analysis,* and Section 7 *Horizon Year (2040) Traffic Analysis* of this report.

It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this criteria condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

2.6 MINIMUM ACCEPTABLE LEVELS OF SERVICE (LOS)

Minimum Acceptable LOS and associated definitions of intersection deficiencies has been obtained from each of the applicable surrounding jurisdictions.

2.6.1 CITY OF RIVERSIDE

Per Policy CCM 2-3: the City of Riverside allows LOS D or better on all Arterial Streets wherever possible. At key locations, such as City Arterials that are used by regional freeway bypass traffic and at heavily traveled freeway interchanges, allow LOS E at peak hours as the acceptable standard on a case-by-case basis.

2.6.2 COUNTY OF RIVERSIDE

The definition of an intersection deficiency has been obtained from the County of Riverside General Plan. Riverside County General Plan Policy C 2.1 states that the County will maintain the following County-wide target LOS:

The following minimum target levels of service have been designated for the review of development proposals in the unincorporated areas of Riverside County with respect to transportation deficiencies on roadways designated in the Riverside County Circulation Plan which are currently County maintained, or are intended to be accepted into the County maintained roadway system:

- *LOS C shall apply to all development proposals in any area of the Riverside County not located within the boundaries of an Area Plan, as well as those areas located within the following Area Plans: REMAP, Eastern Coachella Valley, Desert Center, Palo Verde Valley, and those non-Community Development areas of the Elsinore, Lake Mathews/Woodcrest, Mead Valley and Temescal Canyon Area Plans.*
- *LOS D shall apply to all development proposals located within any of the following Area Plans: Eastvale, Jurupa, Highgrove, Reche Canyon/Badlands, Lakeview/Nuevo, Sun City/Menifee Valley, Harvest Valley/Winchester, Southwest Area, The Pass, San Jacinto Valley, Western Coachella Valley and those Community Development Areas of the Elsinore, Lake Mathews/Woodcrest, Mead Valley and Temescal Canyon Area Plans.*
- *LOS E may be allowed by the Board of Supervisors within designated areas where transit-oriented development and walkable communities are proposed.*

The applicable minimum LOS utilized for the purposes of this analysis is LOS D per the County-wide target LOS for projects located within the Highgrove area plan.

2.6.3 CMP

The CMP definition of deficiency is based on maintaining a level of service standard of LOS E or better, where feasible, except where an existing LOS F condition is identified in the CMP document. However, in an effort to overstate as opposed to understate potential traffic deficiencies, LOS D has been utilized for the CMP intersections for the purposes of this analysis.

2.6.4 CALTRANS

Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D on State Highway System (SHS) facilities, however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. If an existing State highway facility is operating at less than this target LOS, the existing LOS should be maintained. In general, the region-wide goal for an acceptable LOS on all freeways, roadway segments, and intersections is LOS D. Consistent with the City of Riverside LOS criteria of LOS D, LOS D will be used as the target LOS for freeway ramps.

2.7 DEFICIENCY CRITERIA

This section outlines the methodology used in this analysis related to identifying circulation system deficiencies.

2.7.1 INTERSECTIONS

To determine whether the addition of Project traffic (as defined through the comparison of Existing traffic conditions to E+P traffic conditions) at a study intersection would result in a direct project-specific traffic deficiency, the following will be utilized:

- When the pre-Project condition is at or better than LOS D (i.e., acceptable LOS), and project-generated traffic, as measured by 50 or more peak hour trips, causes deterioration below LOS D (i.e., unacceptable LOS) or increases to the peak hour delay as defined in Table 2-4, a deficiency is deemed to occur.

TABLE 2-4: INTERSECTION DEFICIENCY CRITERIA

Pre-Project LOS	Project-Related Delay Increase	Recommended Improvements
A/B	10.0 Seconds or More	Achieve Pre-project delay or better
C	8.0 Seconds or More	Achieve Pre-project delay or better
D	5.0 Seconds or More	Achieve Pre-project delay or better
E	2.0 Seconds or More	Achieve Pre-project delay or better
F	1.0 Second or More	Achieve Pre-project delay or better

However, when the pre-Project condition is already below LOS D (i.e., unacceptable LOS), the Project will be responsible for recommending improvements to achieve a level of service equal to or better than it was without the Project for intersections that receive 50 or more peak hour project-related trips. For intersections currently operating at unacceptable LOS during either the AM and/or PM peak hours under Existing traffic conditions, improvements have been identified to achieve an intersection LOS that is equal to or better than pre-Project conditions.

Cumulative traffic deficiencies are created as a result of a combination of the proposed Project together with other future developments contributing to the overall traffic deficiencies requiring additional improvements to maintain acceptable level of service operations with or without the Project.

2.7.2 CALTRANS FACILITIES

To determine whether the addition of project traffic to the SHS freeway segments would result in a deficiency, the following will be utilized:

- The traffic study finds that the LOS of a segment will degrade from D or better to E or F.
- The traffic study finds that the project will exacerbate an already deficient condition by contributing 50 or more one-way peak hour trips. A segment that is operating at or near capacity is deemed to be deficient.

2.8 PROJECT FAIR SHARE CALCULATION METHODOLOGY

In cases where this TA identifies that the Project would contribute additional traffic volumes to cumulative traffic deficiencies, Project fair share costs of improvements necessary to address deficiencies have been identified. The Project's fair share cost of improvements is determined based on the following equation, which is the ratio of Project traffic to new traffic, and new traffic is total future (Horizon Year) traffic less existing baseline traffic:

Project Fair Share % = Project (2040) Traffic / (2022 or 2040 With Project Total Traffic – Existing Traffic)

The project fair share percentage has been calculated for both the AM peak hour and PM peak hour and the highest of the two has been selected. The Project fair share contribution calculations are presented in Section 8 *Local and Regional Funding Mechanisms* of this TA. The cost of implementing the improvements shown in Table 1-3 have been estimated based on the preliminary construction cost estimates found in Appendix G of the San Bernardino CMP in conjunction with a total cost escalation factor of 1.484 to more closely approximate current (2019) costs. These cost estimates have been utilized in conjunction with the Project fair share percentages to determine the Project's fair share cost of the recommended cumulative improvements (see Table 8-1 and Table 8-2). The estimates shown in Table 1-3 are a rough order of magnitude only as they are intended only for discussion purposes and do not imply any legal responsibility or formula for contributions or improvements.

3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the City of Riverside General Plan Circulation Network, and a review of existing peak hour intersection operations, roadway segment operations, and traffic signal warrant analyses.

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the agreement with the City of Riverside staff (Appendix 1.1), the study area includes a total of 6 existing and future intersections as shown previously on Exhibit 1-2. Exhibit 3-1 illustrates the study area intersections located near the proposed Project and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

3.2 CITY OF RIVERSIDE GENERAL PLAN CIRCULATION ELEMENT

As noted previously, the Project site is located within the City of Riverside. The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on the City of Riverside General Plan Circulation Element, are described subsequently. Exhibit 3-2 shows the City of Riverside General Plan Circulation Element and Exhibit 3-3 illustrates the City of Riverside General Plan roadway cross-sections. The two streets adjacent to the Project (Sycamore Canyon Boulevard and Central Avenue) have been identified in **bold** text.

3.2.1 CITY OF RIVERSIDE

The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on the City of Riverside General Plan Circulation Element, are described subsequently. Exhibit 3-2 shows the City of Riverside General Plan Circulation Element, and Exhibit 3-3 illustrates the City of Riverside General Plan roadway cross-sections.

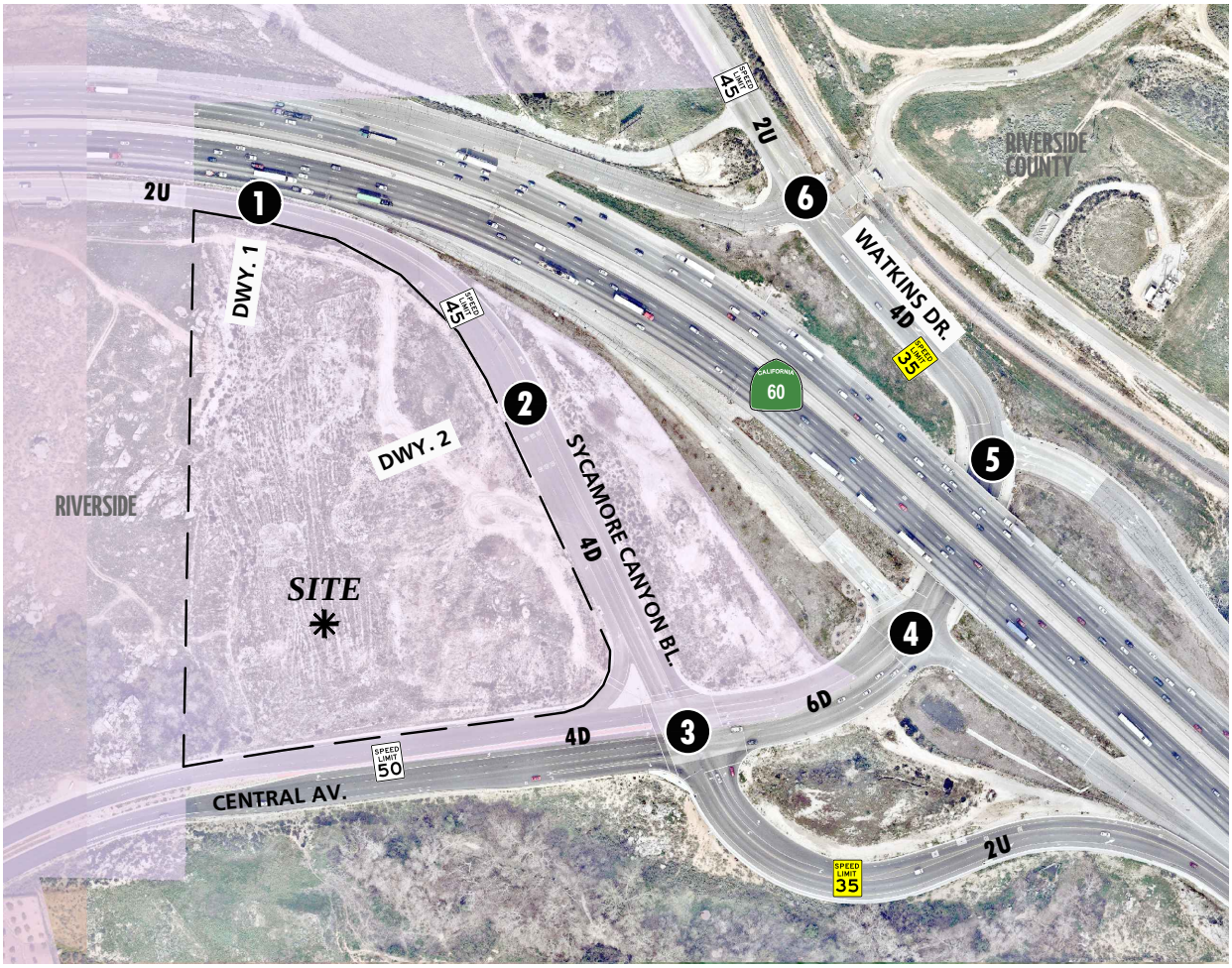
110-foot Arterials include two lanes of travel in each direction and a curbed and/or landscaped median with 80-feet of pavement from curb-to-curb. The study area roadways that are classified as having a 110-foot right-of-way measurement (or 80-foot curb-to-curb measurements) are as follows:

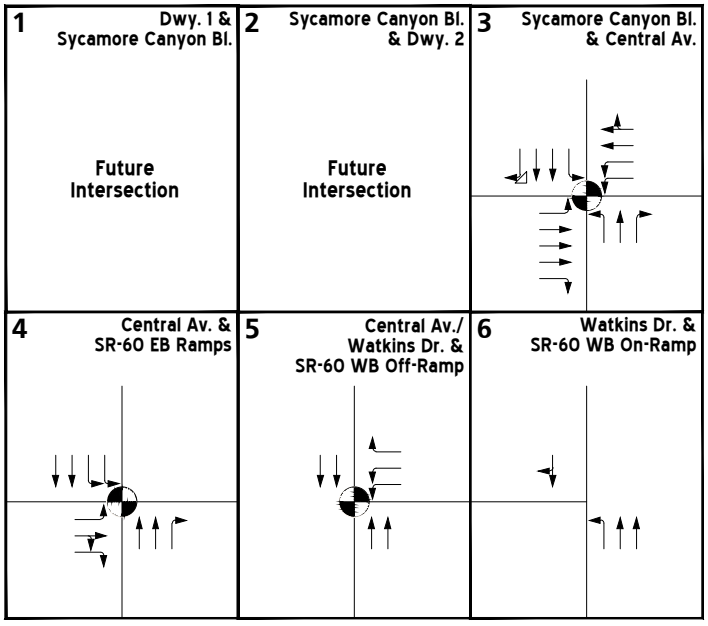
- **Central Avenue, west of Sycamore Canyon Avenue**

88-foot Arterials include two lanes of travel in each direction and a curbed and/or landscaped median with 40-feet of pavement from curb-to-curb. The study area roadways that are classified as having an 88-foot right-of-way measurement (or 40-foot curb-to-curb measurements) are as follows:

- Central Avenue, east of Sycamore Canyon Boulevard
- Sycamore Canyon Boulevard, south of Central Avenue
- Watkins Drive

EXHIBIT 3-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS





LEGEND:

- = TRAFFIC SIGNAL
- 4 = NUMBER OF LANES
- D = DIVIDED
- U = UNDIVIDED
- = CHANNELIZED YIELD
- SPEED LIMIT 25 = SPEED LIMIT (MPH)
- SPEED LIMIT 35 = ADVISORY SPEED LIMIT (MPH)

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EXHIBIT 3-2: CITY OF RIVERSIDE GENERAL PLAN CIRCULATION ELEMENT

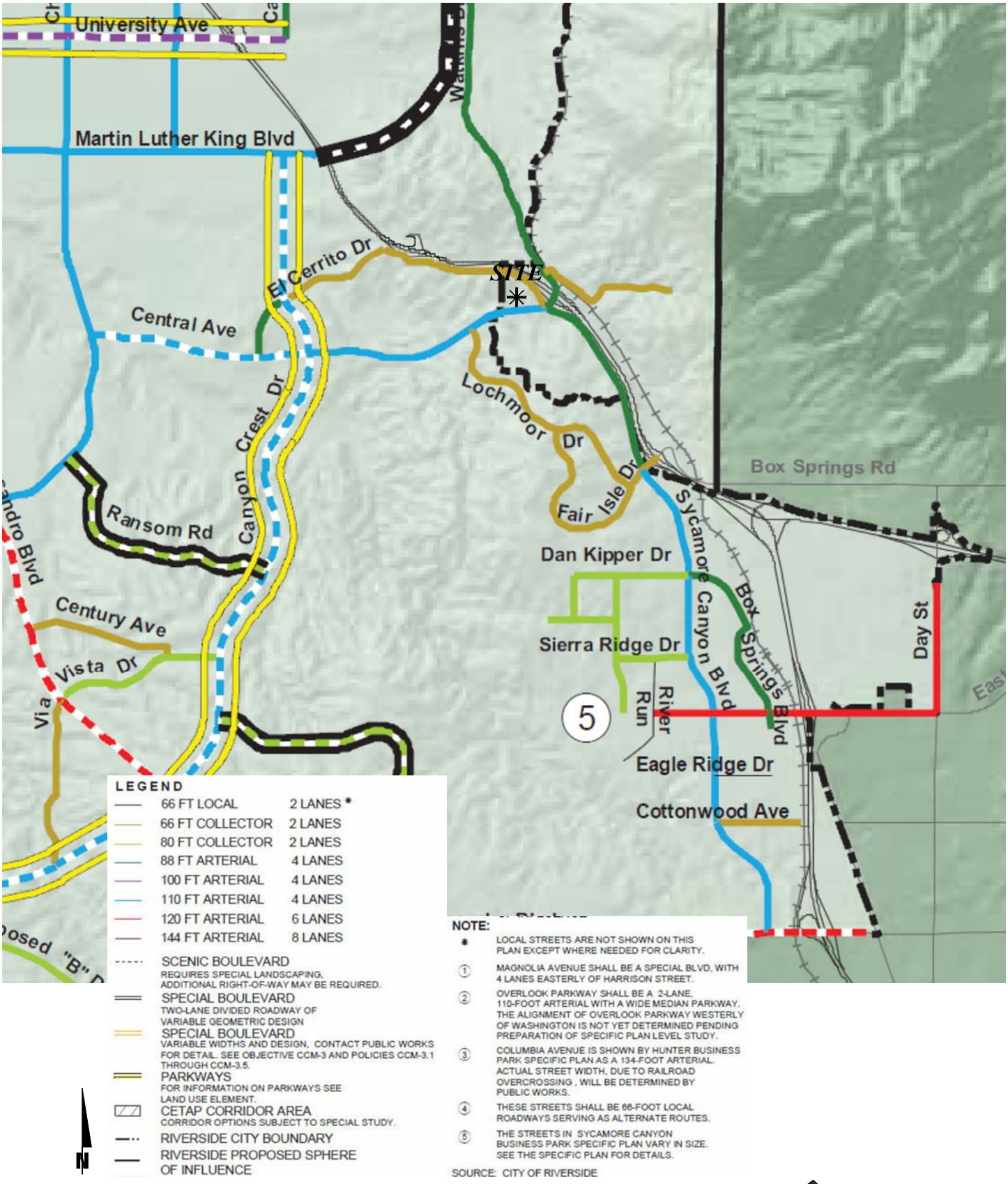

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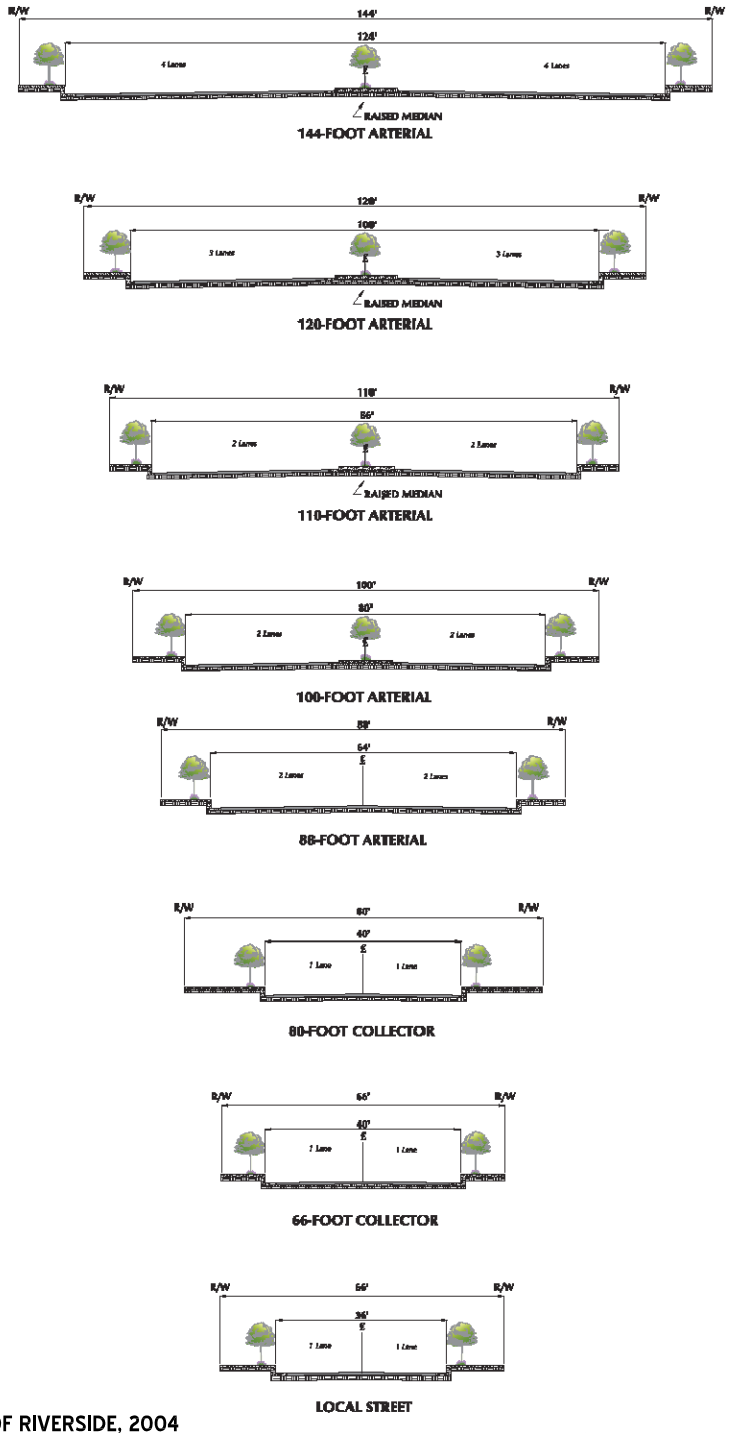
EXHIBIT 3-3: CITY OF RIVERSIDE GENERAL PLAN ROADWAY CROSS-SECTIONS



SOURCE: CITY OF RIVERSIDE, 2004

66-foot Collectors include two lanes of travel in each direction and a curbed and/or landscaped median with 36-feet of pavement from curb-to-curb. The study area roadways that are classified as having a 66-foot right-of-way measurement (or 36-foot curb-to-curb measurements) are as follows:

- **Sycamore Canyon Boulevard, north of Central Avenue**

3.2.2 COUNTY OF RIVERSIDE

The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the County of Riverside as identified on the County of Riverside General Plan Circulation Element are described subsequently. The City of Riverside is located within the County of Riverside and portions of the study area lies within unincorporated County of Riverside. As such, the County of Riverside General Plan Circulation Element and General Plan Roadway Cross-Sections are shown on Exhibits 3-4 and 3-5, respectively.

3.3 BICYCLE & PEDESTRIAN FACILITIES

Exhibit 3-6 illustrates the City of Riverside future planned bicycle facilities, which proposes Class 2 bike lanes along Sycamore Canyon Boulevard and Central Avenue/Watkins Drive in the vicinity of the Project site. A Primary City Trail follows along Sycamore Canyon Boulevard in the vicinity of the Project site as well. Exhibit 3-7 illustrates the County of Riverside trails and bikeway systems. Existing pedestrian facilities within the study area are shown on Exhibit 3-9. Field observations conducted in June 2019 indicate nominal pedestrian and bicycle activity within the study area.

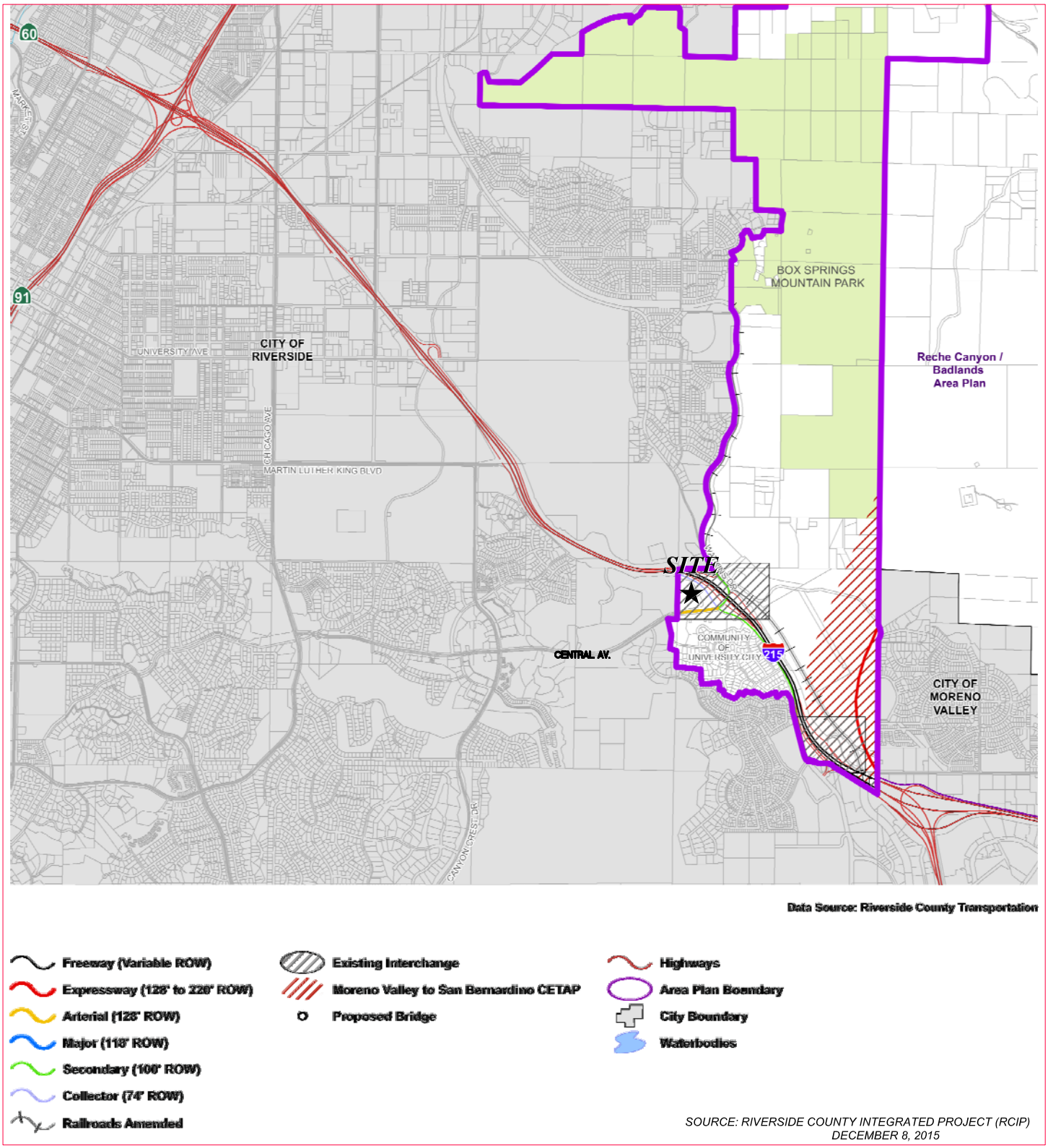
It should be noted, the Project will install a pedestrian gate at the southeast corner of the Project site, in order to provide access to the opposing development.

3.4 TRANSIT SERVICE

As shown on Exhibit 3-8, the study area is currently served by the Riverside Transit Authority (RTA), a public transit agency serving the Riverside County region. RTA has several existing bus routes serving the City of Riverside within the study area. RTA Routes 16 and 208/210 have routes along Central Avenue, Sycamore Canyon Boulevard, and the SR-60 Freeway within the study area. RTA Route 16 could potentially serve the Project in the future.

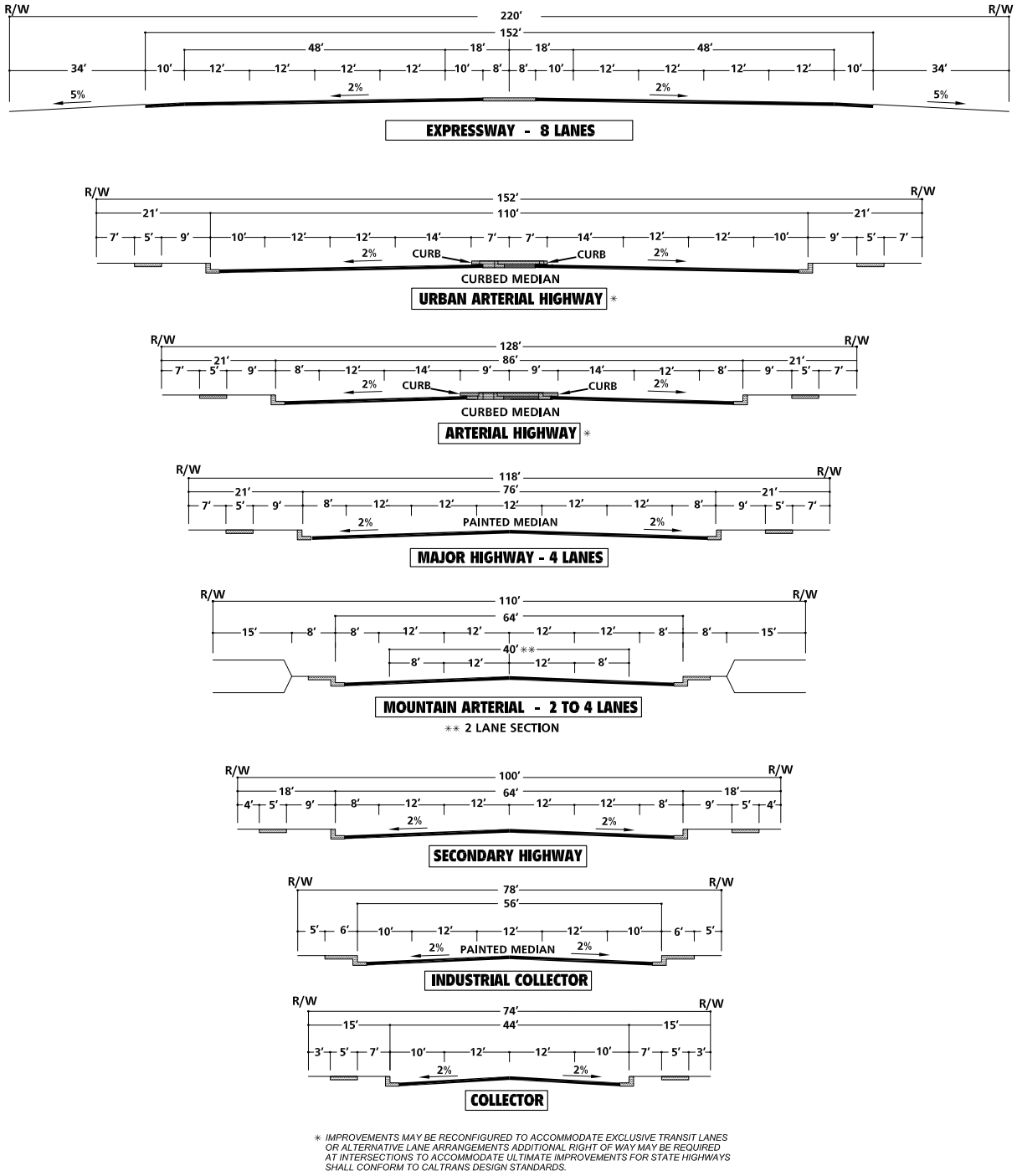
Transit service is reviewed and updated by RTA periodically to address ridership, budget and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate.

EXHIBIT 3-4: COUNTY OF RIVERSIDE GENERAL PLAN CIRCULATION ELEMENT



SOURCE: RIVERSIDE COUNTY INTEGRATED PROJECT (RCIP) DECEMBER 8, 2015

EXHIBIT 3-5: COUNTY OF RIVERSIDE GENERAL PLAN ROADWAY CROSS-SECTIONS

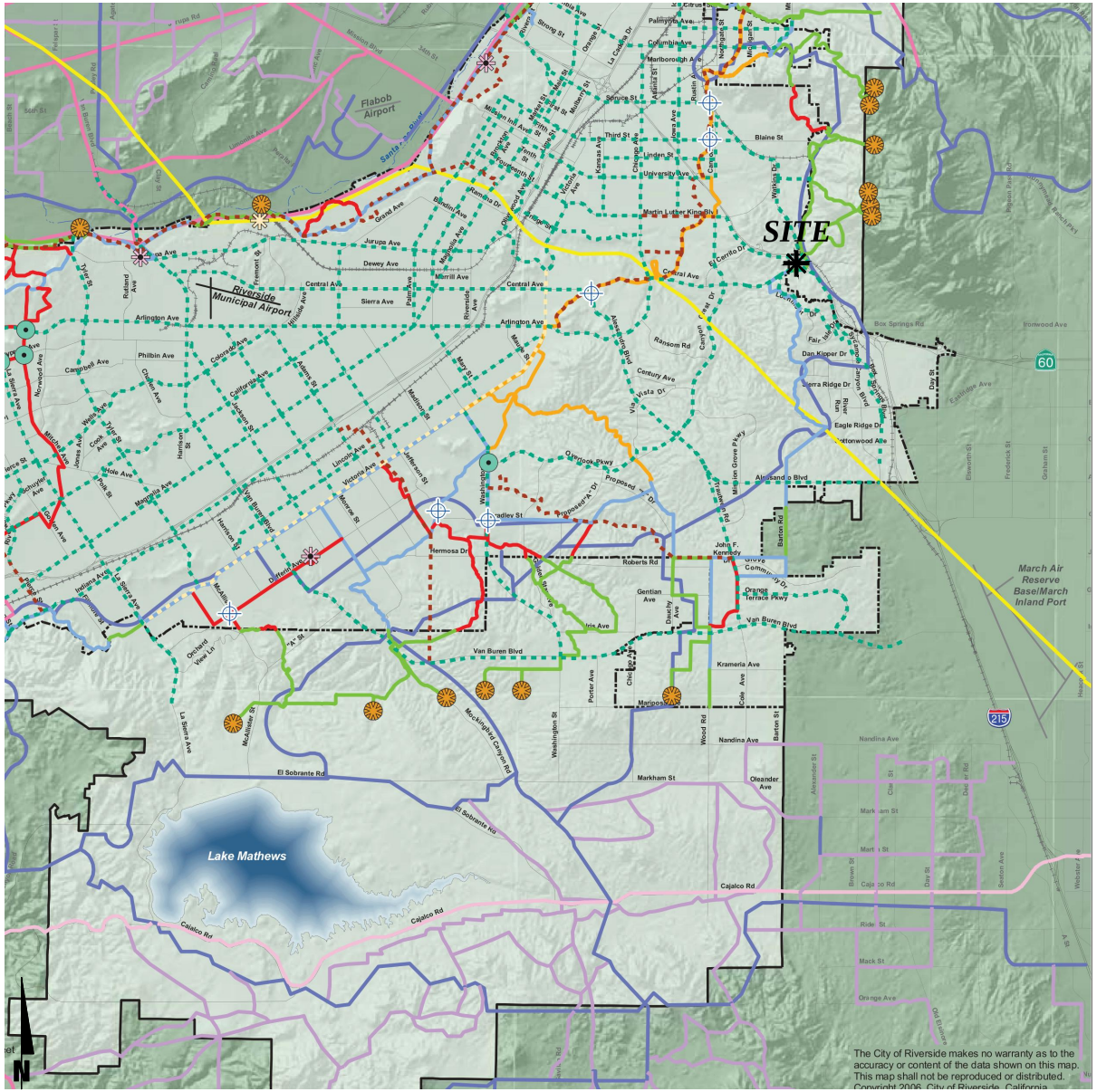


* *IMPROVEMENTS MAY BE RECONFIGURED TO ACCOMMODATE EXCLUSIVE TRANSIT LANES OR ALTERNATIVE LANE ARRANGEMENTS ADDITIONAL RIGHT OF WAY MAY BE REQUIRED AT INTERSECTIONS TO ACCOMMODATE ULTIMATE IMPROVEMENTS FOR STATE HIGHWAYS SHALL CONFORM TO CALTRANS DESIGN STANDARDS.*

NOT TO SCALE

SOURCE: COUNTY OF RIVERSIDE

EXHIBIT 3-6: CITY OF RIVERSIDE MASTER PLAN TRAILS AND BIKEWAYS



LEGEND

CITY TRAIL POINTS
- STAGING AREAS EXISTING FACILITIES
- STAGING AREAS PROPOSED FACILITIES
- CONNECTION TO COUNTY DESIGNATED TRAILS
- TRAIL CROSSING PROPOSED STOP SIGN
- TRAIL CROSSING PROPOSED TRAFFIC SIGNAL

CITY TRAILS
- PRIMARY - EQUESTRIAN, BIKE & PEDESTRIAN TRAIL
- SECONDARY - EQUESTRIAN, BIKE & PEDESTRIAN TRAIL
- SECONDARY - NO EQUESTRIAN
- IN ADJACENT JURISDICTION

CITY BIKEWAYS
- CLASS 1
- CLASS 1&2
- CLASS 2

RIVERSIDE COUNTY TRAILS
- CLASS 1 BIKE PATH
- CLASS 1 BIKE PATH/REGIONAL TRAIL
- COMMUNITY TRAIL
- REGIONAL TRAIL
- HISTORIC TRAIL

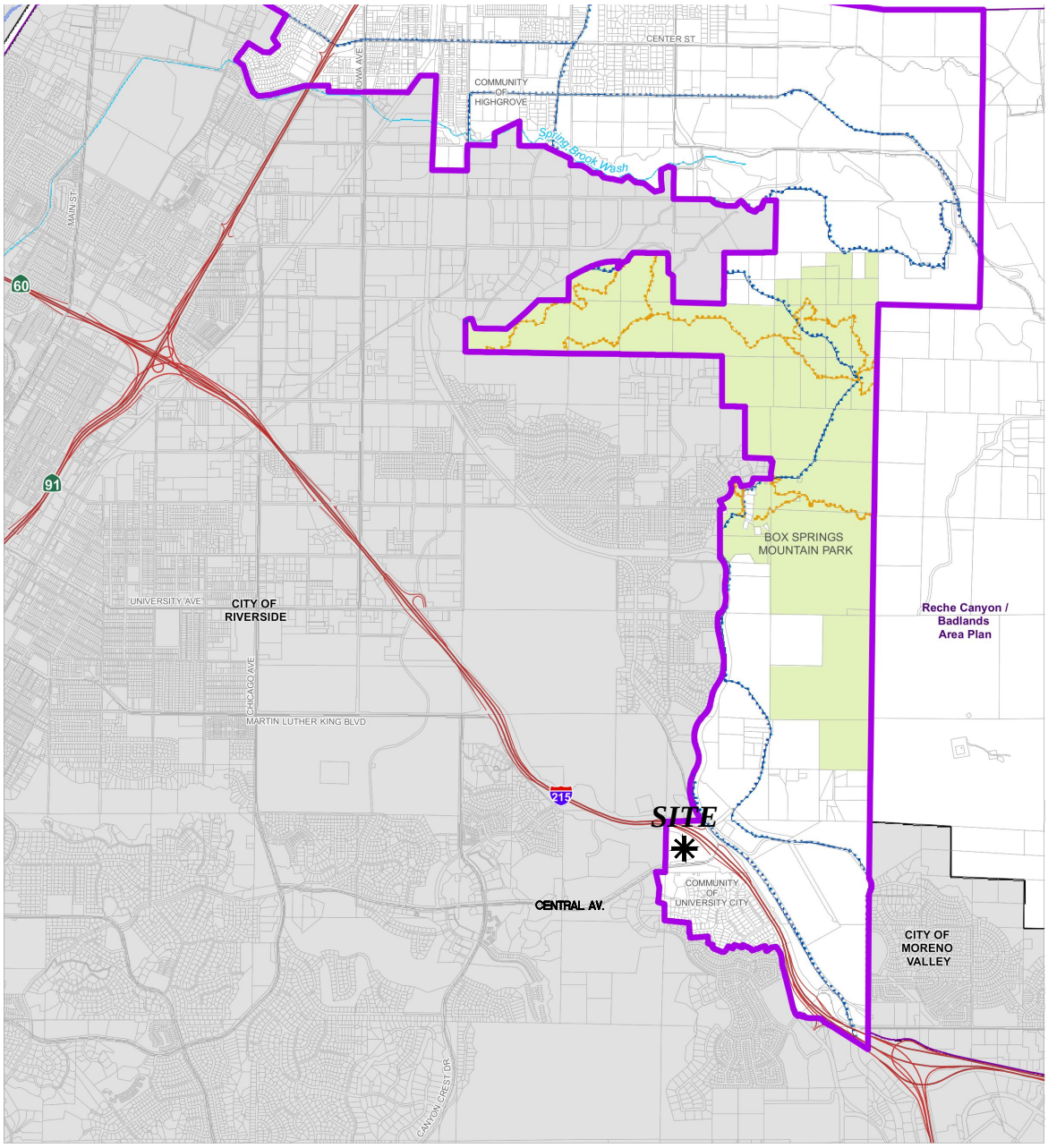
- RIVERSIDE CITY BOUNDARY
- RIVERSIDE PROPOSED SPHERE OF INFLUENCE

SOURCE: CITY OF RIVERSIDE AND RIVERSIDE COUNTY GIS DATA

County Disclaimer: The County of Riverside assumes no warranty or legal responsibility for the information contained on this map. Data and information represented on this map is subject to change and may not be complete or appropriate for all purposes. County GIS and other sources should be queried for the most current information. Do not copy or resell this map. Horizontal accuracy: Parcel data is of mapping grade (quality) only and does not represent trustworthy locations or legal boundaries. User assumes all risk of use of this product. Copyright © 2006 county of Riverside, TLMA-GIS.

NOTE: Currently the City and County trails are not completely coordinated. The County Trails Plan is a conceptual plan at this time and many of the City's trails have not yet been built. An implementation tool of this General Plan is to work with the County to coordinate the RCIP and the City's General Plan (Tool #10).

EXHIBIT 3-7: COUNTY OF RIVERSIDE TRAILS AND BIKEWAY SYSTEM



Data Source: Riverside County Parks

Regional Trail: Urban/Suburban
Regional Trail: Open Space
Highways
Area Plan Boundary
City Boundary
Waterbodies

Note: Trails shown in non-county jurisdictions for informational/coordination purposes only.

Data Source: Primarily Riverside County Regional Park and Open Space District, with assistance from Riverside County TLMA/Transportation and Planning Departments, Riverside County Economic Development Agency, and other local, state, and federal recreational services agencies.

Note: Trails and bikeway maps are a graphic representation identifying the general location and classification of existing and proposed trails and bikeways in the unincorporated area of the County. All questions regarding precise alignment or improvement standards should be referred to the Riverside County Regional Park and Open Space District.

Note: Except for major regional facilities, trails and bikeways systems located within cities are generally not shown. Where trails and bikeways exist or are planned in the unincorporated area in such a manner that there are opportunities for connections with existing or planned trails and bikeways within adjacent cities, an arrow symbol is used to show the approximate location of the intended connection opportunity. The reader should contact the appropriate city for all information about that city's existing or planned trails and bikeways systems.

N

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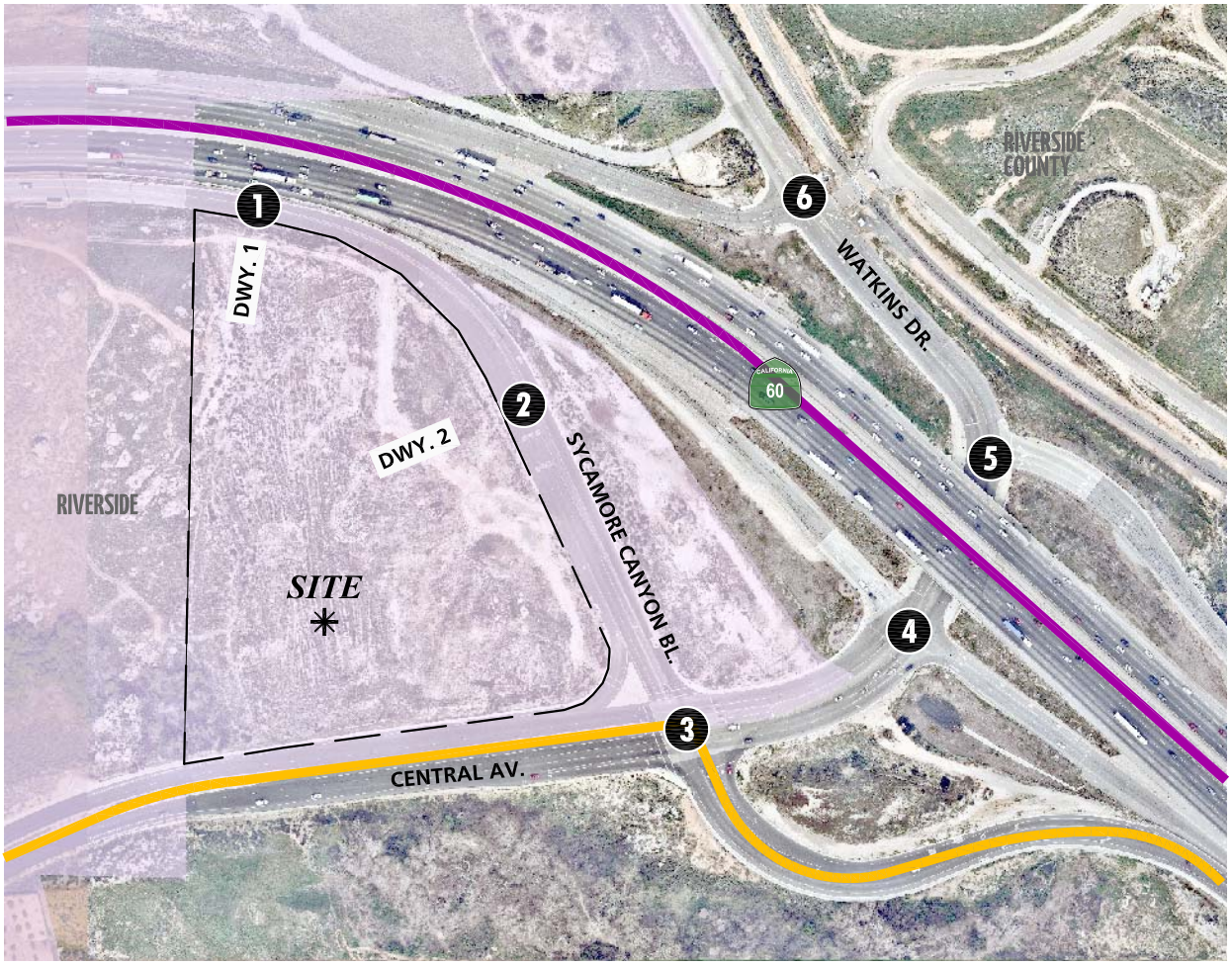
EXHIBIT 3-8: EXISTING TRANSIT ROUTES



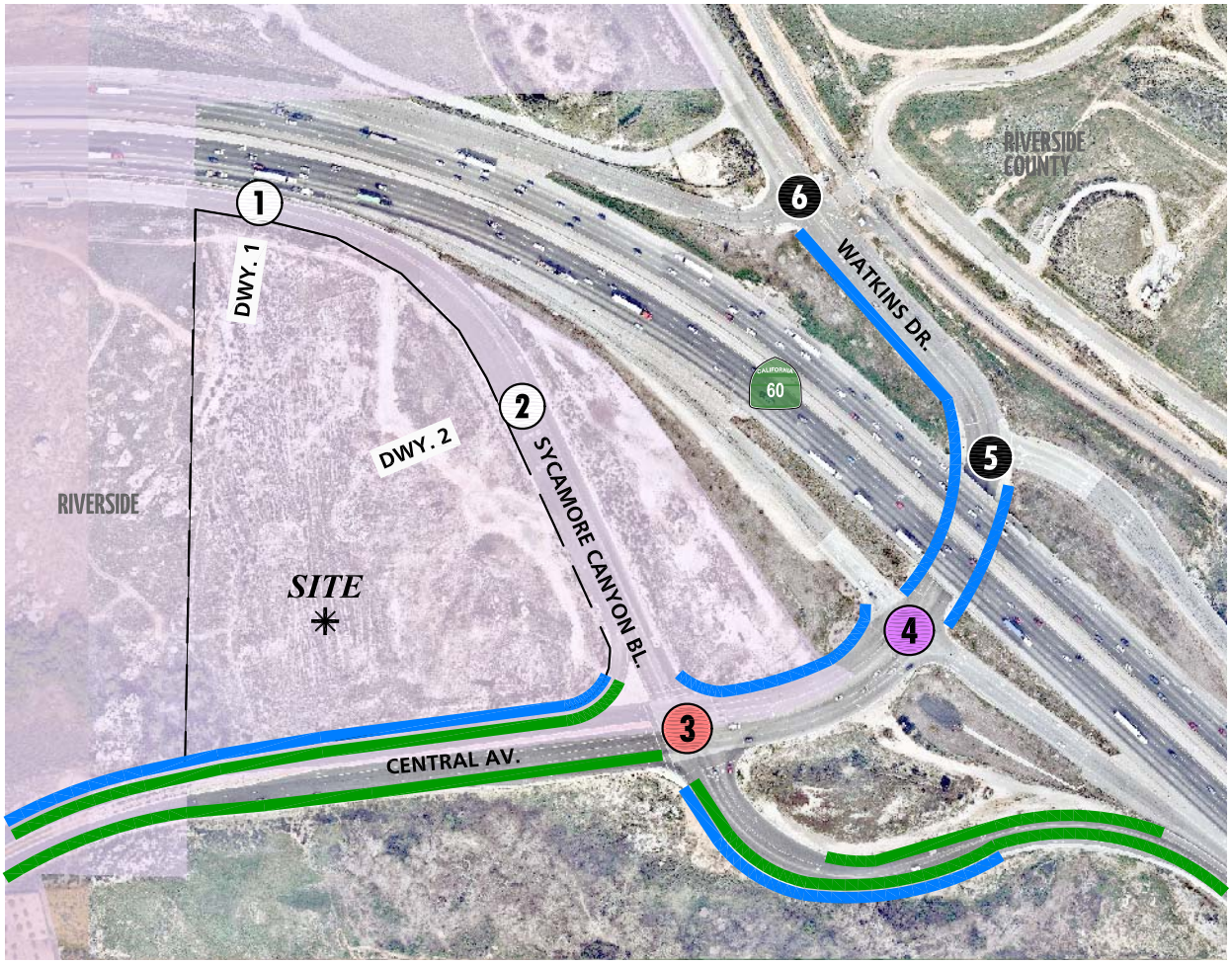
LEGEND:

= RTA ROUTE 16

= RTA ROUTE 208/210

N

EXHIBIT 3-9: EXISTING PEDESTRIAN FACILITIES



LEGEND:

- = SIDEWALK
- = BIKE LANE
- 0 = NO CROSSWALK
- 0 = FUTURE INTERSECTION
- 0 = CROSSWALK ON TWO APPROACHES
- 0 = CROSSWALK ON ONE APPROACH

N

3.5 EXISTING (2019) TRAFFIC COUNTS

The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in May 2019, when local schools were in session. The following peak hours were selected for analysis:

- Weekday AM Peak Hour (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM Peak Hour (peak hour between 4:00 PM and 6:00 PM)

The weekday AM and weekday PM peak hour count data is representative of typical weekday peak hour traffic conditions in the study area. There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity or detour routes and near-by schools were in session and operating on normal schedules. The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1. These raw turning volumes have been flow conserved between intersections with limited access, no access and where there are currently no uses generating traffic (e.g., between ramp-to-arterial intersections, etc.).

The traffic counts collected in May 2019 for the Caltrans ramp-to-arterial facilities include the following vehicle classifications: Passenger Cars, 2-Axle Trucks, 3-Axle Trucks, and 4+ Axle Trucks. To represent the effects of large trucks, buses and recreational vehicles have on traffic flow at Caltrans intersections; truck traffic has been accounted for in the analysis as a percentage of total traffic at the Caltrans ramp-to-arterial intersections.

Existing weekday ADT volumes on arterial highways throughout the study area are shown on Exhibit 3-10. Where actual 24-hour tube count data was not available, Existing ADT volumes were based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

Weekday PM Peak Hour (Approach Volume + Exit Volume) x 11.54 = Leg Volume

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 8.66 percent. As such, the above equation utilizing a factor of 11.54 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 8.66 percent (i.e., 1/0.0866 = 11.54) and was assumed to sufficiently estimate ADT volumes for planning-level analyses. Existing weekday AM and weekday PM peak hour intersection volumes are also shown on Exhibit 3-10.

EXHIBIT 3-10: EXISTING (2019) TRAFFIC VOLUMES

1 Dwy. 1 & Sycamore Canyon Bl.	2 Sycamore Canyon Bl. & Dwy. 2	3 Sycamore Canyon Bl. & Central Av.	4 Central Av. & SR-60 EB Ramps	5 Central Av./ Watkins Dr. & SR-60 WB Off-Ramp	6 Watkins Dr. & SR-60 WB On-Ramp
Future Intersection	Future Intersection	6(7) 38(280) 37(75) / 29(47) 253(346) 44(231) / 13(12) 619(643) 76(459) / 253(266) 373(167) 880(282)	274(572) 174(670) / 92(9) 3(3) 52(52) / 1332(415) 204(585)	331(972) / 394(331) 117(270) / 1424(422)	85(11) 331(972) / 766(219) 1052(534)

LEGEND:

10.0 = ACTUAL (COUNT-BASED) VEHICLES PER DAY (1000'S)
10.0 = ESTIMATED VEHICLES PER DAY (1000'S)
10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES

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3.6 INTERSECTION OPERATIONS ANALYSIS

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. The intersection operations analysis results are summarized in Table 3-1 which indicates that all of the existing study area intersections are currently operating at an acceptable LOS during the peak hours. Consistent with Table 3-1, a summary of the peak hour intersection LOS for Existing conditions are shown on Exhibit 3-11. The intersection operations analysis worksheets are included in Appendix 3.2 of this TA.

3.7 TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for Existing traffic conditions are based on existing peak hour intersection turning volumes. All study area intersections are currently signalized and operating as an acceptable LOS with current traffic controls. As such, no traffic signal warrant analysis has been conducted for Existing traffic conditions.

3.8 ROADWAY SEGMENT ANALYSIS

The roadway segment capacities utilized for the purposes of this analysis are approximate figures only; and are used at the General Plan level to assist in determining the roadway functional classification (number of through lanes) needed to meet traffic demand. Table 3-2 provides a summary of the Existing (2019) conditions roadway segment capacity analysis based on the applicable roadway segment capacities. As shown in Table 3-2, the following study area roadway segment is currently operating at an unacceptable LOS based on the applicable planning level daily roadway capacities:

- Sycamore Canyon Boulevard, South of Central Avenue (#4) – LOS E

3.9 FREEWAY OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the SR-60 Freeway at Central Avenue interchange to assess vehicle queues for the off ramps that may potentially result in deficient peak hour operations at the ramp-to-arterial intersections and may potentially "spill back" onto the SR-60 Freeway mainline. Queuing analysis findings are presented in Table 3-3. It is important to note that off-ramp lengths are consistent with the measured distance between the intersection and the freeway mainline. As shown in Table 3-3, there are no movements that are currently experiencing queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows. Worksheets for Existing traffic conditions off-ramp queuing analysis are provided in Appendix 3.3.

Table 3-1

Intersection Analysis for Existing (2019) Conditions

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service		Acceptable LOS[4]
			Northbound			Southbound			Eastbound			Westbound							
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM	
1	Driveway 1 & Sycamore Canyon Bl.		Intersection Does Not Exist																D
2	Sycamore Canyon Bl. & Driveway 2		Intersection Does Not Exist																D
3	Sycamore Canyon Bl. & Central Av.	TS	1	1	1	1	2	1	1	3	1	2	2	0	40.5	39.5	D	D	D
4	Central Av. & SR-60 EB Ramps	TS	0	2	1	2	2	0	1	1	1	0	0	0	14.2	15.4	B	B	D
5	Watkins Dr./Central Av. & SR-60 WB Off-Ramp	TS	0	2	0	0	2	0	0	0	0	2	0	1	21.4	12.2	C	B	D
6	Watkins Dr. & SR-60 WB On-Ramp	CSS	1	2	0	0	1	0	0	0	0	0	0	0	18.8	14.2	C	B	D

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right

[2] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] CSS = Cross-street Stop; TS = Traffic Signal

[4] Minimum acceptable LOS for each applicable jurisdiction.

Table 3-2

Roadway Segment Analysis for Existing (2019) Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	Existing (2019)	V/C[2]	LOS[3]	Acceptable LOS
1	Central Av.	West of Sycamore Canyon Bl.	4D	33,000	18,531	0.56	A	D
2	Sycamore Canyon Bl.	West of Driveway 1	2U	18,000	6,687	0.37	A	D
3	Sycamore Canyon Bl.	North of Central Av.	4D	22,000	6,687	0.30	A	D
4	Sycamore Canyon Bl.	South of Central Av.	4D	22,000	**21,474**	**0.98**	**E**	D

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] These maximum roadway capacities have been extracted from the following source: City of Riverside Traffic Impact Analysis Preparation Guide (Exhibit D) for each applicable roadway type. These roadway capacities are "rule of thumb" estimates for planning purposes. The LOS "E" service volumes are estimated maximum daily capacity for respective classifications. Capacity is affected by such factors as intersections (spacing, configuration and control features), degree of access control, roadway grades, design geometrics (horizontal and vertical alignment standards), sight distance, vehicle mix (truck and bus traffic) and pedestrian and bicycle traffic.

[2] v/c = Volume-to-capacity

[3] LOS = Level of Service

Table 3-3

Peak Hour Off-Ramp Queuing Analysis for Existing (2019) Conditions

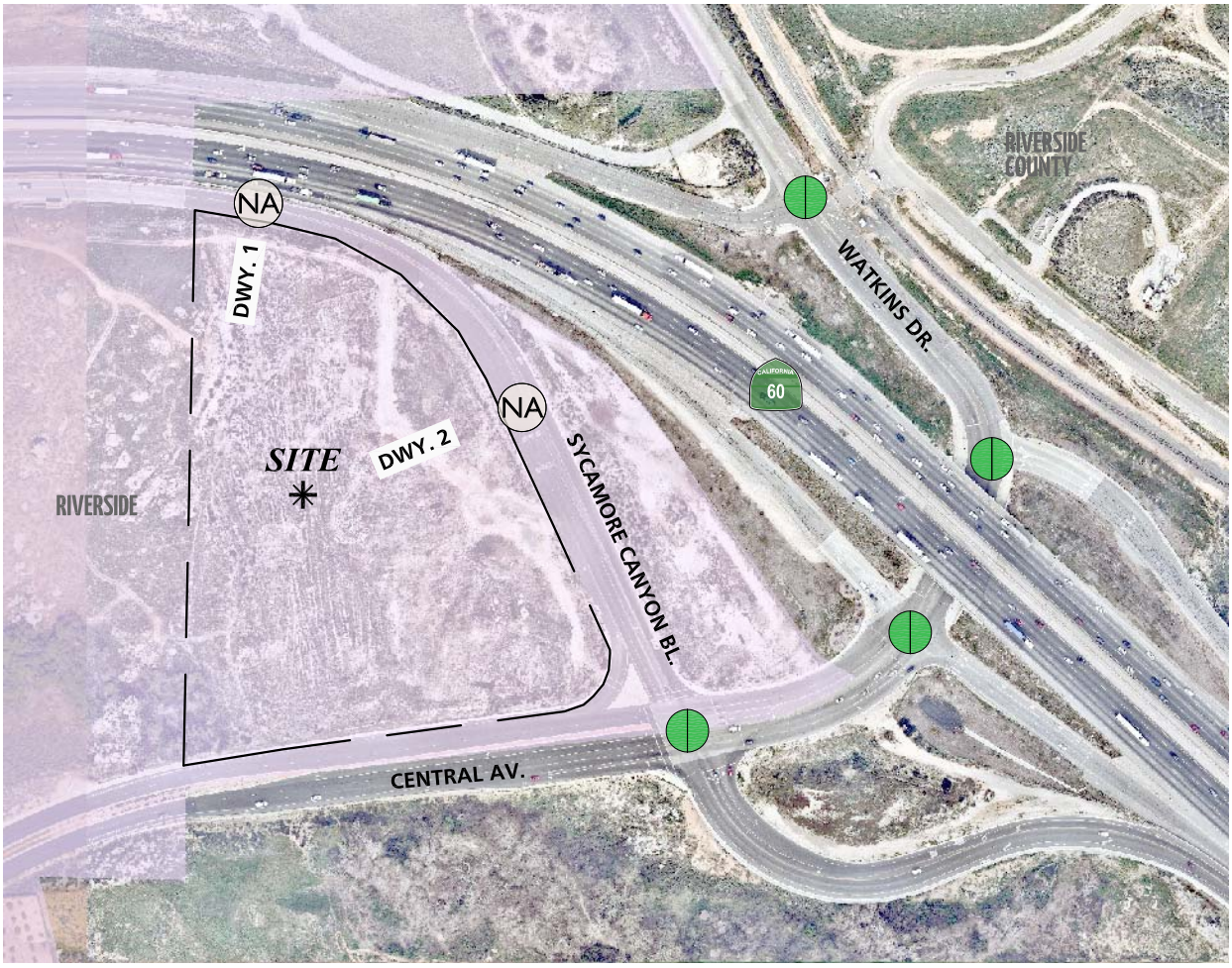
Intersection	Movement	Stacking Distance (Feet)	95th Percentile Stacking Distance Required (Feet)		Acceptable? [1]	
			AM Peak Hour	PM Peak Hour	AM	PM
Central Av. & SR-60 EB Off-Ramp						
	EBL	400	71	14	Yes	Yes
	EBT/R	1,055	21	21	Yes	Yes
	EBR	115	0	0	Yes	Yes
Central Av./Watkins Dr. & SR-60 WB Off-Ramp						
	WBL	1,230	34	69	Yes	Yes
	WBR	300	290 [2]	68	Yes	Yes

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

EXHIBIT 3-11: EXISTING (2019) SUMMARY OF LOS



LEGEND:

- = AM PEAK HOUR
- = PM PEAK HOUR
- = LOS A-D
- = LOS E
- = LOS F
- NA = NOT AN ANALYSIS LOCATION FOR THIS SCENARIO

N

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4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by the Project, as well as the Project's trip assignment onto the study area roadway network. The Project is proposed to consist of up to 237 3-4-story multifamily residential dwelling units. For purposes of this TA, the following land uses are assumed:

- Buildings 1-5: 75 dwelling units of Multifamily Housing (Low Rise)
- Buildings 6-7: 162 dwelling units of Multifamily Housing (Mid-Rise)
- **Total of 237 dwelling units**

The Project's anticipated Opening Year is 2022. Vehicular access will be provided via the following driveways:

- Driveway 1 & Sycamore Canyon Boulevard – Egress access only
- Sycamore Canyon Boulevard & Driveway 2 – Full access driveway (proposed to align, with an offset of 28-feet, with the future driveway for the Sycamore Canyon Commercial use)

Regional access to the site is provided via the SR-60 Freeway at Central Avenue/Watkins Drive.

4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic which is both attracted to and produced by a development. Determining traffic generation for a specific project is therefore based upon forecasting the amount of traffic that is expected to be both attracted to and produced by the specific land uses being proposed for a given development.

Trip generation rates used to estimate the proposed Project traffic are shown in Table 4-1. A summary of the Project's trip generation is also shown in Table 4-1. The trip generation rates used for this analysis are based upon information collected by the ITE as provided in their Trip Generation Manual (10^{th} Edition, 2017). (3) For purposes of this analysis, the following ITE land use codes and vehicle mixes have been utilized:

- ITE land use code 220 (Multifamily Housing (Low Rise)
- ITE land use code 221 (Multifamily Housing (Mid-Rise)

As shown in Table 4-1, the proposed Project is anticipated to generate a total of 1,432 trip-ends per day with 93 AM peak hour trips and 114 PM peak hour trips.

Table 4-1

Project Trip Generation Rates & Trip Generation Summary

Land Use	Units[2]	ITE LU Code	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Trip Generation Rates[1]									
Multifamily Housing (Low Rise)	DU	220	0.11	0.35	0.46	0.35	0.21	0.56	7.32
Multifamily Housing (Mid-Rise)	DU	221	0.09	0.27	0.36	0.27	0.17	0.44	5.44

Land Use	Quantity	Units[2]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Trip Generation Summary									
Crestview Apartments									
Buildings 1-5 (3 Floors)	75	DU	8	27	35	26	16	42	550
Buildings 6-7 (4 Floors)	162	DU	15	43	58	43	28	71	882
TOTAL	**237**	**DU**	**23**	**70**	**93**	**70**	**44**	**114**	**1,432**

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Tenth Edition (2017).

[2] DU = Dwelling Units

4.2 PROJECT TRIP DISTRIBUTION

The Project trip distribution and assignment process represents the directional orientation of traffic to and from the Project site. The trip distribution patterns are heavily influenced by the geographical location of the site, proposed land use, the location of surrounding uses, existing and proposed roadway connections, and the proximity to the regional freeway system. Exhibit 4-1 shows the Project trip distribution patterns.

4.3 MODAL SPLIT

The potential for Project trips (non-truck) to be reduced by the use of public transit, walking or bicycling have not been included as part of the Project's estimated trip generation. Essentially, the Project's traffic projections are "conservative" in that these alternative travel modes would reduce the forecasted traffic volumes.

4.4 PROJECT TRIP ASSIGNMENT

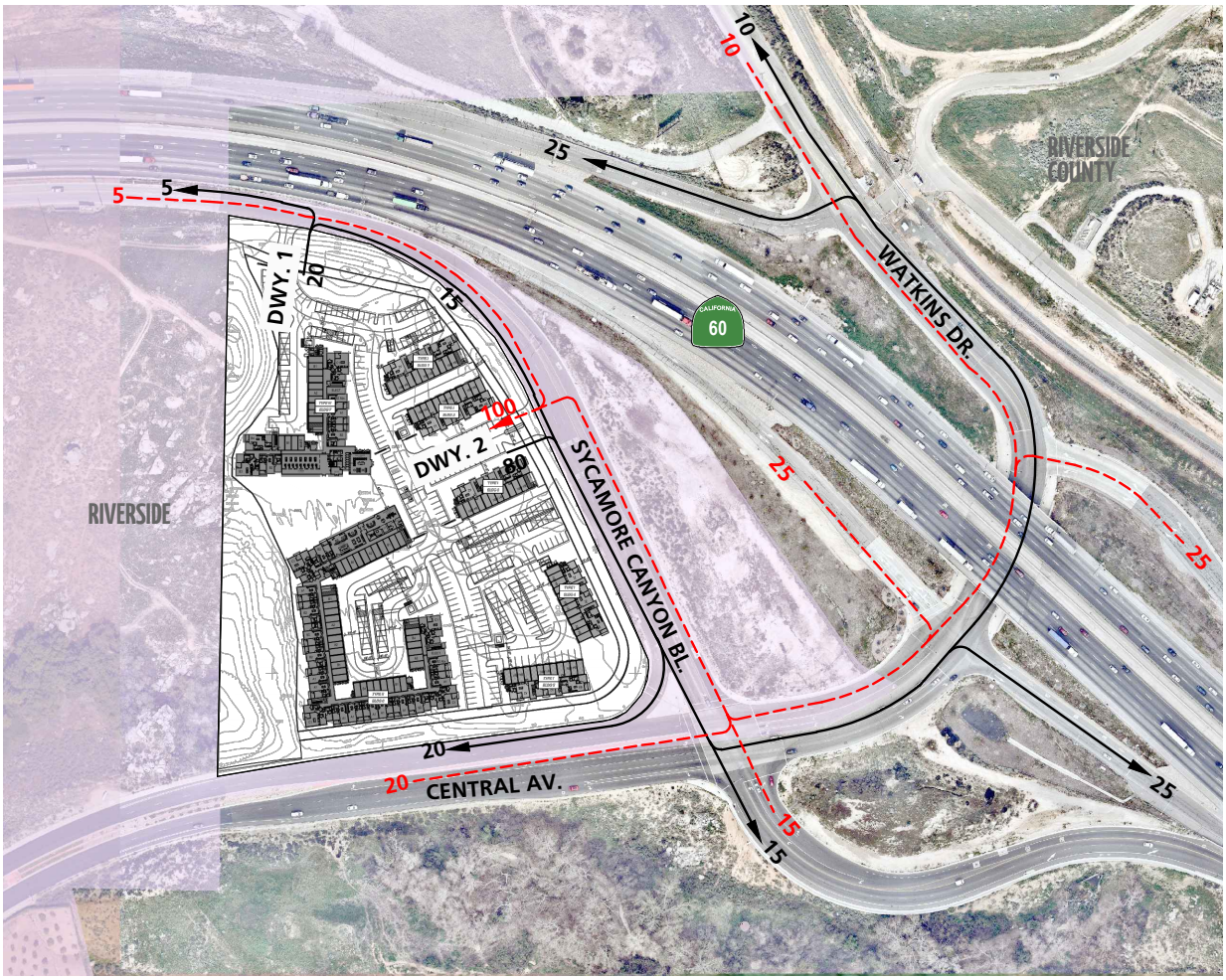
The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, Project ADT and peak hour intersection turning movement volumes are shown on Exhibit 4-2.

4.5 CUMULATIVE DEVELOPMENT TRAFFIC

A cumulative project list was developed for the purposes of this analysis through consultation with planning and engineering staff from the City of Riverside. The cumulative project list includes known and foreseeable projects that are anticipated to contribute traffic to the study area intersections. The City of Moreno Valley and County of Riverside have also been contacted to obtain the most current list of cumulative projects from their respective jurisdictions.

Where applicable, cumulative projects anticipated to contribute measurable traffic to study area intersections have been manually added to the study area network to generate Opening Year Cumulative and Horizon Year forecasts. In other words, this list of cumulative development projects has been reviewed to determine which projects would likely contribute measurable traffic through the study area intersections (e.g., those cumulative projects in close proximity to the proposed Project). For the purposes of this analysis, the cumulative projects that were determined to affect one or more of the study area intersections are shown on Exhibit 4-3 and listed in Table 4-2 have been considered for inclusion. Exhibit 4-4 shows the cumulative only ADT and peak hour intersection volumes.

EXHIBIT 4-1: PROJECT TRIP DISTRIBUTION



LEGEND:

10 = PERCENT TO/FROM PROJECT

= OUTBOUND

= INBOUND

N

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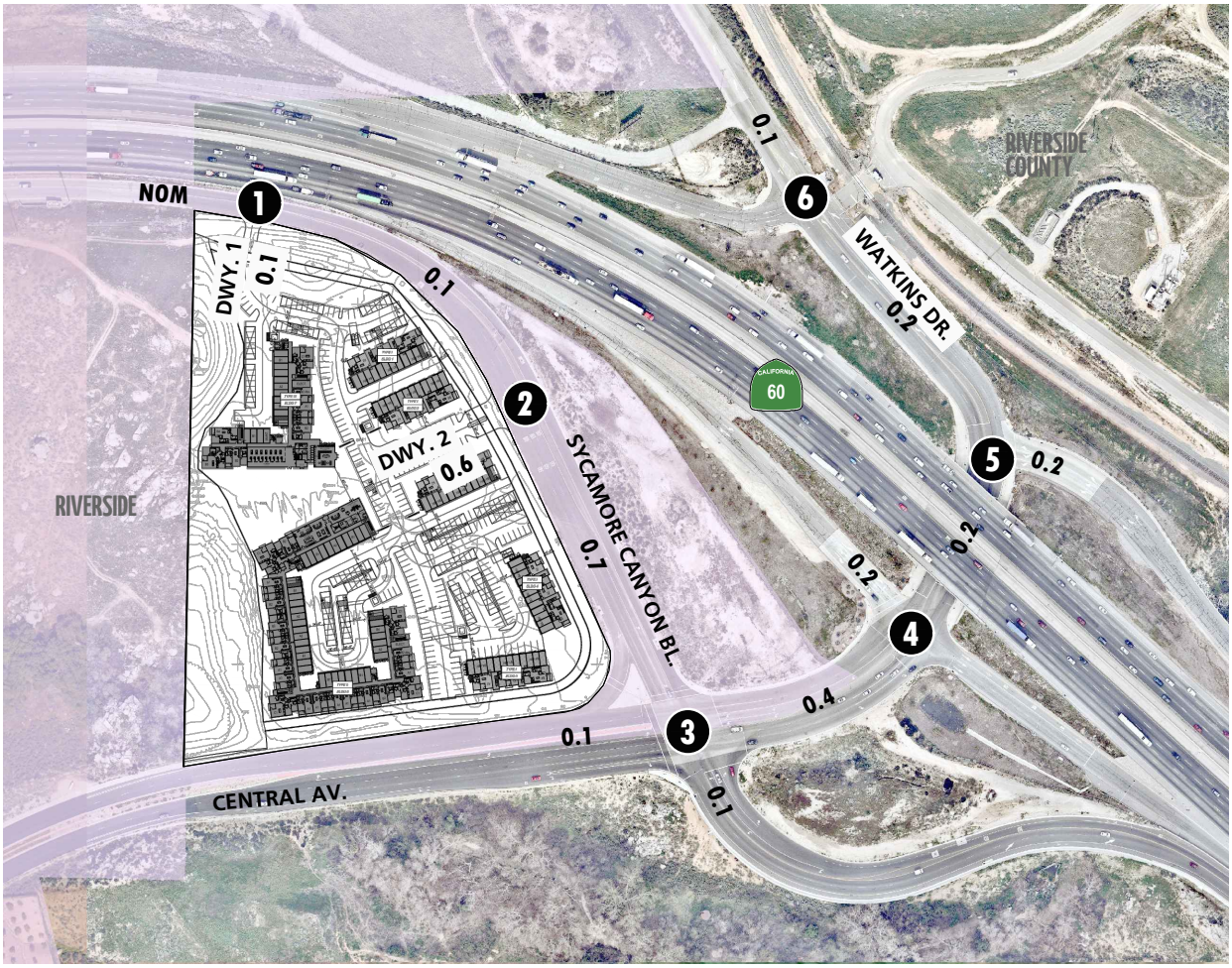
EXHIBIT 4-2: PROJECT ONLY TRAFFIC VOLUMES



1 Dwy. 1 & Sycamore Canyon Bl.	2 Sycamore Canyon Bl. & Dwy. 2	3 Sycamore Canyon Bl. & Central Av.	4 Central Av. & SR-60 EB Ramps	5 Central Av./ Watkins Dr. & SR-60 WB Off-Ramp	6 Watkins Dr. & SR-60 WB On-Ramp
←0(0)	1(3) 10(6)	14(9) 10(6) 41(26)	8(24) 0(0)	2(7)	0(0) 2(7)
		→13(41) ←0(0) ←0(0)		←0(0) ←6(17)	
1(3)→	0(0)→ 54(34)→	4(14)→ 0(0)→ 0(0)→	0(0)→ 0(0)→ 6(17)→	24(15)	17(11) 7(4)
3(2) 10(6)	21(65) 0(0)	0(0) 3(10) 0(0)	24(15) 17(11)		

LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES
10.0 = VEHICLES PER DAY (1000'S)

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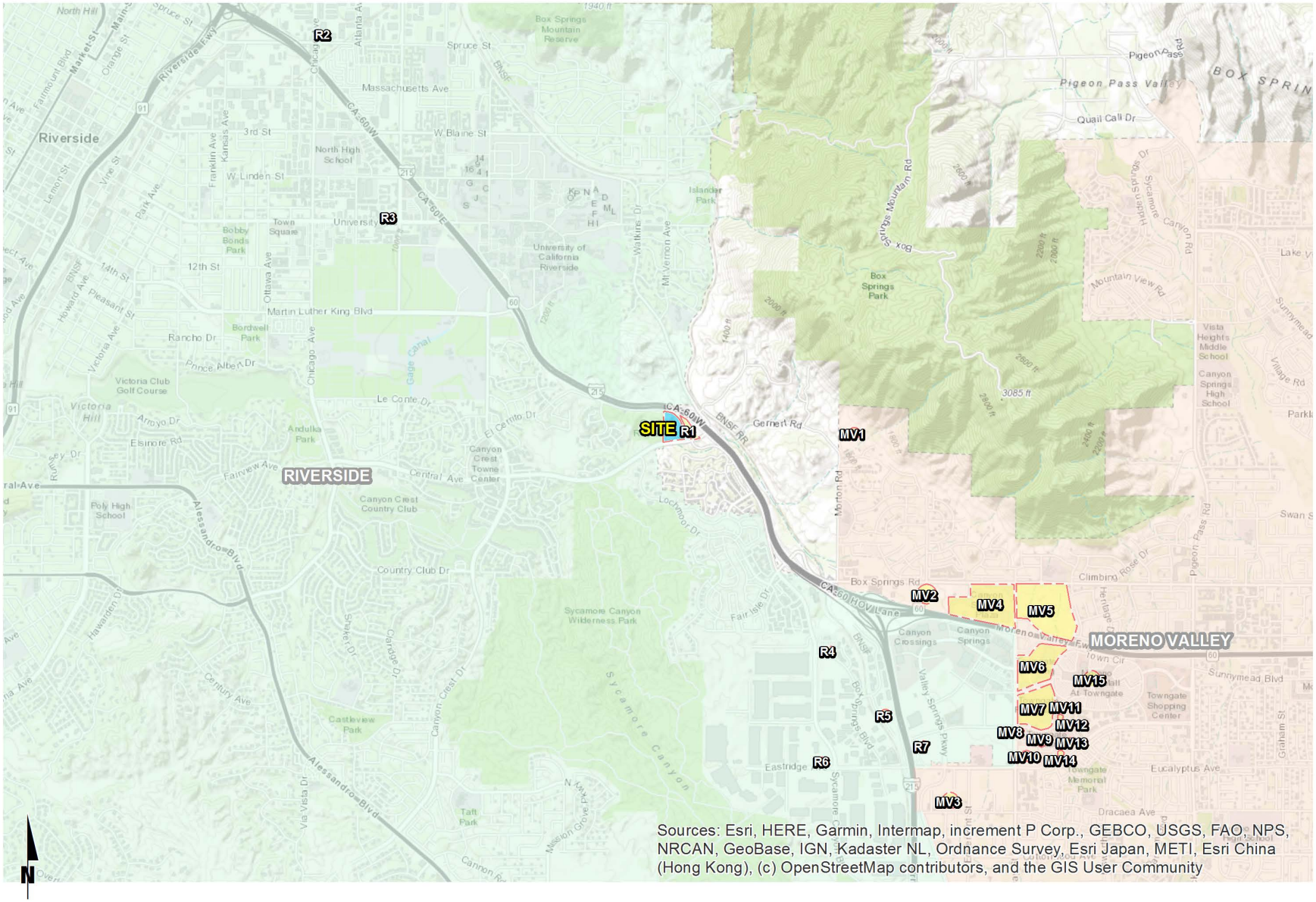
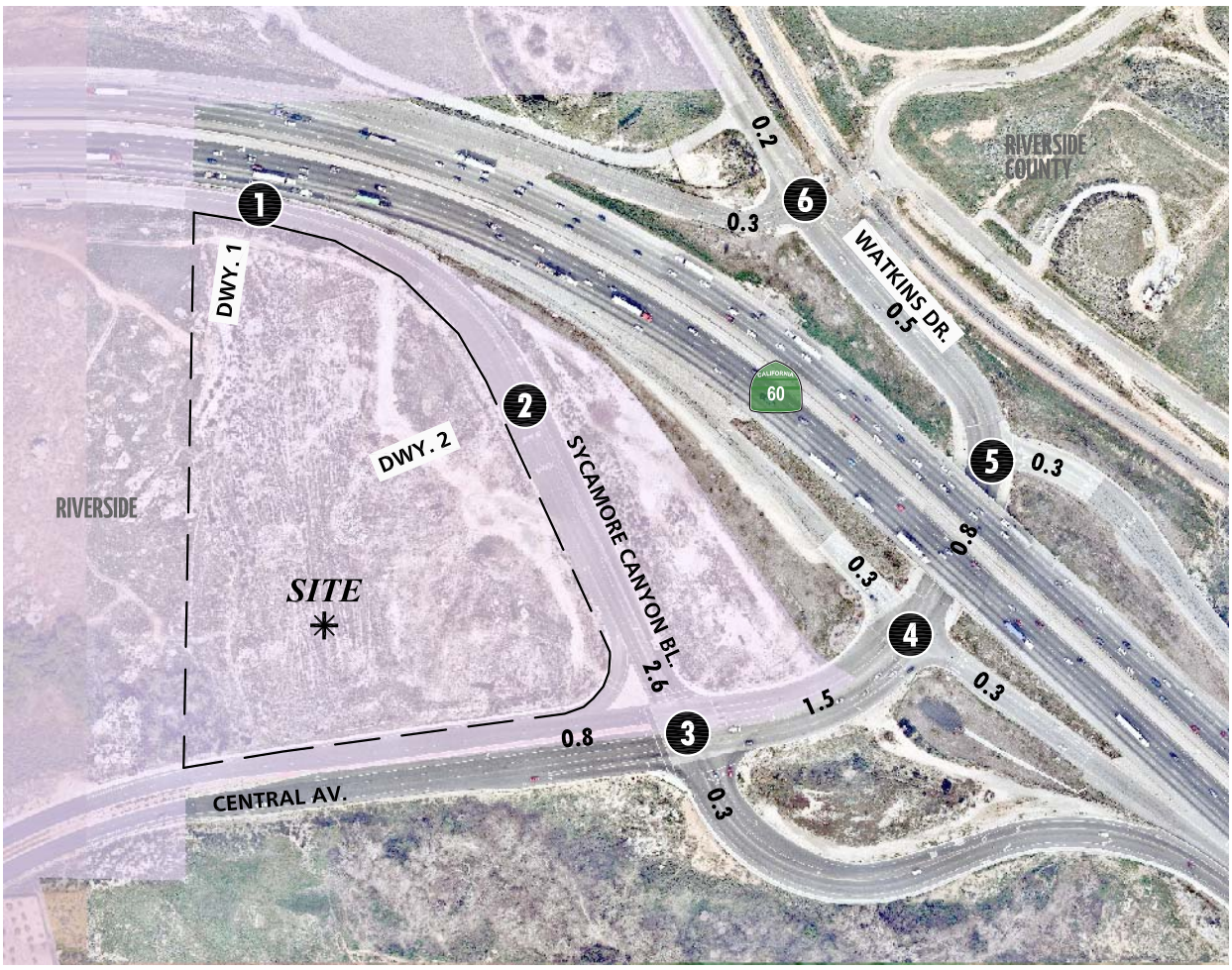
EXHIBIT 4-3: CUMULATIVE DEVELOPMENT LOCATION MAP



URBAN CROSSROADS

EXHIBIT 4-4: CUMULATIVE ONLY TRAFFIC VOLUMES



1 Dwy. 1 & Sycamore Canyon Bl.	2 Sycamore Canyon Bl. & Dwy. 2	3 Sycamore Canyon Bl. & Central Av.	4 Central Av. & SR-60 EB Ramps	5 Central Av./ Watkins Dr. & SR-60 WB Off-Ramp	6 Watkins Dr. & SR-60 WB On-Ramp
Future Intersection	0(0) 37(36) 18(17) 142(134) 18(17) 74(72)	33(32) 13(13) 60(57) 63(60) 0(0) 0(0) 35(34) 0(0) 0(0) 0(0) 0(0) 14(13) 0(0)	35(34) 0(0) 0(0) 0(0) 28(27) 33(32) 27(25)	7(7) 0(0) 28(27) 33(32)	0(0) 7(7) 27(25) 7(6)

LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES
10.0 = VEHICLES PER DAY (1000'S)

Table 4-2

Summary of Cumulative Development Projects

No.	Project Name	Land Use	Quantity[1]	
City of Riverside				
R1	NEC Central Avenue and Sycamore Canyon Boulevard	Fast Food Restaurant with Drive Thru	3.800	TSF
		Gas Station with Convenience Store	12	VFP
R2	1695 Spruce Street	Charter School	6.647	TSF
R3	1301 University Avenue	Fast Food Restaurant with Drive Thru	2.819	TSF
R4	6150 Sycamore Canyon Boulevard	Warehouse	171.616	TSF
R5	6235 River Crest Drive	Church	7.471	TSF
R6	6465 Sycamore Canyon Boulevard	Health/Fitness Club	4.000	TSF
R7	6281 Valley Springs Parkway	Carwash	4.340	TSF
City of Moreno Valley				
MV1	Kincaid Development (Tract 33626)	Single Family Detached Residential	25	DU
MV2	Oak Park Partners (Tract 35414)	Multi Family Housing	266	DU
MV3	Apollo III Development Group (PEN16-0064)	Multi Family Housing	18	DU
MV4	Canyon Spring Center	Commercial Shopping Center	417.000	TSF
MV5	TownGate Highlands	Commercial Shopping Center	251.900	TSF
MV6	TownGate Crossing	Commercial Shopping Center	237.000	TSF
MV7	TownGate Promenade	Commercial Shopping Center	200.000	TSF
MV8	Residence Inn	Hotel	112	RM
MV9	The Quarter	Commercial Shopping Center	420.485	TSF
MV10	Holiday Inn Express	Hotel	104	RM
MV11	Hampton Inn & Suites	Hotel	115	RM
MV12	Ayres Suites	Hotel	127	RM
MV13	Fairfield Inn & Suites	Hotel	106	RM
MV14	TownGate Square	Office / Medical	170.000	TSF
MV15	Moreno Valley Mall	Commercial Shopping Center	1,200.000	TSF

[1] TSF = Thousand Square Feet; RM = Room, VFP = Vehicle Fueling Position; DU = Dwelling Unit

4.6 BACKGROUND TRAFFIC

4.6.1 OPENING YEAR CUMULATIVE CONDITIONS

Future year traffic forecasts have been based upon background (ambient) growth at 2.0% per year for 2022 traffic conditions. The ambient growth factor is intended to approximate regional traffic growth. The total ambient growth is 6.12% for 2022 traffic conditions (growth of 2.0 percent per year compounded over 3 years or $1.02^{3\ years}$). This ambient growth rate is added to existing traffic volumes to account for area-wide growth not reflected by cumulative development projects. Ambient growth has been added to daily and peak hour traffic volumes on surrounding roadways, in addition to traffic generated by the development of future projects that have been approved but not yet built and/or for which development applications have been filed and are under consideration by governing agencies.

Opening Year Cumulative (2022) traffic volumes are provided in Section 6 of this report. The traffic generated by the proposed Project was then manually added to the base volume to determine Opening Year Cumulative "With Project" forecasts for 2022.

4.6.2 HORIZON YEAR CONDITIONS

Horizon Year forecasts are based on the Riverside County Transportation Analysis Model (RivTAM) (see Section 4.7 *Horizon Year Traffic Forecasts* for additional discussion). The currently adopted Southern California Association of Governments (SCAG) 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) (April 2016) growth forecasts for the unincorporated areas of the City of Riverside identifies projected growth in population of 310,700 in 2012 to 386,600 in 2040, or a 24.4 percent increase over the 28-year period. (7) The change in population equates to roughly a 0.78 percent growth rate, compounded annually. Similarly, growth over the same 28-year period in households is projected to increase by 28.4 percent, or 0.90 percent annual growth rate. Finally, growth in employment over the same 28-year period is projected to increase by 67.08 percent, or a 1.85 percent annual growth rate.

Based on a comparison of Existing (2019) traffic volumes to the Horizon Year forecasts, the average growth rate is estimated at approximately 1.56%, compounded annually between Existing (2019) and 2040 traffic conditions. The annual growth rate at each individual intersection is not lower than 1.18% compounded annually to as high as 2.0% compounded annually over the same time period.

Therefore, the annual growth rate utilized for the purposes of this analysis would appear to be consistent with the anticipated regional growth in the City of Riverside for Opening Year Cumulative and Horizon Year traffic conditions, especially when considered along with the addition of project-related traffic. As such, the growth in traffic volumes assumed in this traffic analysis would tend to overstate as opposed to understate the potential deficiencies to traffic and circulation.

4.7 HORIZON YEAR TRAFFIC FORECASTS

Traffic projections for Horizon Year conditions were derived from the RivTAM regional model using accepted procedures for model forecast refinement and smoothing. The traffic forecasts reflect the area-wide growth anticipated between Existing and Horizon Year traffic conditions. The base model year for the RivTAM regional model is Year 2012.

In most instances the traffic model zone structure is not designed to provide accurate turning movements along arterial roadways unless refinement and reasonableness checking is performed. Therefore, the Horizon Year peak hour forecasts were refined using the model derived long-range forecasts, base (validation) year model forecasts, along with existing peak hour traffic count data collected at each analysis location.

The refined future peak hour approach and departure volumes obtained from these calculations are then entered into a spreadsheet program consistent with the National Cooperative Highway Research Program (NCHRP Report 255), along with initial estimates of turning movement proportions. A linear programming algorithm is used to calculate individual turning movements which match the known directional roadway segment forecast volumes computed in the previous step. This program computes a likely set of intersection turning movements from intersection approach counts and the initial turning proportions from each approach leg.

Typically, the model growth is prorated and is subsequently added to the existing (base validation) traffic volumes to represent Horizon Year traffic conditions. However, review of the resulting model growth indicates negative growth for some of the study area intersections. In an effort to conduct a conservative analysis, reductions to traffic forecasts from either Existing or Opening Year Cumulative traffic conditions were not assumed as part of this analysis. As such, in conjunction with the addition of cumulative projects that are not consistent with the General Plan, additional growth has also been applied on a movement-by-movement basis, where applicable, to estimate reasonable Horizon Year forecasts. Horizon Year turning volumes were compared to Opening Year Cumulative volumes in order to ensure a minimum growth as a part of the refinement process. The minimum growth includes any additional growth between Opening Year Cumulative and Horizon Year traffic conditions that is not accounted for by the traffic generated by cumulative development projects and ambient growth rates assumed between Existing (2019) and Horizon Year traffic conditions. Future estimated peak hour traffic data was used for new intersections and intersections with an anticipated change in travel patterns to further refine the Horizon Year peak hour forecasts.

The future Horizon Year Without Project peak hour turning movements were then reviewed by Urban Crossroads for reasonableness, and in some cases, were adjusted to achieve flow conservation, reasonable growth, and reasonable diversion between parallel routes. Flow conservation checks ensure that traffic flow between two closely spaced intersections, such as two freeway ramp locations, is verified in order to make certain that vehicles leaving one intersection are entering the adjacent intersection and that there is no unexplained loss of vehicles. The result of this traffic forecasting procedure is a series of traffic volumes which are suitable for traffic operations analysis.

In an effort to conduct a conservative analysis and overstate as opposed to understate potential traffic deficiencies, the Horizon Year traffic forecasts include background traffic, traffic generated by other cumulative development projects within the study area, and the traffic generated by the proposed Project. Post-processing worksheets for Horizon Year (2040) Without Project traffic conditions are provided in Appendix 4.1.

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5 EXISTING PLUS PROJECT TRAFFIC CONDITIONS

This section discusses the traffic forecasts for Existing plus Project (E+P) conditions and the resulting intersection operations, roadway segment operations, and traffic signal warrant analyses.

5.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for E+P conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for E+P conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).

5.2 EXISTING PLUS PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus Project traffic. Exhibit 5-1 shows the ADT and weekday peak hour intersection turning movement volumes which can be expected for E+P traffic conditions.

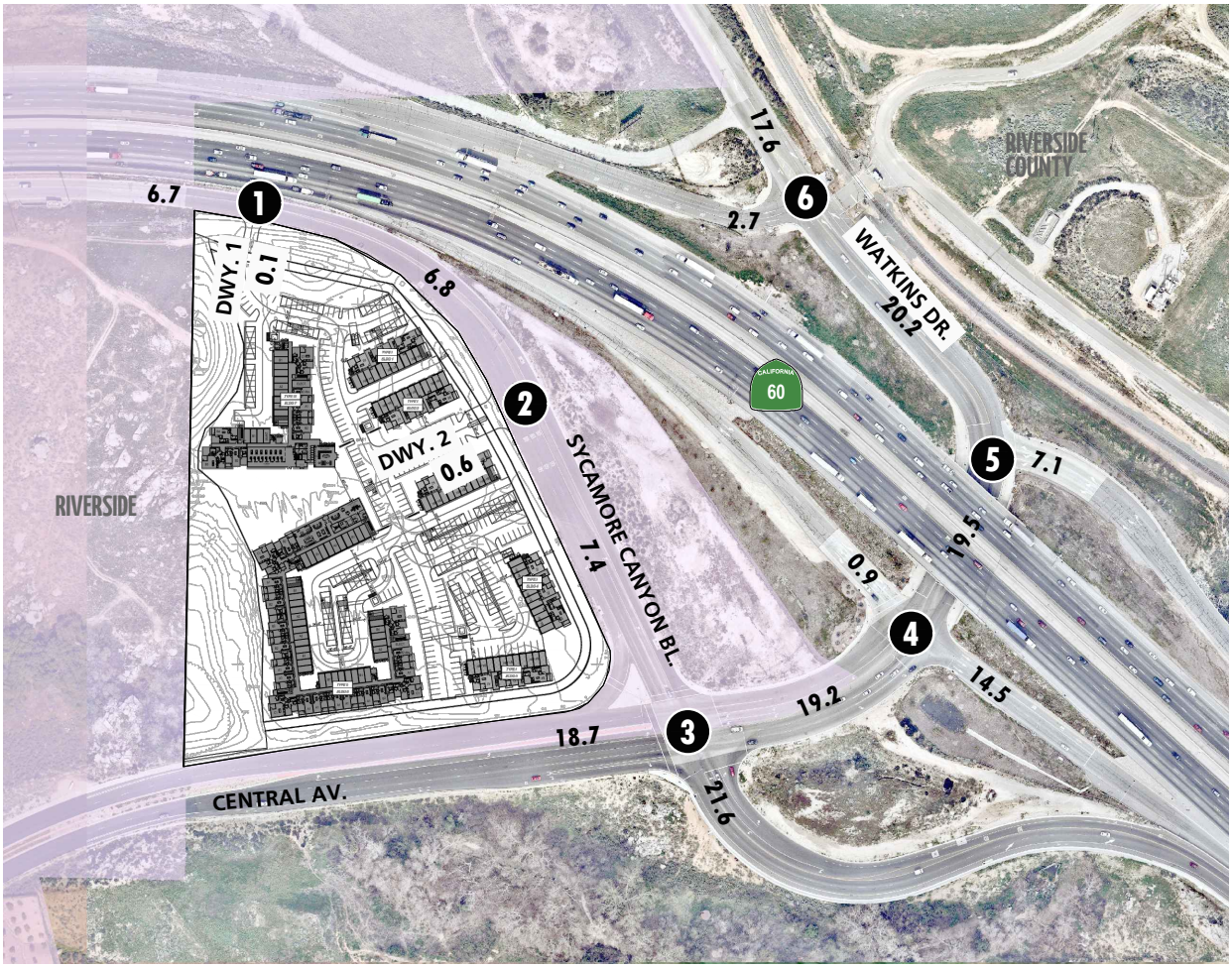
5.3 INTERSECTION OPERATIONS ANALYSIS

E+P peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TA. The intersection analysis results are summarized in Table 5-1, which indicates that the study area intersections are anticipated to operate at acceptable LOS, consistent with Existing traffic conditions. A summary of the Project-specific deficiencies and recommendations, including a review of the increase in delay of the study area intersections, is presented in Section 5.7. A summary of the peak hour intersection LOS for E+P conditions are shown on Exhibit 5-2. The intersection operations analysis worksheets for E+P traffic conditions are included in Appendix 5.1 of this TA.

5.4 ROADWAY SEGMENT ANALYSIS

The roadway segment capacities utilized for the purposes of this analysis are approximate figures only, and are used at the General Plan level to assist in determining the roadway functional classification (number of through lanes) needed to meet traffic demand. Table 5-2 provides a summary of the E+P conditions roadway segment capacity analysis based on the applicable roadway segment capacity. As shown in Table 5-2, all the study area roadway segments are anticipated to continue to operate at an acceptable LOS under E+P conditions with the addition of Project traffic, with the exception of Sycamore Canyon Boulevard south of Central Avenue. This deficiency is consistent with Existing traffic conditions.

EXHIBIT 5-1: E+P TRAFFIC VOLUMES



1 Dwy. 1 & Sycamore Canyon Bl.	2 Sycamore Canyon Bl. & Dwy. 2	3 Sycamore Canyon Bl. & Central Av.	4 Central Av. & SR-60 EB Ramps	5 Central Av./ Watkins Dr. & SR-60 WB Off-Ramp	6 Watkins Dr. & SR-60 WB On-Ramp
←415(226)	1(3) ↓ 91(368)	20(16) ↓ 48(286) ↓ 78(101) ↓ ←42(88) ←253(346) ←44(231)	282(596) ↓ 174(670)	333(979) ↓ ←394(331) ←123(287)	85(11) ↓ 333(979)
82(365)→ 3(2) ↑ 10(6) ←	0(0)→ 54(34)← 21(65) ↑ 415(226)	17(26)→ 619(643)→ 76(459)↓ 253(266) ↑ 376(177) ↑ 880(282) ↑	92(9)→ 3(3)→ 58(69)↓ 1356(430) ↑ 221(596) ↑	1448(437) ↑	783(230) ↑ 1059(538) ↑

LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES
10.0 = VEHICLES PER DAY (1000'S)

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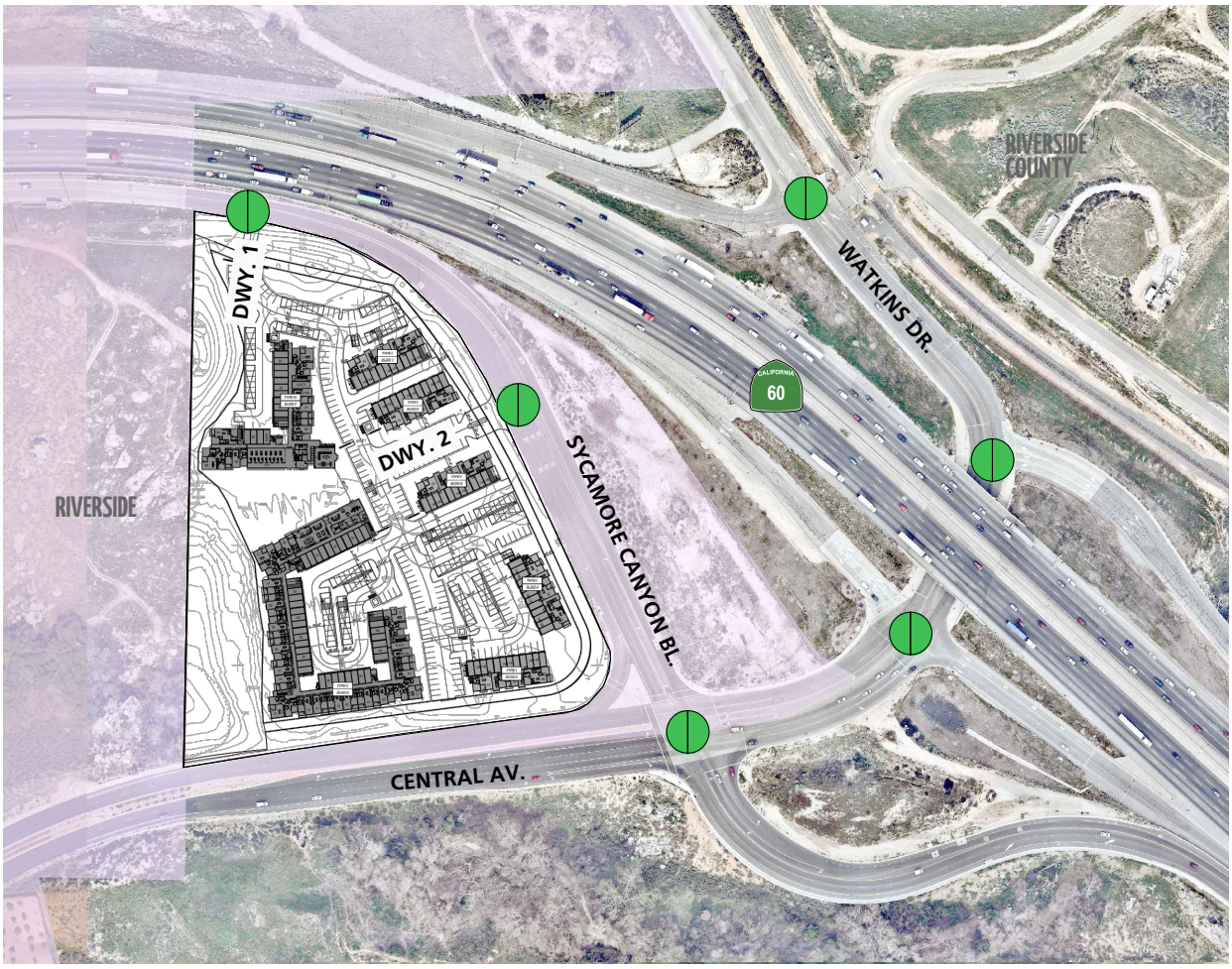
EXHIBIT 5-2: E+P SUMMARY OF LOS



LEGEND:

- = AM PEAK HOUR
- = PM PEAK HOUR
- = LOS A-D
- = LOS E
- = LOS F

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Table 5-1

Intersection Analysis for E+P Conditions

#	Intersection	Traffic Control[3]	Existing (2019) Delay[2] (secs.) AM	Existing (2019) Delay[2] (secs.) PM	Existing (2019) Level of Service AM	Existing (2019) Level of Service PM	E+P Delay[2] (secs.) AM	E+P Delay[2] (secs.) PM	E+P Level of Service AM	E+P Level of Service PM	Change in Delay AM	Change in Delay PM	Project-Specific Traffic Deficiency?[3]
1	Driveway 1 & Sycamore Canyon Bl.	**CSS**	Future Intersection				9.4	10.9	A	B	--	--	No
2	Sycamore Canyon Bl. & Driveway 2	**CSS**	Future Intersection				8.8	9.7	A	A	--	--	No
3	Sycamore Canyon Bl. & Central Av.	TS	40.5	39.5	D	D	45.3	40.0	D	D	4.8	0.5	No
4	Central Av. & SR-60 EB Ramps	TS	14.2	15.4	B	B	14.2	16.0	B	B	0.0	0.6	No
5	Watkins Dr./Central Av. & SR-60 WB Off-Ramp	TS	21.4	12.2	C	B	21.5	12.4	C	B	0.1	0.2	No
6	Watkins Dr. & SR-60 WB On-Ramp	CSS	18.8	14.2	C	B	19.8	14.6	C	B	1.0	0.4	No

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all-way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] CSS = Cross-street Stop; TS = Traffic Signal; **CSS** = Improvement

[3] Project-specific traffic deficiency occurs when the addition of project-related trips causes either peak hour LOS to degrade from acceptable LOS (LOS A through LOS D) to unacceptable levels (LOS E or LOS F) or the peak hour delay is increased by the following values:

LOS A/B = 10 seconds or more
LOS C = 8 seconds or more
LOS D = 5 seconds or more
LOS E = 2 seconds or more
LOS F = 1 second or more

Table 5-2

Roadway Segment Analysis for E+P Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	Existing (2019)	V/C[2]	LOS[3]	E+P	V/C[2]	LOS[3]	Acceptable LOS
1	Central Av.	West of Sycamore Canyon Bl.	4D	33,000	18,531	0.56	A	18,670	0.57	A	D
2	Sycamore Canyon Bl.	West of Driveway 1	2U	18,000	6,687	0.37	A	7,337	0.41	A	D
3	Sycamore Canyon Bl.	North of Central Av.	4D	22,000	6,687	0.30	A	7,346	0.33	A	D
4	Sycamore Canyon Bl.	South of Central Av.	4D	22,000	**21,474**	**0.98**	**E**	**21,578**	**0.98**	**E**	D

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] These maximum roadway capacities have been extracted from the following source: City of Riverside Traffic Impact Analysis Preparation Guide (Exhibit D) for each applicable roadway type. These roadway capacities are "rule of thumb" estimates for planning purposes. The LOS "E" service volumes are estimated maximum daily capacity for respective classifications. Capacity is affected by such factors as intersections (spacing, configuration and control features), degree of access control, roadway grades, design geometrics (horizontal and vertical alignment standards), sight distance, vehicle mix (truck and bus traffic) and pedestrian and bicycle traffic.

[2] v/c = Volume-to-capacity

[3] LOS = Level of Service

5.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

For E+P conditions, no study area intersections are anticipated to meet planning level (ADT-based) traffic signal warrants (see Appendix 5.2).

5.6 OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the SR-60 Freeway at Central Avenue to assess vehicle queues for the off ramps that may potentially result in deficient peak hour operations at the ramp-to-arterial intersections and may potentially "spill back" onto the SR-60 Freeway mainline. Queuing analysis findings are presented in Table 5-3 for E+P traffic conditions. It is important to note that off-ramp lengths are consistent with the measured distance between the intersection and the freeway mainline. As shown in Table 5-3, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows for E+P traffic conditions. Worksheets for E+P traffic conditions off-ramp queuing analysis are provided in Appendix 5.3 for E+P traffic conditions.

5.7 PROJECT DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

This section provides a summary of Project deficiencies and recommended improvements.

5.7.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

As shown previously in Table 5-1, the study area intersections are anticipated to operate at an acceptable LOS during the peak hours under E+P traffic conditions. As such, no improvements have been recommended.

5.7.2 RECOMMENDED IMPROVEMENTS TO ADDRESS OFF-RAMP QUEUES

A queuing analysis was performed for the off-ramps at the SR-60 Freeway at Central Avenue interchange to assess vehicle queues for the off ramps that may potentially result in deficient peak hour operations at the ramp-to-arterial intersections and may potentially "spill back" onto the SR-60 Freeway mainline. Queuing analysis findings are presented in Table 5-3. It is important to note that off-ramp lengths are consistent with the measured distance between the intersection and the freeway mainline. As shown in Table 5-3, with the addition of Project traffic, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows. Worksheets for E+P off-ramp queuing analysis are provided in Appendix 5.3.

Table 5-3

Peak Hour Off-Ramp Queuing Analysis for E+P Conditions

Intersection	Movement	Stacking (Feet)	Existing (2019)				E+P			
			95th Percentile Stacking Distance Required (Feet)		Acceptable? [1]		95th Percentile Stacking Distance Required (Feet)		Acceptable? [1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
Central Av. & SR-60 EB Off-Ramp										
	EBL	400	71	14	Yes	Yes	71	14	Yes	Yes
	EBT/R	1,055	21	21	Yes	Yes	22	23	Yes	Yes
	EBR	115	0	0	Yes	Yes	0	0	Yes	Yes
Central Av./Watkins Dr. & SR-60 WB Off-Ramp										
	WBL	1,230	34	69	Yes	Yes	35	72	Yes	Yes
	WBR	300	290 [2]	68	Yes	Yes	291 [2]	74	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

5.7.3 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON ROADWAY SEGMENTS

The peak hour intersection operations analysis for the study area intersections on either end of the deficient roadway segment indicates acceptable peak hour operations during the peak hours (see Table 5-1). As such, no roadway segment widening has been recommended.

5.7.4 RECOMMENDED IMPROVEMENTS TO ADDRESS OFF-RAMP QUEUES

As shown previously in Table 5-3, there are no anticipated peak hour queuing issues at the SR-60 Freeway and Central Avenue interchange for E+P traffic conditions. As such, no improvements have been recommended.

6 OPENING YEAR CUMULATIVE (2022) TRAFFIC CONDITIONS

This section discusses the methods used to develop Opening Year Cumulative (2022) Without and With Project traffic forecasts, and the resulting intersection operations, roadway segment operations, and traffic signal warrant analyses.

6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Opening Year Cumulative (2022) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Opening Year Cumulative conditions only (e.g., intersection and roadway improvements along the Project's frontage and driveways).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Opening Year Cumulative conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways, such as the eastern extension of Driveway 2 on Sycamore Canyon Boulevard).

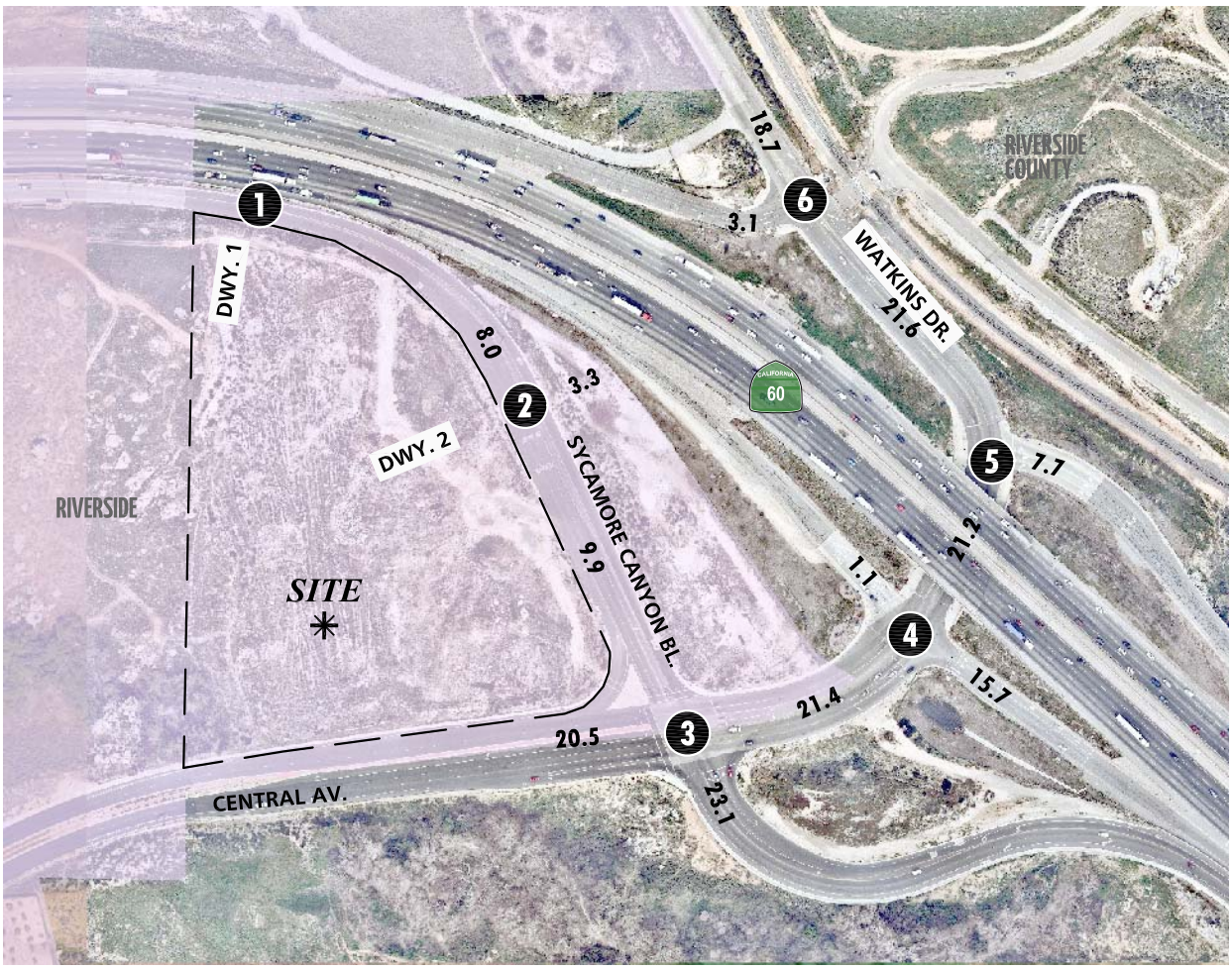
6.2 OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus an ambient growth factor of 6.12% plus traffic from pending and approved but not yet constructed known development projects in the area. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Opening Year Cumulative (2022) Without Project traffic conditions are shown on Exhibit 6-1.

6.3 OPENING YEAR CUMULATIVE (2022) WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Opening Year Cumulative (2022) Without Project traffic in conjunction with the addition of Project traffic. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Opening Year Cumulative (2022) With Project traffic conditions are shown on Exhibit 6-2.

EXHIBIT 6-1: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT TRAFFIC VOLUMES

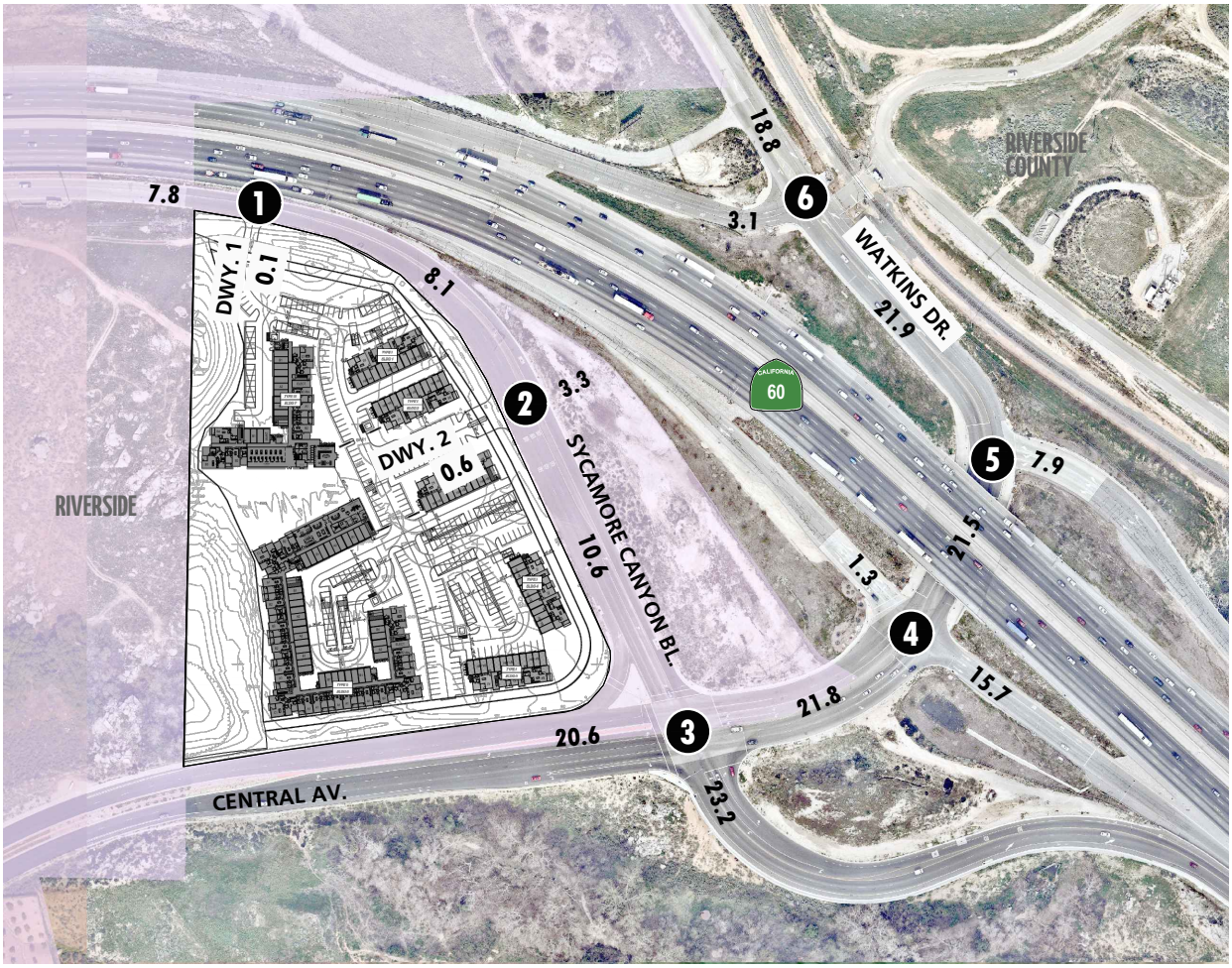


	1 Dwy. 1 & Sycamore Canyon Bl.	2 Sycamore Canyon Bl. & Dwy. 2	3 Sycamore Canyon Bl. & Central Av.	4 Central Av. & SR-60 EB Ramps	5 Central Av./ Watkins Dr. & SR-60 WB Off-Ramp	6 Watkins Dr. & SR-60 WB On-Ramp
Future Intersection		86(384) 37(36) 18(17) 142(134) 458(257) 74(72)	39(39) 53(310) 99(137) 94(110) 268(367) 47(245) 49(47) 657(682) 81(487) 268(282) 410(190) 934(299)	326(641) 185(711) 98(10) 3(3) 83(82) 1447(472) 243(646)	358(1038) 418(351) 152(314) 1544(480)	90(12) 358(1038) 840(257) 1123(573)

LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES
10.0 = VEHICLES PER DAY (1000'S)

EXHIBIT 6-2: OPENING YEAR CUMULATIVE (2022) WITH PROJECT TRAFFIC VOLUMES



1 Dwy. 1 & Sycamore Canyon Bl.	2 Sycamore Canyon Bl. & Dwy. 2	3 Sycamore Canyon Bl. & Central Av.	4 Central Av. & SR-60 EB Ramps	5 Central Av./ Watkins Dr. & SR-60 WB Off-Ramp	6 Watkins Dr. & SR-60 WB On-Ramp
←467(265)	1(3) ↓ 96(390) ↓ 37(36)	53(48) ↓ 63(316) ↓ 140(163)	334(665) ↓ 185(711)	360(1045) ↓	90(12) ↓ 360(1045) ↓
	→18(17) ←0(0) ←142(134)	→107(151) ←268(367) ←47(245)		→418(351) ←158(331)	
115(414)→	0(0)→ 0(0)→ 54(34)→	53(61)→ 657(682)→ 81(487)→	98(10)→ 3(3)→ 89(99)→		
3(2) ↑ 10(6) ↑	21(65) ↑ 458(257) ↑ 74(72) ↑	268(282) ↑ 413(200) ↑ 934(299) ↑	1471(487) ↑ 260(657) ↑	1568(495) ↑	857(268) ↑ 1130(577) ↑

LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES
10.0 = VEHICLES PER DAY (1000'S)

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6.4 INTERSECTION OPERATIONS ANALYSIS

6.4.1 OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT TRAFFIC CONDITIONS

LOS calculations were conducted for the study intersections to evaluate their operations under Opening Year Cumulative (2022) Without Project conditions with roadway and intersection geometrics consistent with Section 6.1 *Roadway Improvements*. As shown in Table 6-1, the study area intersections are anticipated to operate at acceptable levels of service, with the exception of the following location:

- Sycamore Canyon Boulevard & Central Avenue (#3) – LOS E AM peak hour only

A summary of the peak hour intersection LOS for Opening Year Cumulative (2022) Without Project conditions are shown on Exhibit 6-3. The intersection operations analysis worksheets for Opening Year Cumulative (2022) Without Project traffic conditions are included in Appendix 6.1 of this TA.

6.4.2 OPENING YEAR CUMULATIVE (2022) WITH PROJECT TRAFFIC CONDITIONS

As shown in Table 6-1 and illustrated on Exhibit 6-4, there are no additional study area intersections anticipated to experience unacceptable LOS (LOS E or worse) with the addition of Project traffic during the peak hours in addition to those previously identified under Opening Year Cumulative (2022) Without Project conditions. The intersection operations analysis worksheets for Opening Year Cumulative With Project traffic conditions are included in Appendix 6.2 of this TA. Measures to address near term deficiencies for Opening Year Cumulative traffic conditions are discussed in Section 6.8 *Opening Year Cumulative (2022) Deficiencies and Recommended Improvements.*

6.5 ROADWAY SEGMENT ANALYSIS

The roadway segment capacities utilized for the purposes of this analysis are approximate figures only, and are used at the General Plan level to assist in determining the roadway functional classification (number of through lanes) needed to meet traffic demand. Table 6-2 provides a summary of the Opening Year Cumulative (2022) conditions roadway segment capacity analysis based on the applicable roadway segment capacity. As shown in Table 6-2, the following study area roadway segment is anticipated to operate at an unacceptable LOS under Opening Year Cumulative (2022) Without Project traffic conditions:

- Sycamore Canyon Boulevard, South of Central Avenue (#4) – LOS F

There are no additional roadway segments anticipated to operate at an unacceptable LOS with the addition of Project traffic.

Table 6-1

Intersection Analysis for Opening Year Cumulative (2022) Conditions

#	Intersection	Traffic Control[3]	2022 Without Project				2022 With Project				Change in Delay		Project-Specific Traffic Deficiency?[3]
			Delay [2] (secs.)		Level of Service		Delay [2] (secs.)		Level of Service				
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
1	Driveway 1 & Sycamore Canyon Bl.	**CSS**	Future Intersection				9.7	11.4	A	B	--	--	No
2	Sycamore Canyon Bl. & Driveway 2	**CSS**	16.4	14.6	C	B	20.3	20.2	C	C	--	--	No
3	Sycamore Canyon Bl. & Central Av.	TS	**57.4**	46.7	**E**	D	**70.1**	49.4	**E**	D	12.7	2.7	Yes
4	Central Av. & SR-60 EB Ramps	TS	14.7	18.6	B	B	14.7	20.1	B	C	0.0	1.5	No
5	Watkins Dr./Central Av. & SR-60 WB Off-Ramp	TS	22.8	13.0	C	B	23.3	13.1	C	B	0.5	0.1	No
6	Watkins Dr. & SR-60 WB On-Ramp	CSS	26.9	16.6	D	C	29.2	17.2	D	C	2.3	0.6	No

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all-way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] CSS = Cross-street Stop; TS = Traffic Signal; **CSS** = Improvement

[3] Project-specific traffic deficiency occurs when the addition of project-related trips causes either peak hour LOS to degrade from acceptable LOS (LOS A through LOS D) to unacceptable levels (LOS E or LOS F) or the peak hour delay is increased by the following values:

LOS A/B = 10 seconds or more
LOS C = 8 seconds or more
LOS D = 5 seconds or more
LOS E = 2 seconds or more
LOS F = 1 second or more

Table 6-2

Roadway Segment Analysis for Opening Year Cumulative (2022) Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	2022 NP	V/C[2]	LOS[3]	2022 WP	V/C[2]	LOS[3]	Acceptable LOS
1	Central Av.	West of Sycamore Canyon Bl.	4D	33,000	20,477	0.62	B	20,616	0.62	B	D
2	Sycamore Canyon Bl.	West of Driveway 1	2U	18,000	13,818	0.77	C	14,468	0.80	D	D
3	Sycamore Canyon Bl.	North of Central Av.	4D	22,000	9,694	0.44	A	10,353	0.47	A	D
4	Sycamore Canyon Bl.	South of Central Av.	4D	22,000	**23,112**	**1.05**	**F**	**23,216**	**1.06**	**F**	D

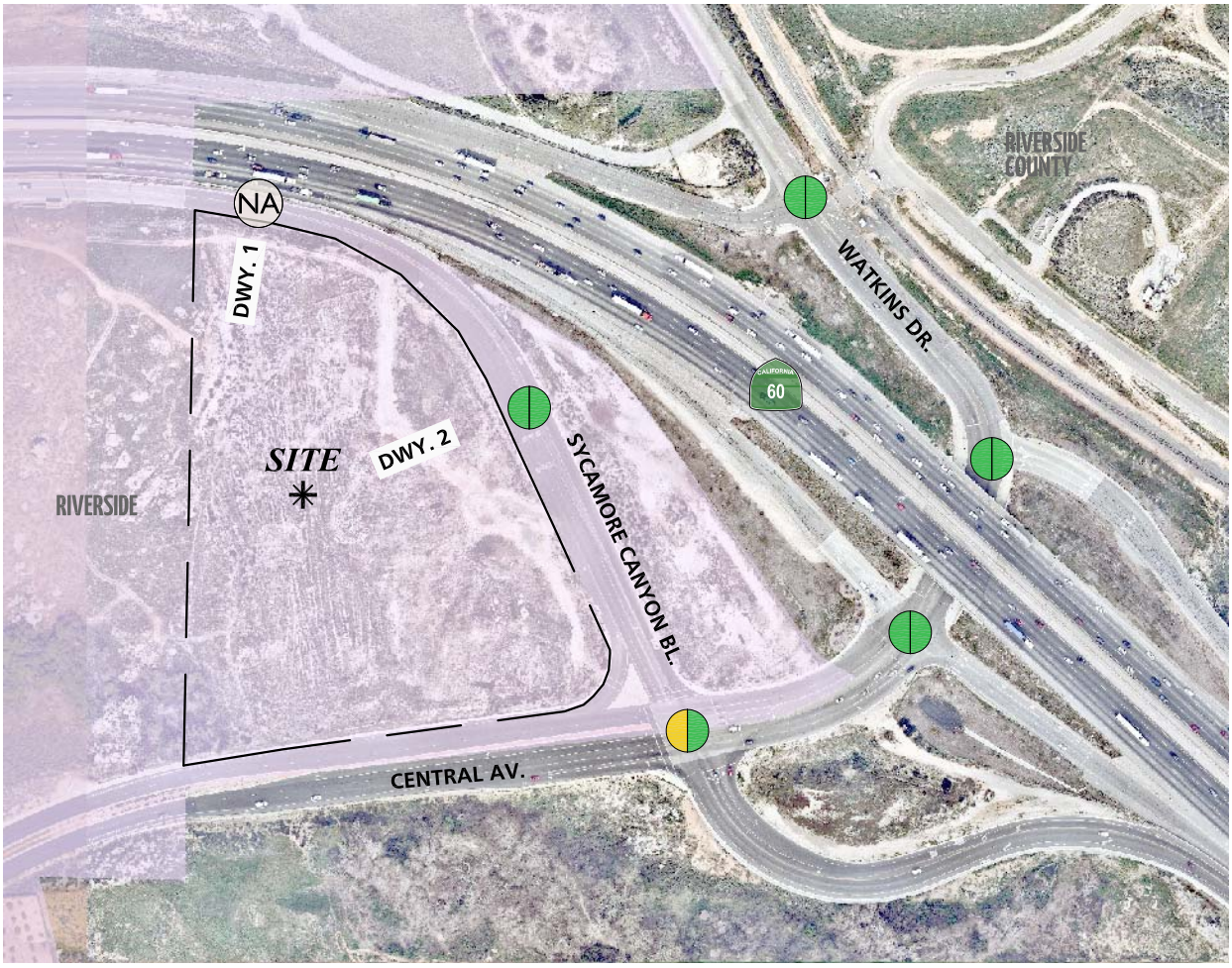
BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] These maximum roadway capacities have been extracted from the following source: City of Riverside Traffic Impact Analysis Preparation Guide (Exhibit D) for each applicable roadway type. These roadway capacities are "rule of thumb" estimates for planning purposes. The LOS "E" service volumes are estimated maximum daily capacity for respective classifications. Capacity is affected by such factors as intersections (spacing, configuration and control features), degree of access control, roadway grades, design geometrics (horizontal and vertical alignment standards), sight distance, vehicle mix (truck and bus traffic) and pedestrian and bicycle traffic.

[2] v/c = Volume-to-capacity

[3] LOS = Level of Service

EXHIBIT 6-3: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT SUMMARY OF LOS



LEGEND:

- = AM PEAK HOUR
- = PM PEAK HOUR
- = LOS A-D
- = LOS E
- = LOS F
- NA = NOT AN ANALYSIS LOCATION FOR THIS SCENARIO

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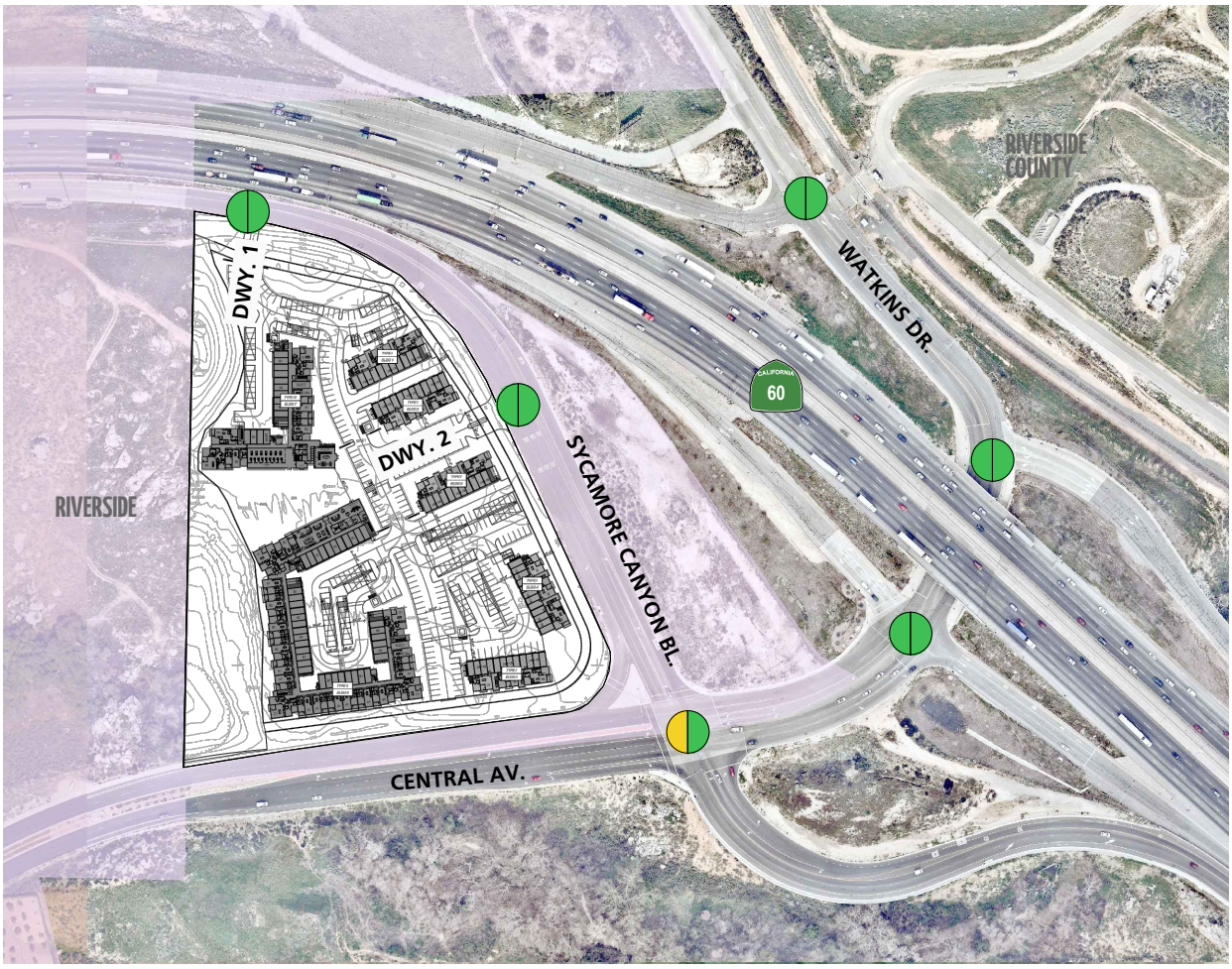
EXHIBIT 6-4: OPENING YEAR CUMULATIVE (2022) WITH PROJECT SUMMARY OF LOS



LEGEND:

- = AM PEAK HOUR
- = PM PEAK HOUR
- = LOS A-D
- = LOS E
- = LOS F

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6.6 TRAFFIC SIGNAL WARRANTS ANALYSIS

The intersection of Sycamore Canyon Boulevard and Driveway 2 is anticipated to meet a planning level traffic signal warrant for Opening Year Cumulative (2022) Without Project traffic conditions (see Appendix 6.3). There are no additional study area intersections that are anticipated to meet traffic signal warrants (either planning level or peak hour volume-based) for Opening Year Cumulative (2022) With Project traffic conditions (see Appendix 6.4).

6.7 OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the SR-60 Freeway at Central Avenue to assess vehicle queues for the off ramps that may potentially result in deficient peak hour operations at the ramp-to-arterial intersections and may potentially "spill back" onto the SR-60 Freeway mainline. Queuing analysis findings are presented in Table 6-3 for Opening Year Cumulative (2022) traffic conditions. It is important to note that off-ramp lengths are consistent with the measured distance between the intersection and the freeway mainline. As shown in Table 6-3, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows for Opening Year Cumulative (2022) traffic conditions. Worksheets for Opening Year Cumulative (2022) Without Project conditions off-ramp queuing analysis are provided in Appendix 6.5. Worksheets for Opening Year Cumulative (2022) With Project conditions off-ramp queuing analysis are provided in Appendix 6.6.

6.8 OPENING YEAR CUMULATIVE (2022) DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

6.8.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

Based on the City of Riverside deficiency criteria discussed in Section 2.7 *Deficiency Criteria*, the following intersection was found to be deficient:

- Sycamore Canyon Boulevard & Central Avenue (#1) – The addition of Project traffic increases the pre-project delay by more than 2.0 seconds during the AM peak hour resulting in a cumulative deficiency

The effectiveness of the proposed recommended intersection improvements is presented in Table 6-4 for Opening Year Cumulative (2022) traffic conditions. With the implementation of the intersection recommendations shown in Table 6-4, there are no project-related deficiencies anticipated to the study area intersections. Worksheets for Opening Year Cumulative (2022) With Project conditions, with improvements, HCM calculation worksheets are provided in Appendix 6.7.

Table 6-3

Peak Hour Off-Ramp Queuing Analysis for Opening Year Cumulative (2022) Conditions

Intersection	Movement	Stacking (Feet)	2022 Without Project				2022 With Project			
			95th Percentile Stacking Distance Required (Feet)		Acceptable? [1]		95th Percentile Stacking Distance Required (Feet)		Acceptable? [1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
Central Av. & SR-60 EB Off-Ramp										
	EBL	400	75	15	Yes	Yes	75	15	Yes	Yes
	EBT/R	1,055	26	26	Yes	Yes	27	28	Yes	Yes
	EBR	115	0	0	Yes	Yes	0	0	Yes	Yes
Central Av./Watkins Dr. & SR-60 WB Off-Ramp										
	WBL	1,230	42	79	Yes	Yes	43	83	Yes	Yes
	WBR	300	319 [2]	104	Yes[3]	Yes	320 [2]	109	Yes[3]	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] The 95th percentile queues indicates potential queuing for the movements and peak hours identified above. However, while the potential queues would exceed the turn pocket lengths and could spillback into the adjacent through lanes, none are anticipated to result in spillback onto the SR-60 Freeway mainline since the adjacent through lanes all have sufficient capacity.

Table 6-4

Intersection Analysis for Opening Year Cumulative (2022) Conditions With Improvements

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
3	Sycamore Canyon Bl. & Central Av.																	
	- 2022 Without Project Conditions	TS	1	1	1	1	2	1	1	3	1	2	2	0	**57.4**	46.7	**E**	D
	- 2022 With Project Conditions	TS	1	1	1	1	2	1	1	3	1	2	2	0	**70.1**	49.4	**E**	D
	- With Improvements	TS	1	1	**1>**	1	2	1	1	3	1	2	2	0	54.7	29.6	D	C

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for righ turning vehicles to travel outside the through lanes

L = Left; T = Through; R = Right; > = Right-Turn Overlap Phasing; **1** = Improvement

[2] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal c all-way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movement sharing a single lane) are shown.

[3] TS = Traffic Signal

6.8.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON ROADWAY SEGMENTS

The peak hour intersection operations analysis for the study area intersections on either end of the deficient roadway segment indicates acceptable peak hour operations with the recommended intersection improvements (see Table 6-1 and Table 6-4). As such, no roadway segment widening has been recommended.

6.8.3 RECOMMENDED IMPROVEMENTS TO ADDRESS OFF-RAMP QUEUES

As shown previously in Table 6-3, there are no anticipated peak hour queuing issues at the SR-60 Freeway and Central Avenue interchange for Opening Year Cumulative (2022) traffic conditions. As such, no improvements have been recommended.

7 HORIZON YEAR (2040) TRAFFIC CONDITIONS

This section discusses the methods used to develop Horizon Year (2040) Without and With Project traffic forecasts, and the resulting intersection operations, roadway segment operations, and traffic signal warrant analyses.

7.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Horizon Year (2040) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Horizon Year (2040) conditions only (e.g., intersection and roadway improvements along the Project's frontage and driveways).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Horizon Year (2040) conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways, such as the eastern extension of Driveway 2).

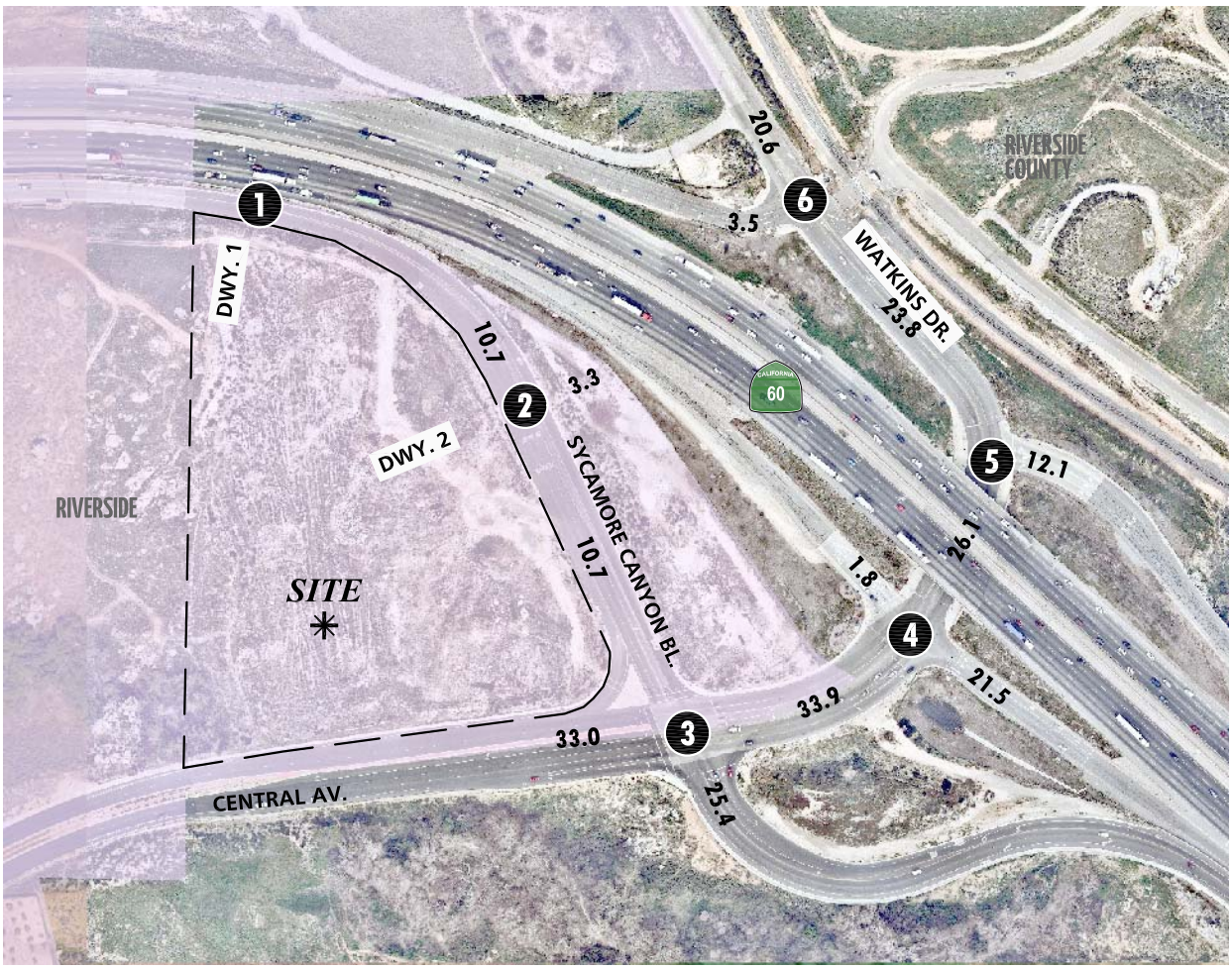
7.2 HORIZON YEAR (2040) WITHOUT PROJECT

This scenario includes the refined post-processed volumes obtained from the RivTAM traffic model. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Horizon Year (2040) Without Project traffic conditions are shown on Exhibit 7-1.

7.3 HORIZON YEAR (2040) WITH PROJECT

Project traffic has been added to the Horizon Year (2040) Without Project traffic forecasts for Horizon Year (2040) With Project traffic conditions. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Horizon Year (2040) With Project traffic conditions are shown on Exhibit 7-2.

EXHIBIT 7-1: HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC VOLUMES

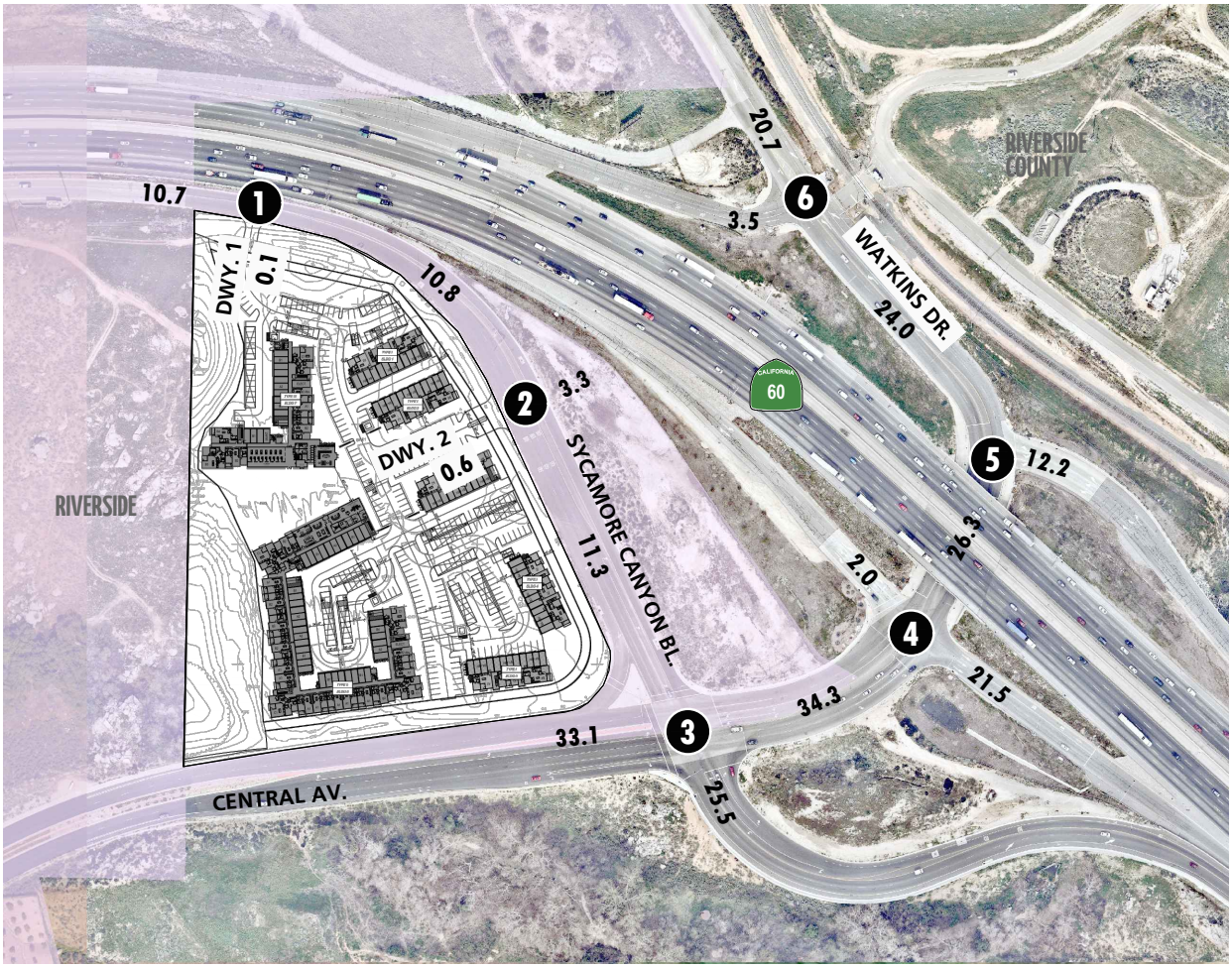


1 Dwy. 1 & Sycamore Canyon Bl.	2 Sycamore Canyon Bl. & Dwy. 2	3 Sycamore Canyon Bl. & Central Av.	4 Central Av. & SR-60 EB Ramps	5 Central Av./ Watkins Dr. & SR-60 WB Off-Ramp	6 Watkins Dr. & SR-60 WB On-Ramp
Future Intersection	69(407) ↓ 37(36) ↓ 18(17) ↱ 142(134) ↱ 536(312) ↑ 74(72) ↱	43(43) ↓ 59(341) ↓ 109(156) ↓ 103(123) ↰ 325(558) ← 51(274) ↰ 54(51) ↱ 1138(781) → 200(645) ↘ 323(412) ↑ 453(209) ↑ 1027(343) ↱	370(864) ↓ 199(851) ↓ 107(19) ↱ 5(3) → 110(90) ↘ 1795(570) ↑ 479(710) ↱	402(1370) ↓ 429(374) ↰ 167(345) ↰ 1903(589) ↑	99(15) ↓ 402(1370) ↓ 924(283) ↱ 1408(680) ↑

LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES
10.0 = VEHICLES PER DAY (1000'S)

EXHIBIT 7-2: HORIZON YEAR (2040) WITH PROJECT TRAFFIC VOLUMES



1 Dwy. 1 & Sycamore Canyon Bl.	2 Sycamore Canyon Bl. & Dwy. 2	3 Sycamore Canyon Bl. & Central Av.	4 Central Av. & SR-60 EB Ramps	5 Central Av./ Watkins Dr. & SR-60 WB Off-Ramp	6 Watkins Dr. & SR-60 WB On-Ramp
←554(329)	1(3) 79(413) 37(36) → 18(17) ←0(0) ←142(134)	57(52) 69(347) 150(182) → 116(164) ←325(558) ←51(274)	378(888) 199(851)	404(1377) → 429(374) ←173(362)	99(15) 404(1377)
107(446) → 3(2) 10(6)	0(0) → 0(0) → 54(34) → 21(65) 536(312) 74(72)	58(65) → 1138(781) → 200(645) → 323(412) 456(219) 1027(343)	107(19) → 5(3) → 116(107) → 1819(585) 496(721)	1927(604)	941(294) 1415(684)

LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES
10.0 = VEHICLES PER DAY (1000'S)

N

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7.4 INTERSECTION OPERATIONS ANALYSIS

7.4.1 HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC CONDITIONS

LOS calculations were conducted for the study intersections to evaluate their operations under Horizon Year (2040) Without Project conditions with roadway and intersection geometrics consistent with Section 7.1 *Roadway Improvements*. As shown in Table 7-1, the study area intersections are anticipated to operate at acceptable levels of service, with the exception of the following locations:

- Sycamore Canyon Boulevard & Central Avenue (#3) – LOS F AM and PM peak hours
- Central Avenue & SR-60 Eastbound Ramps (#4) – LOS E AM peak hour only
- Watkins Drive & SR-60 Westbound On-Ramp (#6) – LOS F AM peak hour only

A summary of the peak hour intersection LOS for Horizon Year (2040) Without Project conditions are shown on Exhibit 7-3. The intersection operations analysis worksheets for Horizon Year (2040) Without Project traffic conditions are included in Appendix 7.1 of this TA.

7.4.2 HORIZON YEAR (2040) WITH PROJECT TRAFFIC CONDITIONS

As shown in Table 7-1 and illustrated on Exhibit 7-4, there are no additional study area intersections anticipated to experience unacceptable LOS (LOS E or worse) with the addition of Project traffic during one or more peak hours in addition to those previously identified under Horizon Year (2040) Without Project conditions. The intersection operations analysis worksheets for Horizon Year (2040) With Project traffic conditions are included in Appendix 7.2 of this TA. Measures to address long-range deficiencies for Horizon Year traffic conditions are discussed in Section 7.8 *Horizon Year Deficiencies and Recommended Improvements.*

7.5 ROADWAY SEGMENT ANALYSIS

The roadway segment capacities utilized for the purposes of this analysis are approximate figures only, and are used at the General Plan level to assist in determining the roadway functional classification (number of through lanes) needed to meet traffic demand. Table 7-2 provides a summary of the Horizon Year (2040) conditions roadway segment capacity analysis based on the applicable roadway segment capacity. As shown in Table 7-2, all the study area roadway segments are anticipated to operate at an acceptable LOS under Horizon Year (2040) Without Project conditions, with the exception of the following roadway segments:

- Central Avenue, West of Sycamore Canyon Boulevard (#1) – LOS E
- Sycamore Canyon Boulevard, South of Central Avenue (#4) – LOS F

There are no additional roadway segments anticipated to operate at an unacceptable LOS with the addition of Project traffic.

Table 7-1

Intersection Analysis for Horizon Year (2040) Conditions

#	Intersection	Traffic Control[3]	2040 Without Project				2040 With Project				Change in Delay		Project-Specific Traffic Deficiency?[3]
			Delay [2] (secs.)		Level of Service		Delay [2] (secs.)		Level of Service				
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
1	Driveway 1 & Sycamore Canyon Bl.	**CSS**	Future Intersection				9.8	11.7	A	B	--	--	No
2	Sycamore Canyon Bl. & Driveway 2	**CSS**	18.1	15.5	C	C	23.1	22.2	C	C	--	--	No
3	Sycamore Canyon Bl. & Central Av.	TS	**111.8**	**118.4**	**F**	**F**	**122.2**	**123.2**	**F**	**F**	10.4	4.8	Yes
4	Central Av. & SR-60 EB Ramps	TS	**58.3**	31.9	**E**	C	**58.3**	35.1	**E**	D	0.0	3.2	No
5	Watkins Dr./Central Av. & SR-60 WB Off-Ramp	TS	36.5	14.4	D	B	40.5	14.5	D	B	4.0	0.1	No
6	Watkins Dr. & SR-60 WB On-Ramp	CSS	**53.1**	33.3	**F**	D	**58.9**	**36.4**	**F**	**E**	5.8	3.1	Yes

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all-way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] CSS = Cross-street Stop; TS = Traffic Signal; **CSS** = Improvement

[3] Project-specific traffic deficiency occurs when the addition of project-related trips causes either peak hour LOS to degrade from acceptable LOS (LOS A through LOS D) to unacceptable levels (LOS E or LOS F) or the peak hour delay is increased by the following values:

LOS A/B = 10 seconds or more
LOS C = 8 seconds or more
LOS D = 5 seconds or more
LOS E = 2 seconds or more
LOS F = 1 second or more

Table 7-2

Roadway Segment Analysis for Horizon Year (2040) Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	2040 NP	V/C[2]	LOS[3]	2040 WP	V/C[2]	LOS[3]	Acceptable LOS
1	Central Av.	West of Sycamore Canyon Bl.	4D	33,000	**32,974**	**1.00**	**E**	**33,113**	**1.00**	**F**	D
2	Sycamore Canyon Bl.	West of Driveway 1	2U	18,000	10,664	0.59	A	11,314	0.63	B	D
3	Sycamore Canyon Bl.	North of Central Av.	4D	22,000	10,664	0.48	A	11,323	0.51	A	D
4	Sycamore Canyon Bl.	South of Central Av.	4D	22,000	**25,424**	**1.16**	**F**	**25,528**	**1.16**	**F**	D

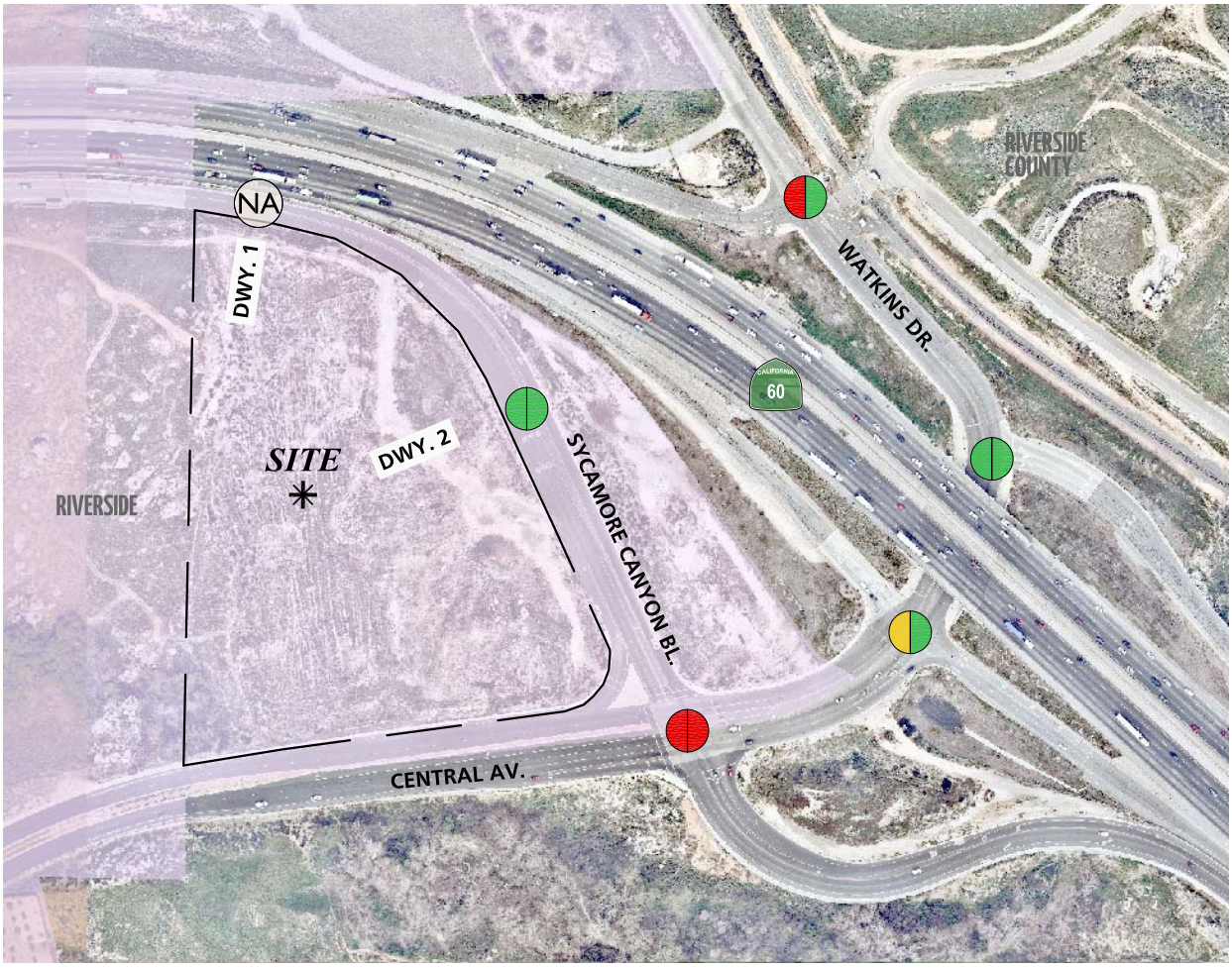
BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] These maximum roadway capacities have been extracted from the following source: City of Riverside Traffic Impact Analysis Preparation Guide (Exhibit D) for each applicable roadway type. These roadway capacities are "rule of thumb" estimates for planning purposes. The LOS "E" service volumes are estimated maximum daily capacity for respective classifications. Capacity is affected by such factors as intersections (spacing, configuration and control features), degree of access control, roadway grades, design geometrics (horizontal and vertical alignment standards), sight distance, vehicle mix (truck and bus traffic) and pedestrian and bicycle traffic.

[2] v/c = Volume-to-capacity

[3] LOS = Level of Service

EXHIBIT 7-3: HORIZON YEAR (2040) WITHOUT PROJECT SUMMARY OF LOS



LEGEND:

- = AM PEAK HOUR
- = PM PEAK HOUR
- = LOS A-D
- = LOS E
- = LOS F
- NA = NOT AN ANALYSIS LOCATION FOR THIS SCENARIO

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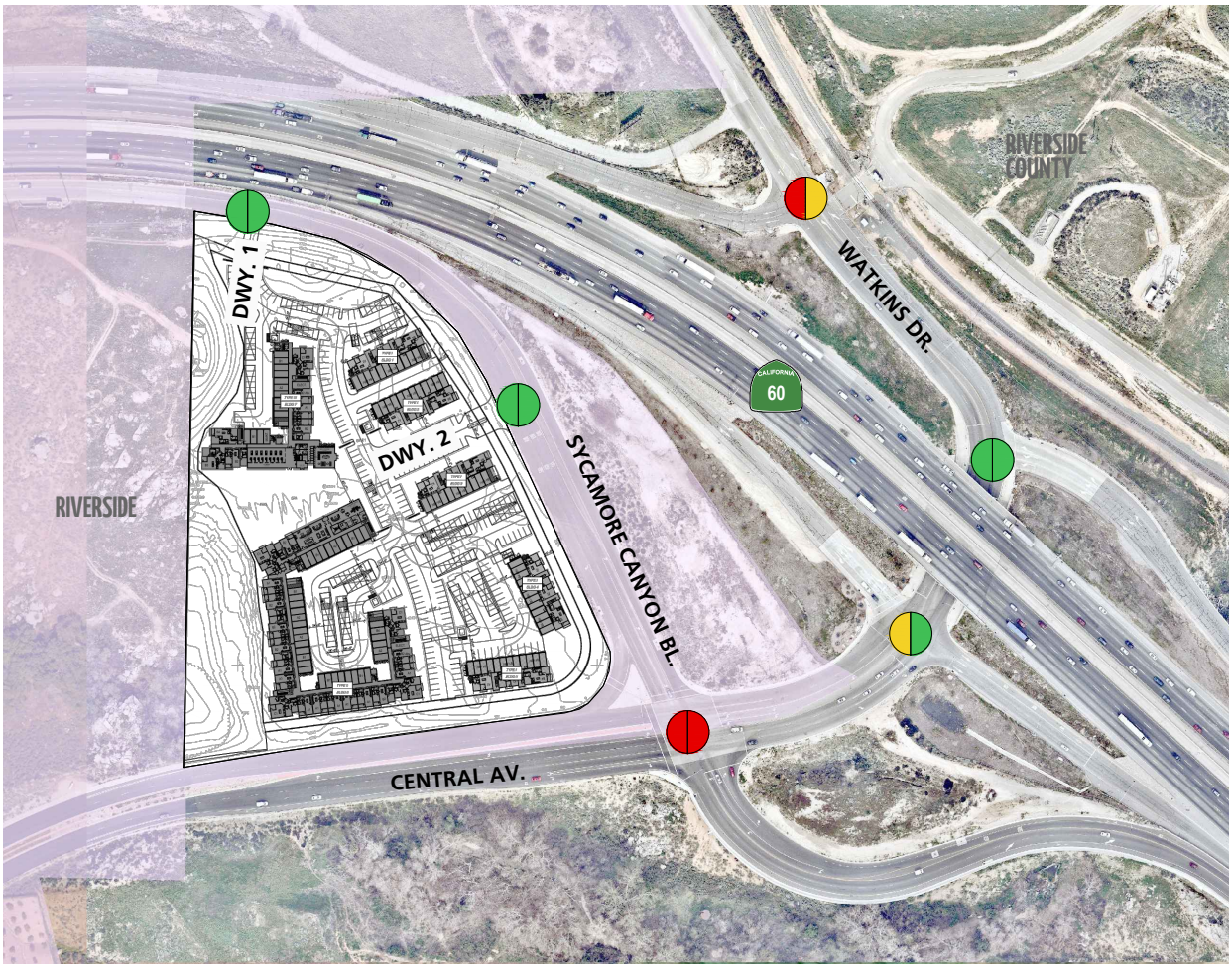
EXHIBIT 7-4: HORIZON YEAR (2040) WITH PROJECT SUMMARY OF LOS



LEGEND:

- = AM PEAK HOUR
- = PM PEAK HOUR
- = LOS A-D
- = LOS E
- = LOS F

N

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7.6 TRAFFIC SIGNAL WARRANTS ANALYSIS

There are no unsignalized intersections for Horizon Year (2040) Without Project traffic conditions, as such, no traffic signal warrant analysis has been conducted. There are no additional study area intersections that are anticipated to meet either peak hour volume-based or planning level (ADT) traffic signal warrants for Horizon Year (2040) With Project traffic conditions, in addition to the location previously warranted under Opening Year Cumulative (2022) traffic conditions (see Appendix 7.3).

7.7 OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the SR-60 Freeway at Central Avenue to assess vehicle queues for the off ramps that may potentially result in deficient peak hour operations at the ramp-to-arterial intersections and may potentially "spill back" onto the SR-60 Freeway mainline. Queuing analysis findings are presented in Table 7-3 for Horizon Year (2040) traffic conditions. It is important to note that off-ramp lengths are consistent with the measured distance between the intersection and the freeway mainline. As shown in Table 7-3, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows for Horizon Year (2040) traffic conditions. Worksheets for Horizon Year (2040) Without Project conditions off-ramp queuing analysis are provided in Appendix 7.4. Worksheets for Horizon Year (2040) With Project conditions off-ramp queuing analysis are provided in Appendix 7.5.

7.8 HORIZON YEAR DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

7.8.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

Based on the City of Riverside deficiency criteria discussed in Section 2.7 *Deficiency Criteria*, the following intersections were found to be deficient:

- Sycamore Canyon Boulevard & Central Avenue (#3) – The addition of Project traffic increases the pre-project delay by more than 1.0 second during the AM and PM peak hours resulting in a cumulative traffic deficiency.
- Central Avenue & SR-60 Eastbound Ramps (#4) – The addition of Project traffic is anticipated to increase the pre-project delay by less than 2.0 seconds during the deficient peak hour. As such, the deficiency is not considered to be a Project-specific traffic deficiency.
- Watkins Drive & SR-60 Westbound On-Ramp (#6) – The addition of Project traffic increases the pre-project delay by more than 1.0 second during the AM peak hour and causes a deficiency in the PM peak hour, resulting in a cumulative traffic deficiency.

The effectiveness of the proposed recommended intersection improvements is presented in Table 7-4 for Horizon Year (2040) With Project traffic conditions. With the implementation of the intersection recommendations shown in Table 7-4, there are no project-related deficiencies anticipated to the study area intersections. Worksheets for Horizon Year (2040) With Project conditions, with improvements, HCM calculation worksheets are provided in Appendix 7.6.

Table 7-3

Peak Hour Off-Ramp Queuing Analysis for Horizon Year (2040) Conditions

Intersection	Movement	Stacking (Feet)	2040 Without Project				2040 With Project			
			95th Percentile Stacking Distance Required (Feet)		Acceptable? [1]		95th Percentile Stacking Distance Required (Feet)		Acceptable? [1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
Central Av. & SR-60 EB Off-Ramp										
	EBL	400	80	22	Yes	Yes	80	22	Yes	Yes
	EBT/R	1,055	30	27	Yes	Yes	31	29	Yes	Yes
	EBR	115	3	0	Yes	Yes	6	2	Yes	Yes
Central Av./Watkins Dr. & SR-60 WB Off-Ramp										
	WBL	1,230	45	87	Yes	Yes	46	90	Yes	Yes
	WBR	300	334 [2]	154	Yes[3]	Yes	334 [2]	158	Yes[3]	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] The 95th percentile queues indicates potential queuing for the movements and peak hours identified above. However, while the potential queues would exceed the turn pocket lengths and could spillback into the adjacent through lanes, none are anticipated to result in spillback onto the SR-60 Freeway mainline since the adjacent through lanes all have sufficient capacity.

Table 7-4

Intersection Analysis for Horizon Year (2040) Conditions With Improvements

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
3	Sycamore Canyon Bl. & Central Av.																	
	- 2040 Without Project Conditions	TS	1	1	1	1	2	1	1	3	1	2	2	0	**111.8**	**118.4**	**F**	**F**
	- 2040 With Project Conditions	TS	1	1	1	1	2	1	1	3	1	2	2	0	**122.2**	**123.2**	**F**	**F**
	- With Improvements	TS	1	1	**2>**	1	2	1	1	3	**1>**	2	2	0	40.4	33.7	D	C
6	Watkins Dr. & SR-60 WB On-Ramp																	
	- 2040 Without Project Conditions	CSS	1	2	0	0	1	0	0	0	0	0	0	0	**53.1**	33.3	**F**	D
	- 2040 With Project Conditions	CSS	1	2	0	0	1	0	0	0	0	0	0	0	**58.9**	**36.4**	**F**	**E**
	- With Improvements	**TS**	**2**	2	0	0	**2**	0	0	0	0	0	0	0	7.3	8.5	A	A

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes

L = Left; T = Through; R = Right; > = Right-Turn Overlap Phasing; d = Defacto Right Turn Lane;**1** = Improvement

[2] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all-way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movement sharing a single lane) are shown.

[3] CSS = Cross-street Stop; TS = Traffic Signal; **TS** = Improvement

[4] Recommended improvement consists of modifying the cycle length from 60-seconds to 90-seconds during both peak hours. No physical improvements recommended.

It should be noted, although not included for analysis in this TA, pursuant to comments received by the City of Riverside, Garnet Road (located north of the intersection of Watkins Drive and SR-60 Westbound On-Ramp) should be restricted to right-in/right-out access only with the implementation of the intersection improvements shown in Table 7-4.

The Project Applicant shall participate in the funding of off-site improvements, including traffic signals that are needed to serve cumulative traffic conditions through the payment of DIF/TUMF (if the improvements are included in the DIF/TUMF fee programs) or on a fair share basis (if the improvements are not included in the DIF/TUMF fee programs). These fees shall be collected by the City of Riverside, with the proceeds solely used as part of a funding mechanism aimed at ensuring that regional highways and arterial expansions keep pace with the projected population increases. Each of the improvements discussed above have been identified as being included as part of the TUMF fee program or fair share contribution in Section 8 *Local and Regional Funding Mechanisms* of this TA.

7.8.2 Recommended Improvements to Address Roadway Segment Deficiencies

The peak hour intersection operations analysis for the study area intersections on either end of the deficient roadway segments indicate acceptable peak hour operations with the recommended intersection improvements (see Table 7-1 and Table 7-4). As such, no roadway segment widening has been recommended.

7.8.3 Recommended Improvements to Address Off-Ramp Queues

As shown previously in Table 7-3, there are no anticipated peak hour queuing issues at the SR-60 Freeway and Central Avenue interchange for Horizon Year (2040) traffic conditions. As such, no improvements have been recommended.

8 LOCAL AND REGIONAL FUDNING MECHANISMS

Transportation improvements within the City of Riverside are funded through a combination of improvements constructed by the Project, development impact fee programs or fair share contributions, such as the City of Riverside Development Impact Fee (DIF) program and County of Riverside Transportation Uniform Mitigation Fee (TUMF) program. Identification and timing of needed improvements is generally determined through local jurisdictions based upon a variety of factors.

8.1 CITY OF RIVERSIDE DEVELOPMENT IMPACT FEE PROGRAM

The City of Riverside has created its own local DIF program to impose and collect fees from new residential, commercial and industrial development for the purpose of funding roadways and intersections necessary to accommodate City growth as identified in the City's General Plan Circulation Element. Under the City's DIF program, the City may grant to developers a credit against specific components of fees when those developers construct certain facilities and landscaped medians identified in the list of improvements funded by the DIF program.

The timing to use the DIF fees is established through periodic capital improvement programs which are overseen by the City's Public Works Department. Periodic traffic counts, review of traffic accidents, and a review of traffic trends throughout the City are also periodically performed by City staff and consultants. The City uses this data to determine the timing of implementing necessary improvements. The City also uses this data to ensure that the improvements are constructed before the LOS falls below the LOS performance standards adopted by the City. In this way, the improvements are constructed before the LOS falls below the City's LOS performance criteria.

The Project Applicant will be subject to the City's DIF fee program and will pay the requisite City DIF fees at the rates then in effect pursuant to the City's ordinance. The Project Applicant's payment of the requisite DIF at the rates then in effect, pursuant to the City DIF Program, would satisfy the Project's proportional improvement requirements at potentially affected DIF-funded facilities. At the time of preparation of the traffic study, the City of Riverside does not currently maintain a list of DIF covered facilities.

8.2 TRANSPORTATION UNIFORM MITIGATION FEE (TUMF) PROGRAM

The Western Riverside Council of Governments (WRCOG) is responsible for establishing and updating TUMF rates. The County may grant to developers a credit against the specific components of fees for the dedication of land or the construction of facilities identified in the list of improvements funded by each of these fee programs. Fees are based upon projected land uses and a related transportation needs to address growth based upon a 2016 Nexus study. (8)

TUMF is an ambitious regional program created to address cumulative deficiencies from growth throughout Western Riverside County. Program guidelines are being handled on an iterative basis. Exemptions, credits, reimbursements and local administration are being deferred to primary agencies. The County of Riverside serves this function for the proposed Project. Fees submitted to the County are passed on to the WRCOG as the ultimate program administrator.

TUMF guidelines empower a local zone committee to prioritize and arbitrate certain projects. The Project is located in the Northwest Zone. The zone has developed a 5-year capital improvement program to prioritize public construction of certain roads. TUMF is focused on improvements necessitated by regional growth. There are no TUMF facilities within the study area.

After the TUMF fees are collected, they are placed in a separate interest-bearing account pursuant to the requirements of Government Code § 66000 *et seq*. The TUMF funds both local area projects and needed projects to improve the region's backbone arterial system. Local area projects receive about 48% of all funds. The Project Applicant will be subject to the TUMF fee program and will pay the requisite TUMF fees at the rates then in effect pursuant to the TUMF Ordinance.

8.3 FAIR SHARE CONTRIBUTION

Project improvement may include a combination of fee payments to established programs, construction of specific improvements, payment of a fair share contribution toward future improvements or a combination of these approaches. Improvements constructed by development may be eligible for a fee credit or reimbursement through the program where appropriate (to be determined at the City's discretion). Fair share rates should be developed by the Project and furnished to the appropriate agency through a development agreement, and should not be tied to an additional policy that is not planned or tied to entitlement of the proposed Project.

When off-site improvements are identified with a minor share of responsibility assigned to proposed development, the approving jurisdiction may elect to collect a fair share contribution or require the development to construct improvements. Detailed fair share calculations, for each peak hour, have been provided in Table 8-1 for the applicable deficient study area intersections. These fees are collected with the proceeds solely used as part of a funding mechanism aimed at ensuring that regional highways and arterial expansions keep pace with the projected population increases.

Table 8-1

Project Fair Share Calculations at Intersections

#	Intersection	Existing (2019)	Project	2040 WP	Net New Traffic	Project % of New Traffic[1]
3	Sycamore Canyon Bl. & Central Av.					
	AM:	2,621	85	3,971	1,350	6.3%
	PM:	2,815	106	4,043	1,228	**8.6%**
6	Watkins Dr. & SR-60 WB On-Ramp					
	AM:	2,234	26	2,859	625	**4.2%**
	PM:	1,736	22	2,370	634	3.5%

[1] Project percentage of new traffic between Existing (2017) and Horizon Year (2040) traffic conditions. Highest fair share percentage is highlighted.

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9 REFERENCES

1. **City of Riverside Public Works Department.** *Traffic Impact Analysis Preparation Guide.* City of Riverside : s.n., January 2016.
2. **California Department of Transportation.** *Guide for the Preparation of Traffic Impact Studies.* December 2002.
3. **Institute of Transportation Engineers.** *Trip Generation.* 10th Edition. 2017.
4. **Riverside County Transportation Commission.** *2011 Riverside County Congestion Management Program.* County of Riverside : RCTC, December 14, 2011.
5. **Transportation Research Board.** *Highway Capacity Manual (HCM).* 6th Edition. s.l. : National Academy of Sciences, 2016.
6. **California Department of Transportation.** California Manual on Uniform Traffic Control Devices (CA MUTCD). [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CA MUTCD).* 2014.
7. **Southern California Association of Governments.** *2016 Regional Transportation Plan/Sustainable Communities Strategy.* April 2016.
8. **WSP.** *Western Riverside Council of Governments Transportation Uniform MItigation Fee Nexus Study.* County of Riverside : s.n., 2016 Update.

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APPENDIX 1.1:

APPROVED TRAFFIC STUDY SCOPING AGREEMENT

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Exhibit B

SCOPING AGREEMENT FOR TRAFFIC IMPACT STUDY

This letter acknowledges the City of Riverside Public Works Traffic Engineering Division requirements for traffic impact analysis of the following project. The analysis must follow the City Traffic Impact Analysis Preparation Guide dated January 2016.

Case No. _____
Related Cases -
SP No. _____
EIR No. _____
GPA No. _____
CZ No. _____
Project Name: Crestview Apartments
Project Location: Northwest Corner of Sycamore Canyon Bl. & Central Av.
Project Description: 51 (2-3 Floor) Apartment units and 186 (4 floor) Apartment units

	Consultant	Developer Representative
Name:	Urban Crossroads, Inc. - Charlene So	Ruth Villalobos & Associates - Sonya Hooker
Address:	260 E. Baker St., Suite 200	3602 Inland Empire Bl., Suite C310
	Costa Mesa, CA 92626	Ontario, CA 91764
Telephone:	(949) 336-5982	

A. Trip Generation Source: ITE *Trip Generation Manual*, most recent edition

Existing Land Use	Vacant	**Proposed Land Use**	Apartments - Residential
Existing Zoning	C-Commercial	**Proposed Zoning**	HDR-High-Density Residential
Total Daily Trips	1,386		

	In	Out	Total
AM Trips	22	68	90
PM Trips	68	43	111

Internal Trip Allowance ☐ Yes ☒ No (% Trip Discount)
Pass-By Trip Allowance ☐ Yes ☒ No (% Trip Discount)
(Attach additional sheet if this is a multi-use site with a breakdown of trips generated)

B. Trip Geographic Distribution: N 30 % S 40 % E 10 % W 20 %
(See attached exhibit for detailed assignment)

C. Background Traffic

Project Completion Year: 2022 **Annual Ambient Growth Rate:** 2.0 %
Other area projects to be included: To be provided by the City Planing Department

Please contact Planning Division or use the most recently provided data

Model/Forecast methodology if required RivTAM

D. Build-out Studies: Does this project require a Build-out Study per TIA Guidelines Section 7.2? ☒ Yes ☐ No

E. Study Intersections: (NOTE: Subject to revision after other projects, trip generation and distribution are determined, or comments from other agencies.)

1. Driveway 1 & Sycamore Canyon Bl.
2. Sycamore Canyon Bl. & Driveway 2
3. Sycamore Canyon Bl. & Central Av.
4. Central Av. & SR-60 EB Ramps
5. Central Av. & SR-60 WB Off-Ramp
6. Watkins Dr. / Central Av. & SR-60 WB On-Ramp
7.
8.

F. Study Roadway Segments (For Build-out Studies):

1. Central Av. Roadway (West of Sycamore Canyon Bl.)
2. Sycamore Canyon Bl. (North of Project)
3. Sycamore Canyon Bl. (North of Central Av.)
4. Sycamore Canyon Bl. (South of Central Av.)
5.
6.
7.
8.

G. Other Jurisdictional Impacts

Is this project within any other Agency's Sphere of Influence or one-mile radius of boundaries? ☒ Yes ☐ No

If so, name of Jurisdiction: Caltrans

H. Site Plan (please attach a legible 11'X17' copy)

I. Specific issues to be addressed in the Study (in addition to the standard analysis described in the Guideline) (To be filled out by Public Works Traffic Department)

To include project P17-0511 Sycamore Canyon Commercial Development in the cumulative projects which is currently under entitlement process. Site Plan and proposed striping are shown on Exhibit 1.

* ALIGN OWY 2 WITH OPPOSING DEVELOPMENT

Recommended by:

Charlene So — 5/14/2019

Consultant's Representative — Date

5/14/2019

Scoping Agreement Submitted on — Date

6/11/2019

Scoping Agreement Resubmitted on — Date

Approved Scoping Agreement:

6/13/19

City of Riverside
Traffic Engineering Division — Date

cc: Planning Division

URBAN CROSSROADS

260 E. Baker St. | Suite 200 | Costa Mesa, CA 92626 | (949) 660-1994
urbanxroads.com

June 11, 2019

Mr. Nathan Mustafa
City of Riverside
3900 Main Street
Riverside, California 92522

SUBJECT: SCOPING ASSUMPTIONS FOR THE CRESTVIEW APARTMENTS TRAFFIC IMPACT ANALYSIS

Dear Mr. Nathan Mustafa:

The firm of Urban Crossroads, Inc. is pleased to submit this letter documenting the suggested scope of study for the Crestview Apartments development ("Project"), which is located on the northwest corner of Sycamore Canyon Boulevard and Central Avenue in the City of Riverside. It is our understanding that the Project is to consist of 51 low-rise multifamily housing units and 186 mid-rise multifamily housing units.

Our goal is to obtain comments from City of Riverside staff, to ensure that the traffic study fully addresses the potential impacts of the proposed Project. The remainder of this letter describes the draft proposed analysis methodology, project trip generation, trip distribution, and project traffic assignment/project trips on the surrounding roadway network, which have been used to establish the draft proposed project study area and analysis locations.

Exhibit 1 identifies the location of the proposed Project in relation to the existing roadway network. For purposes of the traffic analysis it is anticipated that the Project will be evaluated in a single phase with a projected Opening Year of 2022. As indicated on Exhibit 1, access to the Project site is proposed to be provided to Sycamore Canyon Boulevard. All driveways are proposed to provide full access. Driveway 1 is to serve as an exit only for residents, while Driveway 2 would be the primary driveway serving both residents and visitors.

INTERSECTIONS AND ROADWAY SEGMENTS

Exhibit 2 illustrates the proposed study area intersections and roadway segments. The study area was determined based on the City of Riverside Traffic Impact Analysis Preparation Guide (December 2017) and consultation with City staff.

ANALYSIS SCENARIOS

Consistent with traffic study guidelines adopted by multiple local jurisdictions throughout the County of Riverside, peak hour operations at each of the study area intersections and site access driveways will be assessed for the following analysis scenarios:

1. Existing (2019) Conditions (Baseline)
2. Existing plus Project (E+P) Conditions
3. Opening Year Cumulative (2022) Without and With Project Conditions
4. Horizon Year (2040) Without and With Project Conditions

Analysis Scenario #1 establishes the baseline for CEQA purposes.

Consistent with recent CEQA case law, Analysis Scenario #2 identifies significant traffic impacts associated with the proposed Project.

Analysis Scenarios #3 and #4 would identify cumulative impacts for Opening Year Cumulative (near-term) and Horizon Year (long-term) traffic conditions. It is assumed that intersection improvements required to address Opening Year Cumulative and Horizon Year traffic impacts will be addressed through either an existing fee program, or through a fair-share contribution. The Opening Year Cumulative (2022) traffic volume forecasts will be derived from Existing (2019) baseline conditions plus ambient growth. Individual cumulative projects will be added, as necessary. The Horizon Year (2040) traffic volume forecasts will be derived from the Riverside County Transportation Analysis Model (RivTAM) using accepted procedures for model forecast refinement and smoothing. The 2040 forecasts will be based on the most current socio-economic data (SED) provided by County staff in December 2017. The SED was updated within the WRCOG region to be consistent with the adopted Southern California Association of Governments (SCAG) 2016 Regional Transportation Plan (RTP) (April 2016).

Information for Existing (2019) conditions will be disclosed to represent the baseline traffic conditions as they existed at the time the report is prepared. Traffic counts will be conducted when local schools are in session and operating on normal bell schedules. The Riverside Unified School District is out for Summer break the week of May 28th. We would like to conduct traffic counts on or before May 23rd for the purposes of this TIA.

TRIP GENERATION

Trip generation represents the amount of traffic that is attracted and produced by a development, and is based upon the specific land uses planned for a given project. Actual vehicle trip generation rates for the Project and the actual vehicle trip generation summary illustrating daily, and peak hour trip generation estimates for the proposed Project are shown on Table 1.

The trip generation rates used for this analysis are based upon information collected by the Institute of Transportation Engineers (ITE) as provided in their Trip Generation Manual, 10th Edition, 2017. ITE land use codes 220 and 221 (Multifamily Low-Rise and Mid-Rise Housing) have been used to derive site specific trip generation estimates for the Project. As shown on Table 1, the proposed Project is anticipated to generate a net total of 1,386 vehicle trip-ends per day with 90 AM peak hour trips and 111 PM peak hour trips.

TRIP DISTRIBUTION

The Project trip distribution and assignment process represents the directional orientation of traffic to and from the Project site. The trip distribution patterns are heavily influenced by the geographical location of the site, the location of surrounding uses, and the proximity to the regional freeway system. Exhibit 3 illustrates the Project trip distribution patterns.

INTERSECTION ANALYSIS METHODOLOGY

For the purposes of this analysis, signalized intersection operations analysis will be based on the methodology described in the Highway Capacity Manual (HCM 6th Edition). Intersection levels of service (LOS) operations are based on an intersection's average control delay. Unsignalized intersections will be evaluated using the methodology described in the HCM, 6th Edition. At two-way or side-street stop-controlled intersections, LOS for the intersection will be the worst LOS of all the individual movements. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. For all-way stop controlled intersections, LOS is computed for the intersection as a whole.

TRAFFIC SIGNAL WARRANTS

Traffic signal warrant analysis will be conducted for unsignalized intersections. Peak Hour Volume based Warrant 3 based on 2014 California Manual on Uniform Traffic Control Devices (MUTCD) will be utilized to determine whether a signal would be warranted.

LEVEL OF SERVICE (LOS) CRITERIA

The definitions of an operational deficiency for each of the applicable jurisdictions are as follows:

CITY OF RIVERSIDE

Per City of Riverside Policy CCM-2.3, maintain LOS D or better on Arterial Streets wherever possible. At key locations, such as City Arterials that are used by regional freeway bypass traffic and at heavily traveled freeway interchanges, allow LOS E at peak hours as the acceptable standard on a case-by-case basis. City of Riverside allows Level of Service (LOS) D to be used as the maximum acceptable threshold for the study intersections and roadways of Collector or higher classification. LOS C is to be maintained on all street intersections.

COUNTY OF RIVERSIDE

County of Riverside General Plan Policy C 2.1 states that the following minimum target levels of service have been designated for the review of development proposals in the unincorporated areas of Riverside County:

- LOS C shall apply to all development proposals in any area of the Riverside County not located within the boundaries of an Area Plan, as well those areas located within the following Area Plans: REMAP, Eastern Coachella Valley, Desert Center, Palo Verde Valley, and those non- Community Development areas of the Elsinore, Lake Mathews/Woodcrest, Mead Valley and Temescal Canyon Area Plans.
- LOS D shall apply to all development proposals located within any of the following Area Plans: Eastvale, Jurupa, Highgrove, Reche Canyon/Badlands, Lakeview/Nuevo, Sun City/Menifee Valley, Harvest Valley/Winchester, Southwest Area, The Pass, San Jacinto Valley, Western Coachella Valley and those Community Development Areas of the Elsinore, Lake Mathews/Woodcrest, Mead Valley and Temescal Canyon Area Plans. LOS E may be allowed by the Board of Supervisors within designated areas where transit oriented development and walkable communities are proposed.

Notwithstanding the forgoing minimum LOS targets, the Board of Supervisors may, on occasion by virtue of their discretionary powers, approve a project that fails to meet these LOS targets in order to balance congestion management considerations in relation to benefits, environmental impacts and costs, provided an Environmental Impact Report, or equivalent, has been completed to fully evaluate the impacts of such approval. Any such approval must incorporate all feasible mitigation measures,

make specific findings to support the decision, and adopt a statement of overriding considerations.

CEQA COMPLIANCE AND DOCUMENTATION – INTERSECTIONS

CITY OF RIVERSIDE

For projects in conformance with the General Plan, a significant impact occurs at a study intersection when the peak hour LOS falls below C, or D per CCM-2.3 as noted below. For projects that propose uses or intensities above that contained in the General Plan, a significant impact at a study intersection is when the addition of project related trips causes either peak hour LOS to degrade from acceptable (LOS A thru D) to unacceptable levels (E or F) or the peak hour delay to increase as follows:

LOS A/B	=	By 10.0 seconds or more
LOS C	=	By 8.0 seconds or more
LOS D	=	By 5.0 seconds or more
LOS E	=	By 2.0 seconds or more
LOS F	=	By 1.0 second or more

COUNTY OF RIVERSIDE

For the study area intersections that lie within the County of Riverside and City of Moreno Valley, to determine whether the addition of project traffic (as defined through the comparison of Existing to E+P traffic conditions) at a study intersection would result in a direct project-specific traffic impact, the following conditions must occur:

- Peak hour project traffic plus existing traffic causes an intersection to operate at LOS E or F

SPECIAL ISSUES

The following special issue will be addressed in the traffic study:

- Provide a queuing analysis to determine the 95th percentile queues and the minimum requirement of storage lengths for right and left-turn movements at the Project driveways and site adjacent signalized intersections based on forecasted traffic volumes of Horizon Year (2040) with Project traffic conditions.

OPEN ITEMS - CUMULATIVE DEVELOPMENT PROJECTS

A list of cumulative projects from both the City of Riverside (based on April 2019 list) and the City of Moreno Valley (based on list dated May 2019) has been utilized to develop the cumulative projects that

will be evaluated in this traffic study. Table 2 summarizes the list of cumulative development projects and are graphically shown on Exhibit 4.

CONCLUSION

Urban Crossroads, Inc. is pleased to submit this letter documenting the Project trip generation, trip distribution, and the recommended intersection analysis locations for the Crestview Apartments Traffic Impact Study. We will continue to move forward towards completing the traffic study after receiving jurisdiction approval or comments finalizing the study area.

If you have any questions, please contact me directly at (949) 336-5982.

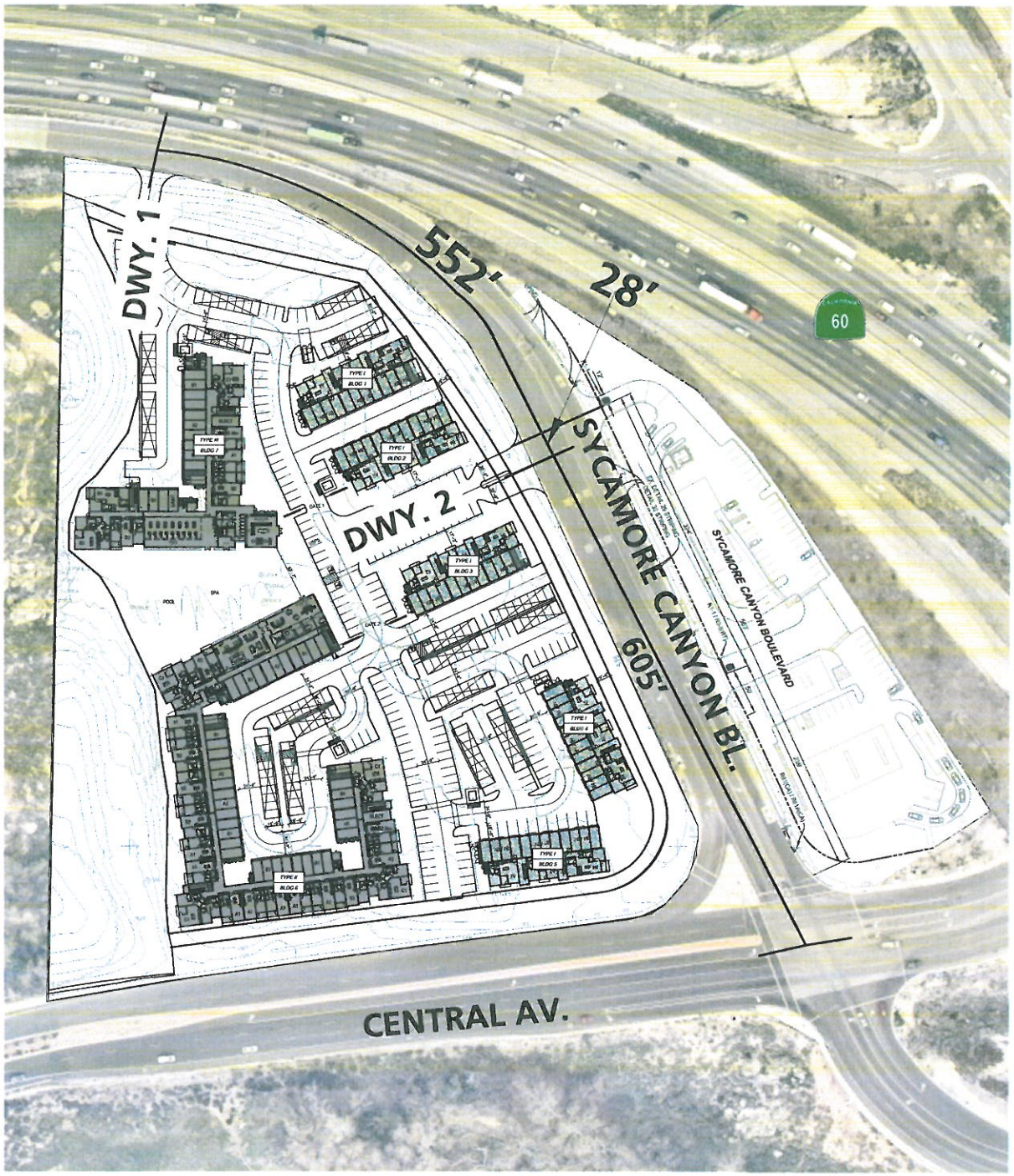
Respectfully submitted,

URBAN CROSSROADS, INC.

Charlene So

Charlene So, PE
Senior Associate

EXHIBIT 1: PRELIMINARY SITE PLAN



12061 - siteplan.dwg

EXHIBIT 2: LOCATION MAP

LEGEND:

- (0) = EXISTING INTERSECTION ANALYSIS LOCATION
- (0) = FUTURE INTERSECTION ANALYSIS LOCATION
- [00] = ROADWAY SEGMENT ANALYSIS LOCATION

N

12061 - locmap.dwg

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EXHIBIT 3: PROJECT TRIP DISTRIBUTION

LEGEND:

10 = PERCENT TO/FROM PROJECT

◄—— = OUTBOUND

◄- - - = INBOUND

N

12061 - trip.dwg

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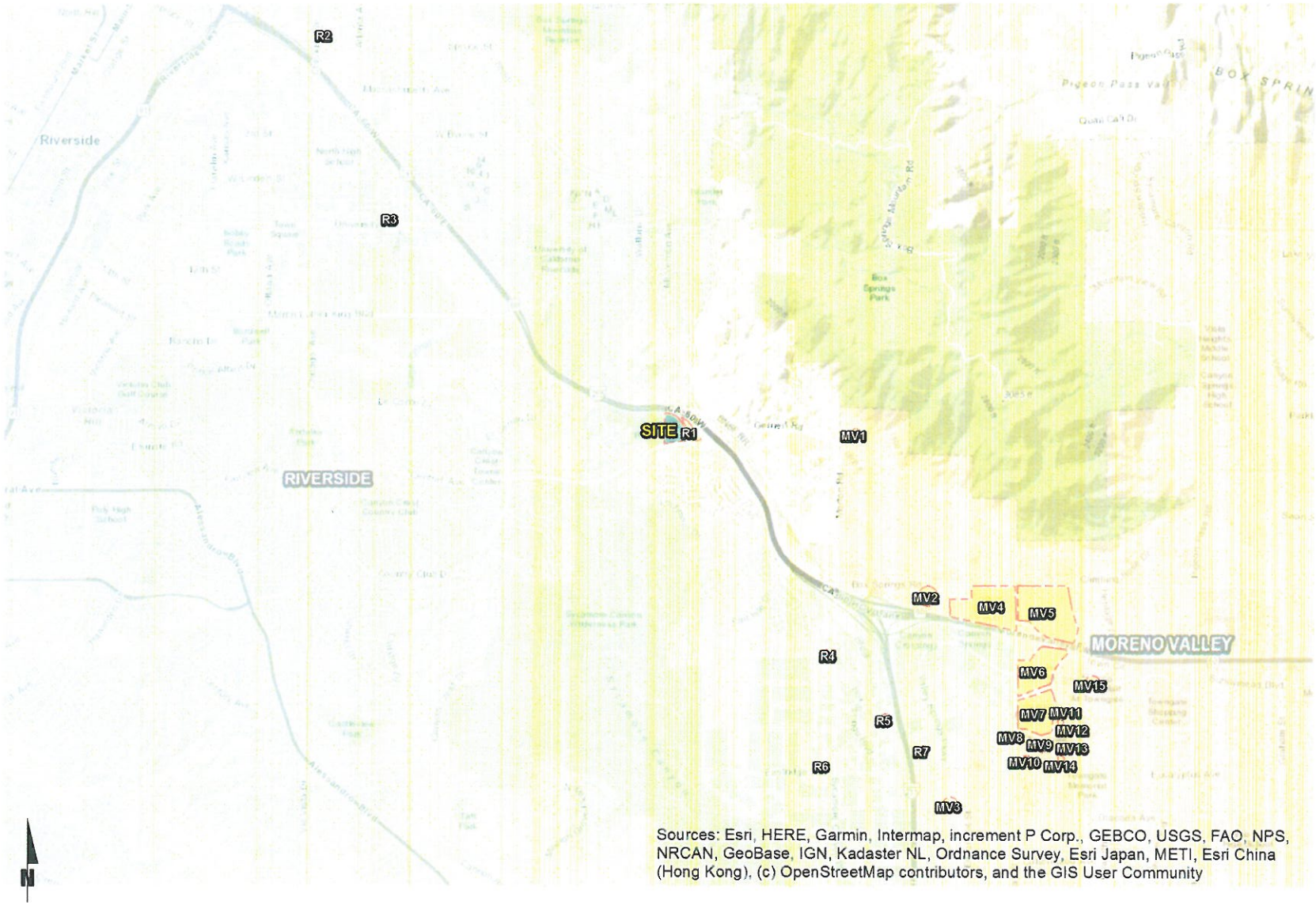
EXHIBIT 4: CUMULATIVE DEVELOPMENT LOCATION MAP



URBAN CROSSROADS

Table 1

Project Trip Generation Rates & Trip Generation Summary

Land Use	Units[2]	ITE LU Code	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Trip Generation Rates[1]									
Multifamily Housing (Low Rise)	DU	220	0.11	0.35	0.46	0.35	0.21	0.56	7.32
Multifamily Housing (Mid-Rise)	DU	221	0.09	0.27	0.36	0.27	0.17	0.44	5.44

Land Use	Quantity	Units[2]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Trip Generation Summary									
Crestview Apartments									
Building 1 (2-3 Floors)	51	DU	5	18	23	18	11	29	374
Building 2-7 (4 Floors)	186	DU	17	50	67	50	32	82	1,012
TOTAL	**237**	**DU**	**22**	**68**	**90**	**68**	**43**	**111**	**1,386**

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Tenth Edition (2017).

[2] DU = Dwelling Units

Table 2

Summary of Cumulative Development Projects

No.	Project Name	Land Use	Quantity[1]	
CITY OF RIVERSIDE				
R1	NEC Central Avenue and Sycamore Canyon Boulevard	Fast Food Restaurant with Drive Thru	3.800	TSF
		Gas Station with Convenience Store	12	VFP
R2	1695 Spruce Street	Charter School	6.647	TSF
R3	1301 University Avenue	Fast Food Restaurant with Drive Thru	2.819	TSF
R4	6150 Sycamore Canyon Boulevard	Warehouse	171.616	TSF
R5	6235 River Crest Drive	Church	7.471	TSF
R6	6465 Sycamore Canyon Boulevard	Health/Fitness Club	4.000	TSF
R7	6281 Valley Springs Parkway	Carwash	4.340	TSF
CITY OF MORENO VALLEY				
MV1	Kincaid Development (Tract 33626)	Single Family Detached Residential	25	DU
MV2	Oak Park Partners (Tract 35414)	Multi Family Housing	266	DU
MV3	Apollo III Development Group (PEN16-0064)	Multi Family Housing	18	DU
MV4	Canyon Spring Center	Commercial Shopping Center		TSF
MV5	TownGate Highlands	Commercial Shopping Center	252	TSF
MV6	TownGate Crossing	Commercial Shopping Center	237	TSF
MV7	TownGate Promenade	Commercial Shopping Center	200	TSF
MV8	Residence Inn	Hotel	112	RM
MV9	The Quarter	Commercial Shopping Center	420	TSF
MV10	Holiday Inn Express	Hotel	104	RM
MV11	Hampton Inn & Suites	Hotel	115	RM
MV12	Ayres Suites	Hotel	127	RM
MV13	Fairfield Inn & Suites	Hotel	106	RM
MV14	TownGate Square	Office / Medical	170	TSF
MV15	Moreno Valley Mall	Commercial Shopping Center	1,200	TSF

[1] TSF = Thousand Square Feet; RM = Room, VFP = Vehicle Fueling Position; DU = Dwelling Unit

APPENDIX 1.2:

SITE ADJACENT QUEUES

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Intersection: 1: Driveway 1 & Sycamore Canyon Bl.

Movement	NB
Directions Served	LR
Maximum Queue (ft)	24
Average Queue (ft)	8
95th Queue (ft)	26
Link Distance (ft)	61
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Sycamore Canyon Bl. & Driveway 2/Driveway

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	TR	L
Maximum Queue (ft)	62	100	29	4	45
Average Queue (ft)	27	56	2	0	9
95th Queue (ft)	51	95	13	3	32
Link Distance (ft)	176	76		500	
Upstream Blk Time (%)		4			
Queuing Penalty (veh)		0			
Storage Bay Dist (ft)			100		100
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Sycamore Canyon Bl. & Central Av.

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	R	L	L	T	TR	L	T	R
Maximum Queue (ft)	452	763	717	630	251	22	42	168	157	350	874	215
Average Queue (ft)	77	505	447	248	40	3	7	64	60	273	774	215
95th Queue (ft)	336	780	709	569	182	14	25	130	125	440	1034	217
Link Distance (ft)		1585	1585	1585			290	290	290		818	
Upstream Blk Time (%)											26	
Queuing Penalty (veh)											0	
Storage Bay Dist (ft)	570				200	100				250		115
Storage Blk Time (%)		16		4						1	30	41
Queuing Penalty (veh)		10		8						17	408	319

Intersection: 3: Sycamore Canyon Bl. & Central Av.

Movement	NB	SB	SB	SB
Directions Served	R	L	T	T
Maximum Queue (ft)	165	260	75	54
Average Queue (ft)	123	111	22	18
95th Queue (ft)	220	209	54	49
Link Distance (ft)			500	500
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	115	250		
Storage Blk Time (%)	1	1		
Queuing Penalty (veh)	5	0		

Zone Summary

Zone wide Queuing Penalty: 767

Intersection: 1: Driveway 1 & Sycamore Canyon Bl.

Movement	NB
Directions Served	LR
Maximum Queue (ft)	23
Average Queue (ft)	6
95th Queue (ft)	23
Link Distance (ft)	61
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Sycamore Canyon Bl. & Driveway 2/Driveway

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	L
Maximum Queue (ft)	66	91	47	37
Average Queue (ft)	22	53	14	9
95th Queue (ft)	50	91	40	30
Link Distance (ft)	176	76		
Upstream Blk Time (%)		3		
Queuing Penalty (veh)		0		
Storage Bay Dist (ft)			100	100
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Sycamore Canyon Bl. & Central Av.

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	T	R	L	L	T	TR	L	T	R
Maximum Queue (ft)	126	1602	1633	1636	375	121	165	254	269	330	383	138
Average Queue (ft)	45	1042	1592	1605	375	58	66	128	146	199	113	44
95th Queue (ft)	108	2134	1656	1622	375	104	123	220	240	309	258	99
Link Distance (ft)		1585	1585	1585			290	290	290		818	
Upstream Blk Time (%)		3	32	95				0	0			
Queuing Penalty (veh)		0	0	0				0	0			
Storage Bay Dist (ft)	570				200	100				250		115
Storage Blk Time (%)				86	13	2	2			5	4	0
Queuing Penalty (veh)				557	33	3	3			30	34	0

Intersection: 3: Sycamore Canyon Bl. & Central Av.

Movement	NB	SB	SB	SB
Directions Served	R	L	T	T
Maximum Queue (ft)	108	212	159	143
Average Queue (ft)	51	108	91	82
95th Queue (ft)	91	178	141	134
Link Distance (ft)			500	500
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	115	250		
Storage Blk Time (%)	0	0		
Queuing Penalty (veh)	1	0		

Zone Summary

Zone wide Queuing Penalty: 662

APPENDIX 3.1:

EXISTING TRAFFIC COUNTS – MAY 2019

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

County of Riverside
N/S: Sycamore Canyon Boulevard
E/W: Central Avenue
Weather: Clear

File Name : A_CRV_Sycamore Cyn_Central AM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	Sycamore Canyon Boulevard Southbound					Central Avenue Westbound					Sycamore Canyon Boulevard Northbound					Central Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	7	8	2	0	17	7	55	5	0	67	60	85	237	5	382	2	126	8	0	136	5	602	607
07:15 AM	10	12	1	0	23	9	60	5	1	74	68	94	227	27	389	1	152	18	0	171	28	657	685
07:30 AM	9	4	2	0	15	8	75	3	1	86	54	82	170	25	306	5	208	21	0	234	26	641	667
07:45 AM	11	14	1	0	26	19	60	16	1	95	71	112	236	31	419	5	127	29	2	161	34	701	735
Total	37	38	6	0	81	43	250	29	3	322	253	373	870	88	1496	13	613	76	2	702	93	2601	2694
08:00 AM	18	7	0	0	25	14	54	5	0	73	70	63	221	37	354	2	107	12	2	121	39	573	612
08:15 AM	16	6	2	0	24	15	39	3	2	57	65	78	194	21	337	1	121	25	2	147	25	565	590
08:30 AM	8	7	0	0	15	6	49	4	0	59	87	77	232	41	396	0	93	15	1	108	42	578	620
08:45 AM	8	11	1	0	20	3	55	3	0	61	82	81	183	18	346	0	75	19	1	94	19	521	540
Total	50	31	3	0	84	38	197	15	2	250	304	299	830	117	1433	3	396	71	6	470	125	2237	2362
Grand Total	87	69	9	0	165	81	447	44	5	572	557	672	1700	205	2929	16	1009	147	8	1172	218	4838	5056
Apprch %	52.7	41.8	5.5			14.2	78.1	7.7			19	22.9	58			1.4	86.1	12.5					
Total %	1.8	1.4	0.2		3.4	1.7	9.2	0.9		11.8	11.5	13.9	35.1		60.5	0.3	20.9	3		24.2	4.3	95.7	
Passenger Vehicles	86	66	8		160	80	440	43		568	544	667	1644		3058	16	991	138		1153	0	0	4939
% Passenger Vehicles	98.9	95.7	88.9	0	97	98.8	98.4	97.7	100	98.4	97.7	99.3	96.7	99	97.6	100	98.2	93.9	100	97.7	0	0	97.7
Large 2 Axle Vehicles	0	2	1		3	1	4	1		6	13	5	40		59	0	17	9		26	0	0	94
% Large 2 Axle Vehicles	0	2.9	11.1	0	1.8	1.2	0.9	2.3	0	1	2.3	0.7	2.4	0.5	1.9	0	1.7	6.1	0	2.2	0	0	1.9
3 Axle Vehicles	0	1	0		1	0	1	0		1	0	0	8		8	0	1	0		1	0	0	11
% 3 Axle Vehicles	0	1.4	0	0	0.6	0	0.2	0	0	0.2	0	0	0.5	0	0.3	0	0.1	0	0	0.1	0	0	0.2
4+ Axle Trucks	1	0	0		1	0	2	0		2	0	0	8		9	0	0	0		0	0	0	12
% 4+ Axle Trucks	1.1	0	0	0	0.6	0	0.4	0	0	0.3	0	0	0.5	0.5	0.3	0	0	0	0	0	0	0	0.2

	Sycamore Canyon Boulevard Southbound				Central Avenue Westbound				Sycamore Canyon Boulevard Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	7	8	**2**	17	7	55	5	67	60	85	**237**	382	2	126	8	136	602
07:15 AM	10	12	1	23	9	60	5	74	68	94	227	389	1	152	18	171	657
07:30 AM	9	4	2	15	8	**75**	3	86	54	82	170	306	**5**	**208**	21	**234**	641
07:45 AM	**11**	**14**	1	**26**	**19**	60	**16**	**95**	**71**	**112**	236	**419**	5	127	**29**	161	**701**
Total Volume	37	38	6	81	43	250	29	322	253	373	870	1496	13	613	76	702	2601
% App. Total	45.7	46.9	7.4		13.4	77.6	9		16.9	24.9	58.2		1.9	87.3	10.8		
PHF	.841	.679	.750	.779	.566	.833	.453	.847	.891	.833	.918	.893	.650	.737	.655	.750	.928

Counts Unlimited
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County of Riverside
N/S: Sycamore Canyon Boulevard
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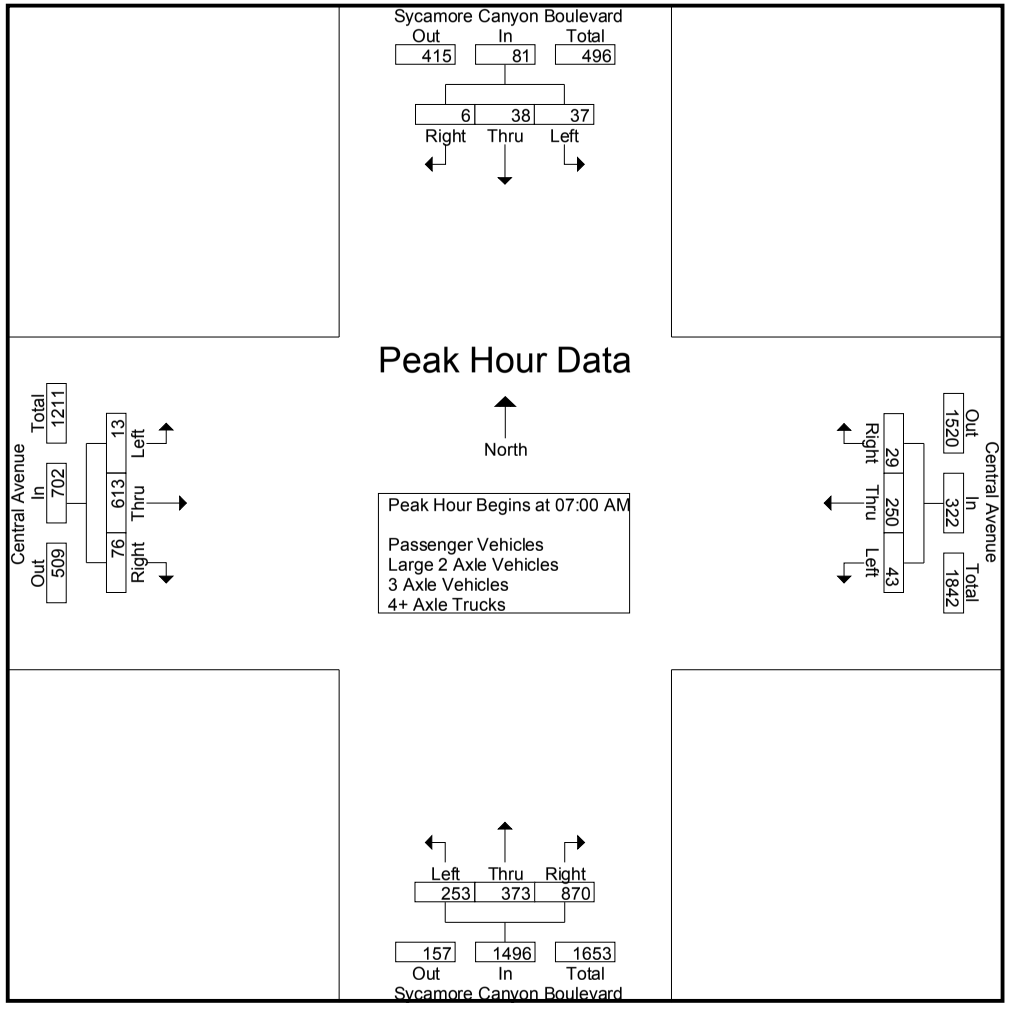
Weather: Clear

File Name : A_CRV_Sycamore Cyn_Central AM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 2



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	Sycamore Canyon Boulevard Southbound				Central Avenue Westbound				Sycamore Canyon Boulevard Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:30 AM				07:15 AM				07:45 AM				07:00 AM				
+0 mins.	9	4	**2**	15	9	60	5	74	71	**112**	**236**	**419**	2	126	8	136	
+15 mins.	11	**14**	1	**26**	8	**75**	3	86	70	63	221	354	1	152	18	171	
+30 mins.	**18**	7	0	25	**19**	60	**16**	**95**	65	78	194	337	**5**	**208**	21	**234**	
+45 mins.	16	6	2	24	14	54	5	73	**87**	77	232	396	5	127	**29**	161	
Total Volume	54	31	5	90	50	249	29	328	293	330	883	1506	13	613	76	702	
% App. Total	60	34.4	5.6		15.2	75.9	8.8		19.5	21.9	58.6		1.9	87.3	10.8		
PHF	.750	.554	.625	.865	.658	.830	.453	.863	.842	.737	.935	.899	.650	.737	.655	.750	

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Site Code : 05119367
Start Date : 5/21/2019
Page No : 1

Groups Printed- Passenger Vehicles

	Sycamore Canyon Boulevard Southbound					Central Avenue Westbound					Sycamore Canyon Boulevard Northbound					Central Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	7	8	2	0	17	7	55	5	0	67	57	83	230	5	370	2	123	7	0	132	5	586	591
07:15 AM	9	11	1	0	21	9	59	5	1	73	67	94	225	27	386	1	149	17	0	167	28	647	675
07:30 AM	9	4	1	0	14	8	75	3	1	86	52	82	156	25	290	5	202	20	0	227	26	617	643
07:45 AM	11	14	1	0	26	19	58	15	1	92	70	112	231	31	413	5	126	27	2	158	34	689	723
Total	36	37	5	0	78	43	247	28	3	318	246	371	842	88	1459	13	600	71	2	684	93	2539	2632
08:00 AM	18	7	0	0	25	13	53	5	0	71	69	63	214	37	346	2	106	11	2	119	39	561	600
08:15 AM	16	6	2	0	24	15	39	3	2	57	64	78	188	20	330	1	120	24	2	145	24	556	580
08:30 AM	8	7	0	0	15	6	48	4	0	58	85	76	225	41	386	0	91	14	1	105	42	564	606
08:45 AM	8	9	1	0	18	3	53	3	0	59	80	79	175	17	334	0	74	18	1	92	18	503	521
Total	50	29	3	0	82	37	193	15	2	245	298	296	802	115	1396	3	391	67	6	461	123	2184	2307
Grand Total	86	66	8	0	160	80	440	43	5	563	544	667	1644	203	2855	16	991	138	8	1145	216	4723	4939
Apprch %	53.8	41.2	5			14.2	78.2	7.6			19.1	23.4	57.6			1.4	86.6	12.1					
Total %	1.8	1.4	0.2		3.4	1.7	9.3	0.9		11.9	11.5	14.1	34.8		60.4	0.3	21	2.9		24.2	4.4	95.6	

3.1-4

	Sycamore Canyon Boulevard Southbound				Central Avenue Westbound				Sycamore Canyon Boulevard Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	7	8	**2**	17	7	55	5	67	57	83	230	370	2	123	7	132	586
07:15 AM	9	11	1	21	9	59	5	73	67	94	225	386	1	149	17	167	647
07:30 AM	9	4	1	14	8	**75**	3	86	52	82	156	290	**5**	**202**	20	**227**	617
07:45 AM	**11**	**14**	1	**26**	**19**	58	**15**	**92**	**70**	**112**	**231**	**413**	5	126	**27**	158	**689**
Total Volume	36	37	5	78	43	247	28	318	246	371	842	1459	13	600	71	684	2539
% App. Total	46.2	47.4	6.4		13.5	77.7	8.8		16.9	25.4	57.7		1.9	87.7	10.4		
PHF	.818	.661	.625	.750	.566	.823	.467	.864	.879	.828	.911	.883	.650	.743	.657	.753	.921

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

County of Riverside
N/S: Sycamore Canyon Boulevard
E/W: Central Avenue
Weather: Clear

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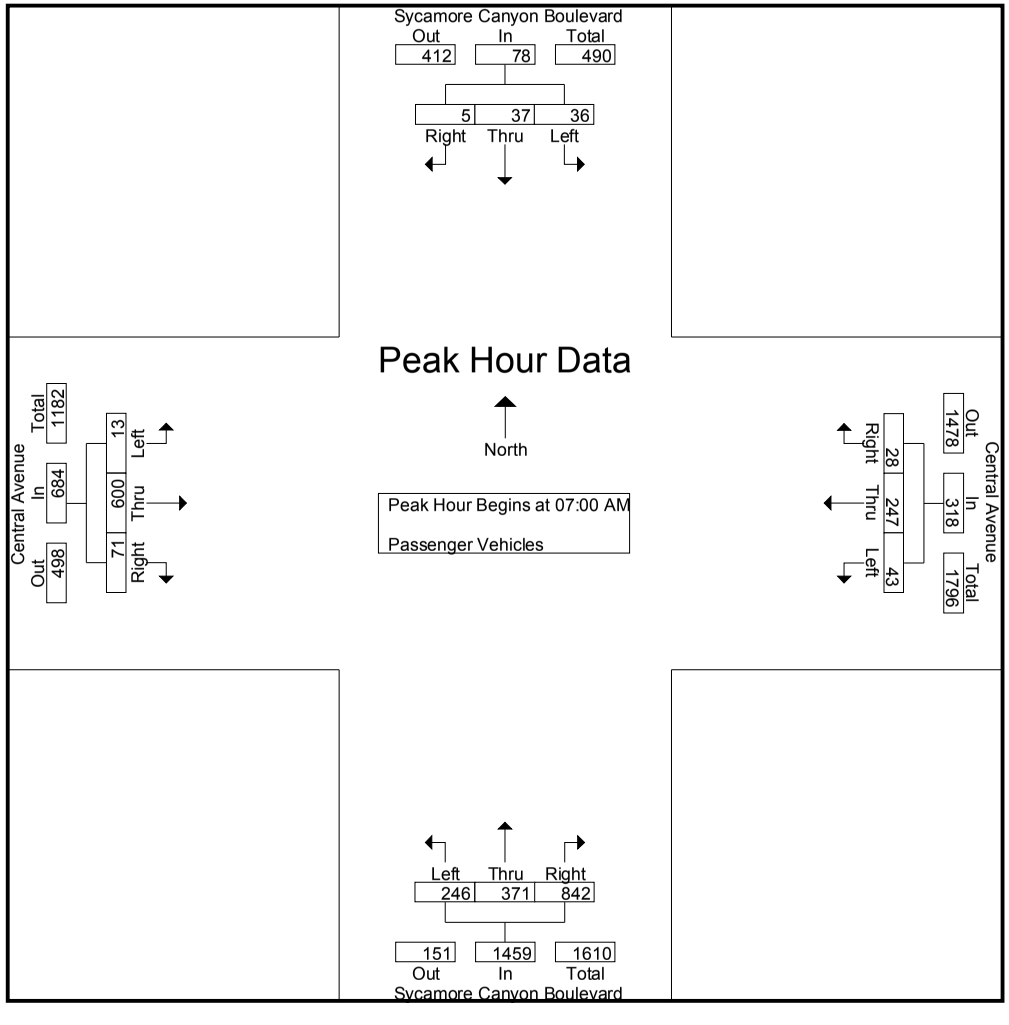
Site Code : 05119367
Start Date : 5/21/2019
Page No : 2



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Page No : 3

	Sycamore Canyon Boulevard Southbound				Central Avenue Westbound				Sycamore Canyon Boulevard Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:00 AM				07:00 AM				07:00 AM				07:00 AM				
+0 mins.	7	8	**2**	17	7	55	5	67	57	83	230	370	2	123	7	132	
+15 mins.	9	11	1	21	9	59	5	73	67	94	225	386	1	149	17	167	
+30 mins.	9	4	1	14	8	**75**	3	86	52	82	156	290	**5**	**202**	20	**227**	
+45 mins.	**11**	**14**	1	**26**	**19**	58	**15**	**92**	**70**	**112**	**231**	**413**	5	126	**27**	158	
Total Volume	36	37	5	78	43	247	28	318	246	371	842	1459	13	600	71	684	
% App. Total	46.2	47.4	6.4		13.5	77.7	8.8		16.9	25.4	57.7		1.9	87.7	10.4		
PHF	.818	.661	.625	.750	.566	.823	.467	.864	.879	.828	.911	.883	.650	.743	.657	.753	

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Groups Printed- Large 2 Axle Vehicles

	Sycamore Canyon Boulevard Southbound					Central Avenue Westbound					Sycamore Canyon Boulevard Northbound					Central Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	3	2	7	0	12	0	3	1	0	4	0	16	16
07:15 AM	0	1	0	0	1	0	0	0	0	0	1	0	1	0	2	0	2	1	0	3	0	6	6
07:30 AM	0	0	1	0	1	0	0	0	0	0	2	0	9	0	11	0	6	1	0	7	0	19	19
07:45 AM	0	0	0	0	0	0	2	1	0	3	1	0	2	0	3	0	1	2	0	3	0	9	9
Total	0	1	1	0	2	0	2	1	0	3	7	2	19	0	28	0	12	5	0	17	0	50	50
08:00 AM	0	0	0	0	0	1	1	0	0	2	1	0	7	0	8	0	1	1	0	2	0	12	12
08:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	4	1	5	0	1	1	0	2	1	7	8
08:30 AM	0	0	0	0	0	0	0	0	0	0	2	1	5	0	8	0	2	1	0	3	0	11	11
08:45 AM	0	1	0	0	1	0	1	0	0	1	2	2	5	0	9	0	1	1	0	2	0	13	13
Total	0	1	0	0	1	1	2	0	0	3	6	3	21	1	30	0	5	4	0	9	1	43	44
Grand Total	0	2	1	0	3	1	4	1	0	6	13	5	40	1	58	0	17	9	0	26	1	93	94
Apprch %	0	66.7	33.3			16.7	66.7	16.7			22.4	8.6	69			0	65.4	34.6					
Total %	0	2.2	1.1		3.2	1.1	4.3	1.1		6.5	14	5.4	43		62.4	0	18.3	9.7		28	1.1	98.9	

	Sycamore Canyon Boulevard Southbound				Central Avenue Westbound				Sycamore Canyon Boulevard Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	**3**	**2**	7	**12**	0	3	1	4	16
07:15 AM	0	**1**	0	**1**	0	0	0	0	1	0	1	2	0	2	1	3	6
07:30 AM	0	0	**1**	1	0	0	0	0	2	0	**9**	11	0	**6**	1	**7**	**19**
07:45 AM	0	0	0	0	0	**2**	**1**	**3**	1	0	2	3	0	1	**2**	3	9
Total Volume	0	1	1	2	0	2	1	3	7	2	19	28	0	12	5	17	50
% App. Total	0	50	50		0	66.7	33.3		25	7.1	67.9		0	70.6	29.4		
PHF	.000	.250	.250	.500	.000	.250	.250	.250	.583	.250	.528	.583	.000	.500	.625	.607	.658

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County of Riverside
N/S: Sycamore Canyon Boulevard
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Weather: Clear

File Name : A_CRV_Sycamore Cyn_Central AM
Site Code : 05119367
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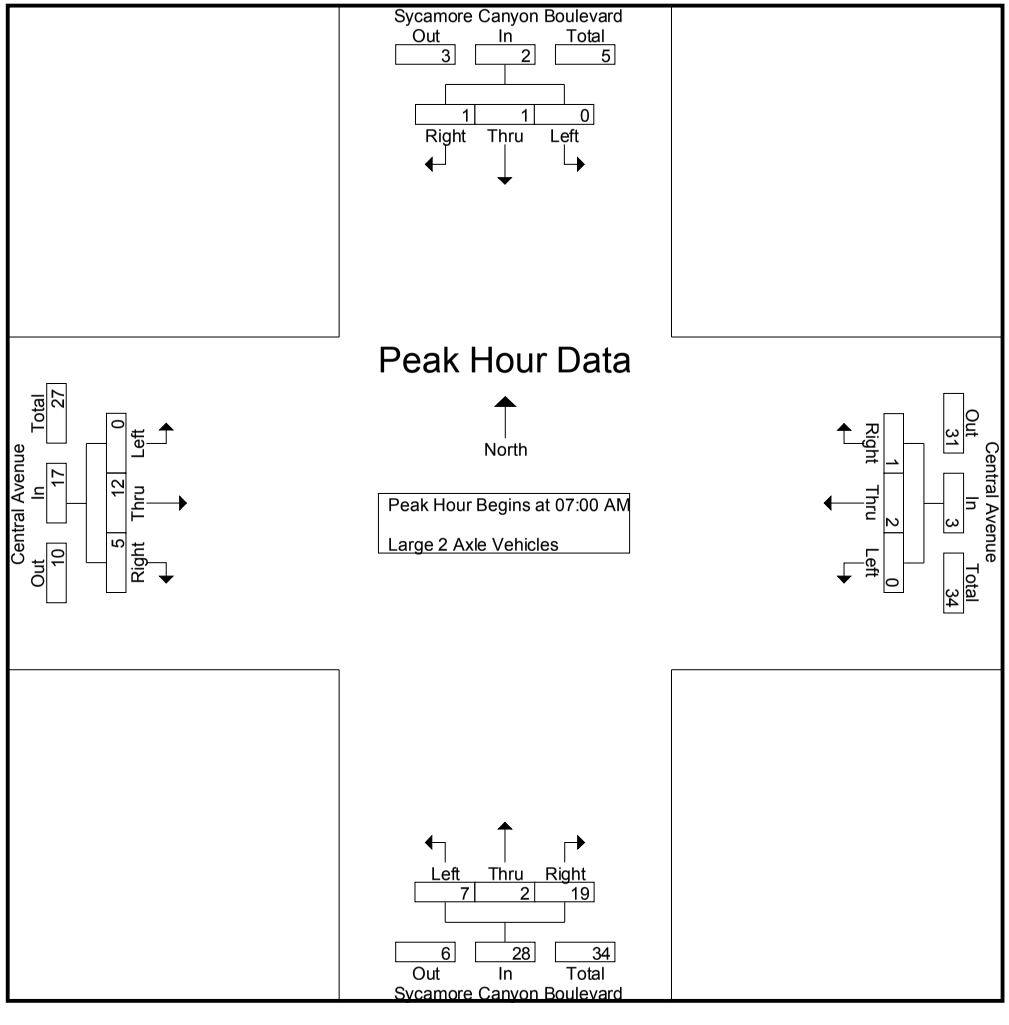

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	Sycamore Canyon Boulevard Southbound				Central Avenue Westbound				Sycamore Canyon Boulevard Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:00 AM				07:00 AM				07:00 AM				07:00 AM				
+0 mins.	0	0	0	0	0	0	0	0	**3**	**2**	7	**12**	0	3	1	4	
+15 mins.	0	**1**	0	**1**	0	0	0	0	1	0	1	2	0	2	1	3	
+30 mins.	0	0	**1**	1	0	0	0	0	2	0	**9**	11	0	**6**	1	**7**	
+45 mins.	0	0	0	0	0	**2**	**1**	**3**	1	0	2	3	0	1	**2**	3	
Total Volume	0	1	1	2	0	2	1	3	7	2	19	28	0	12	5	17	
% App. Total	0	50	50		0	66.7	33.3		25	7.1	67.9		0	70.6	29.4		
PHF	.000	.250	.250	.500	.000	.250	.250	.250	.583	.250	.528	.583	.000	.500	.625	.607	

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Groups Printed- 3 Axle Vehicles

	Sycamore Canyon Boulevard Southbound					Central Avenue Westbound					Sycamore Canyon Boulevard Northbound					Central Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	0	0	4	4
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5	0	1	0	0	1	0	6	6
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	2	2
08:30 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
08:45 AM	0	1	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2	2
Total	0	1	0	0	1	0	1	0	0	1	0	0	3	0	3	0	0	0	0	0	0	5	5
Grand Total	0	1	0	0	1	0	1	0	0	1	0	0	8	0	8	0	1	0	0	1	0	11	11
Apprch %	0	100	0			0	100	0			0	0	100			0	100	0					
Total %	0	9.1	0		9.1	0	9.1	0		9.1	0	0	72.7		72.7	0	9.1	0		9.1	0	100	

	Sycamore Canyon Boulevard Southbound				Central Avenue Westbound				Sycamore Canyon Boulevard Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	**4**	**4**	0	0	0	0	**4**
07:45 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
Total Volume	0	0	0	0	0	0	0	0	0	0	5	5	0	1	0	1	6
% App. Total	0	0	0		0	0	0		0	0	100		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.313	.313	.000	.250	.000	.250	.375

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County of Riverside
N/S: Sycamore Canyon Boulevard
E/W: Central Avenue
Weather: Clear

File Name : A_CRV_Sycamore Cyn_Central AM
Site Code : 05119367
Start Date : 5/21/2019
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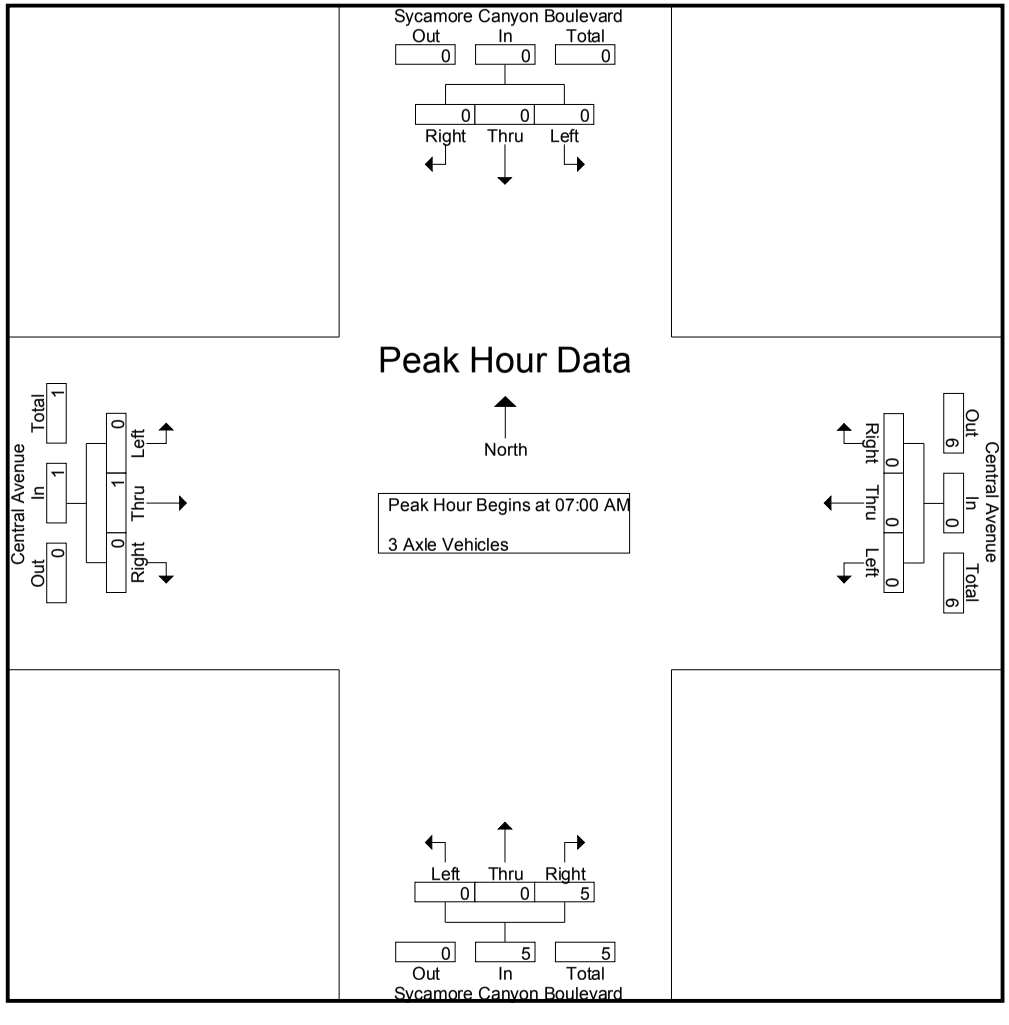

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	Sycamore Canyon Boulevard Southbound				Central Avenue Westbound				Sycamore Canyon Boulevard Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:00 AM				07:00 AM				07:00 AM				07:00 AM				
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**	
+30 mins.	0	0	0	0	0	0	0	0	0	0	**4**	**4**	0	0	0	0	
+45 mins.	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	
Total Volume	0	0	0	0	0	0	0	0	0	0	5	5	0	1	0	1	
% App. Total	0	0	0		0	0	0		0	0	100		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.313	.313	.000	.250	.000	.250	

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County of Riverside
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Start Date : 5/21/2019
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Groups Printed- 4+ Axle Trucks

	Sycamore Canyon Boulevard Southbound					Central Avenue Westbound					Sycamore Canyon Boulevard Northbound					Central Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	1	0	0	0	1	0	1	0	0	1	0	0	1	0	1	0	0	0	0	0	0	3	3
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	2	2
Total	1	0	0	0	1	0	1	0	0	1	0	0	4	0	4	0	0	0	0	0	0	6	6
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	2	2
08:45 AM	0	0	0	0	0	0	1	0	0	1	0	0	2	1	2	0	0	0	0	0	1	3	4
Total	0	0	0	0	0	0	1	0	0	1	0	0	4	1	4	0	0	0	0	0	1	5	6
Grand Total	1	0	0	0	1	0	2	0	0	2	0	0	8	1	8	0	0	0	0	0	1	11	12
Apprch %	100	0	0			0	100	0			0	0	100			0	0	0					
Total %	9.1	0	0		9.1	0	18.2	0		18.2	0	0	72.7		72.7	0	0	0		0	8.3	91.7	

	Sycamore Canyon Boulevard Southbound				Central Avenue Westbound				Sycamore Canyon Boulevard Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	**1**	0	0	**1**	0	**1**	0	**1**	0	0	1	1	0	0	0	0	**3**
07:30 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
07:45 AM	0	0	0	0	0	0	0	0	0	0	**2**	**2**	0	0	0	0	2
Total Volume	1	0	0	1	0	1	0	1	0	0	4	4	0	0	0	0	6
% App. Total	100	0	0		0	100	0		0	0	100		0	0	0		
PHF	.250	.000	.000	.250	.000	.250	.000	.250	.000	.000	.500	.500	.000	.000	.000	.000	.500

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Site Code : 05119367
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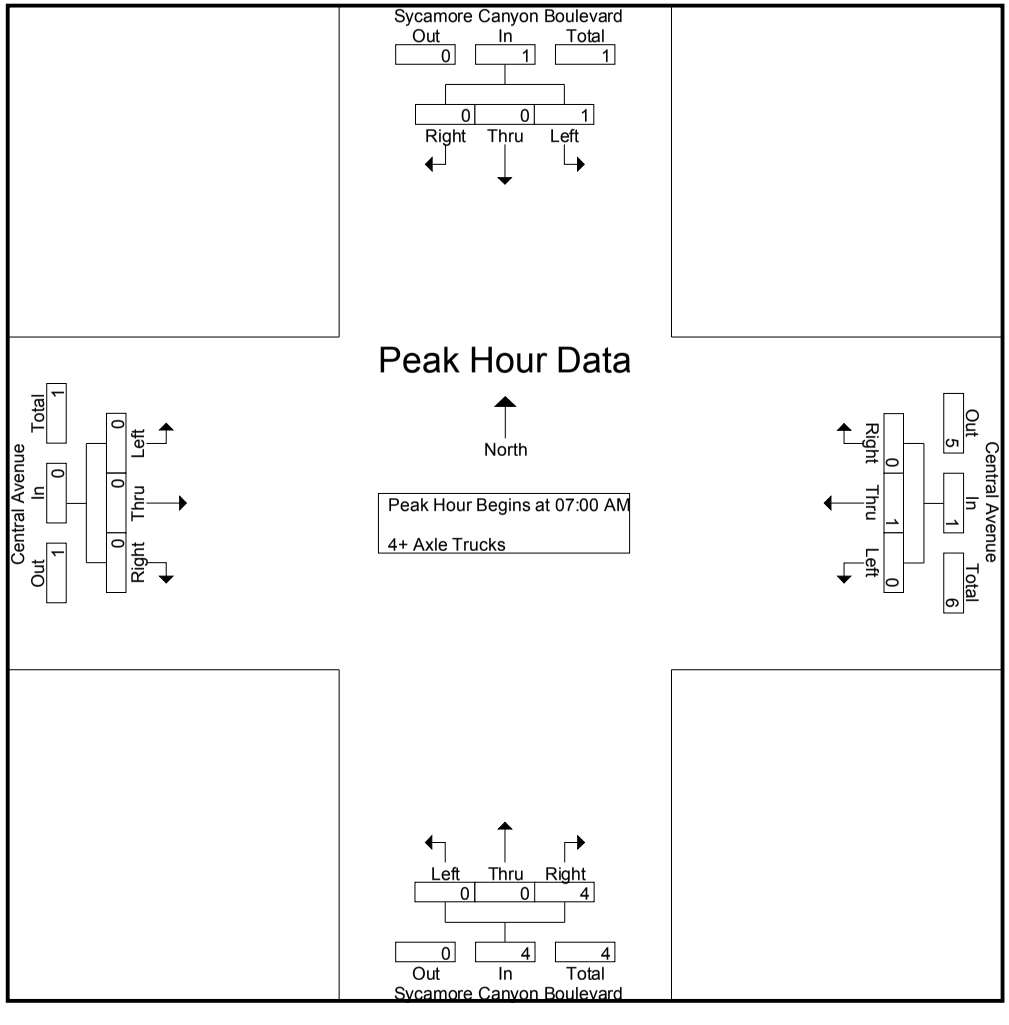

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Page No : 3

	Sycamore Canyon Boulevard Southbound				Central Avenue Westbound				Sycamore Canyon Boulevard Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:00 AM				07:00 AM				07:00 AM				07:00 AM				
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
+15 mins.	**1**	0	0	**1**	0	**1**	0	**1**	0	0	1	1	0	0	0	0	
+30 mins.	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	
+45 mins.	0	0	0	0	0	0	0	0	0	0	**2**	**2**	0	0	0	0	
Total Volume	1	0	0	1	0	1	0	1	0	0	4	4	0	0	0	0	
% App. Total	100	0	0		0	100	0		0	0	100		0	0	0		
PHF	.250	.000	.000	.250	.000	.250	.000	.250	.000	.000	.500	.500	.000	.000	.000	.000	

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Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	Sycamore Canyon Boulevard Southbound					Central Avenue Westbound					Sycamore Canyon Boulevard Northbound					Central Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	11	33	2	0	46	33	92	13	3	138	76	46	97	43	219	0	158	118	44	276	90	679	769
04:15 PM	16	46	3	0	65	47	88	11	3	146	77	46	92	37	215	3	159	85	21	247	61	673	734
04:30 PM	14	63	0	0	77	45	71	13	7	129	83	51	71	31	205	2	100	113	53	215	91	626	717
04:45 PM	19	46	1	0	66	59	81	10	5	150	54	44	92	45	190	4	162	119	41	285	91	691	782
Total	60	188	6	0	254	184	332	47	18	563	290	187	352	156	829	9	579	435	159	1023	333	2669	3002
05:00 PM	16	65	1	0	82	49	74	9	3	132	76	58	75	23	209	4	137	100	23	241	49	664	713
05:15 PM	23	78	3	0	104	62	85	14	3	161	74	41	73	14	188	1	160	122	34	283	51	736	787
05:30 PM	15	91	2	0	108	58	102	14	3	174	62	24	30	7	116	3	160	118	35	281	45	679	724
05:45 PM	24	61	3	0	88	61	99	10	2	170	48	30	41	12	119	0	141	118	28	259	42	636	678
Total	78	295	9	0	382	230	360	47	11	637	260	153	219	56	632	8	598	458	120	1064	187	2715	2902
Grand Total	138	483	15	0	636	414	692	94	29	1200	550	340	571	212	1461	17	1177	893	279	2087	520	5384	5904
Apprch %	21.7	75.9	2.4			34.5	57.7	7.8			37.6	23.3	39.1			0.8	56.4	42.8					
Total %	2.6	9	0.3		11.8	7.7	12.9	1.7		22.3	10.2	6.3	10.6		27.1	0.3	21.9	16.6		38.8	8.8	91.2	
Passenger Vehicles	137	478	15		630	411	687	93		1220	536	339	557		1640	16	1169	880		2340	0	0	5830
% Passenger Vehicles	99.3	99	100	0	99.1	99.3	99.3	98.9	100	99.3	97.5	99.7	97.5	98.1	98	94.1	99.3	98.5	98.6	98.9	0	0	98.7
Large 2 Axle Vehicles	0	5	0		5	3	4	0		7	14	1	12		30	1	7	13		25	0	0	67
% Large 2 Axle Vehicles	0	1	0	0	0.8	0.7	0.6	0	0	0.6	2.5	0.3	2.1	1.4	1.8	5.9	0.6	1.5	1.4	1.1	0	0	1.1
3 Axle Vehicles	1	0	0		1	0	1	0		1	0	0	0		0	0	0	0		0	0	0	2
% 3 Axle Vehicles	0.7	0	0	0	0.2	0	0.1	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0
4+ Axle Trucks	0	0	0		0	0	0	1		1	0	0	2		3	0	1	0		1	0	0	5
% 4+ Axle Trucks	0	0	0	0	0	0	0	1.1	0	0.1	0	0	0.4	0.5	0.2	0	0.1	0	0	0	0	0	0.1

	Sycamore Canyon Boulevard Southbound				Central Avenue Westbound				Sycamore Canyon Boulevard Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	19	46	1	66	59	81	10	150	54	44	**92**	190	**4**	**162**	119	**285**	691
05:00 PM	16	65	1	82	49	74	9	132	**76**	**58**	75	**209**	4	137	100	241	664
05:15 PM	**23**	78	**3**	104	**62**	85	**14**	161	74	41	73	188	1	160	**122**	283	**736**
05:30 PM	15	**91**	2	**108**	58	**102**	14	**174**	62	24	30	116	3	160	118	281	679
Total Volume	73	280	7	360	228	342	47	617	266	167	270	703	12	619	459	1090	2770
% App. Total	20.3	77.8	1.9		37	55.4	7.6		37.8	23.8	38.4		1.1	56.8	42.1		
PHF	.793	.769	.583	.833	.919	.838	.839	.886	.875	.720	.734	.841	.750	.955	.941	.956	.941

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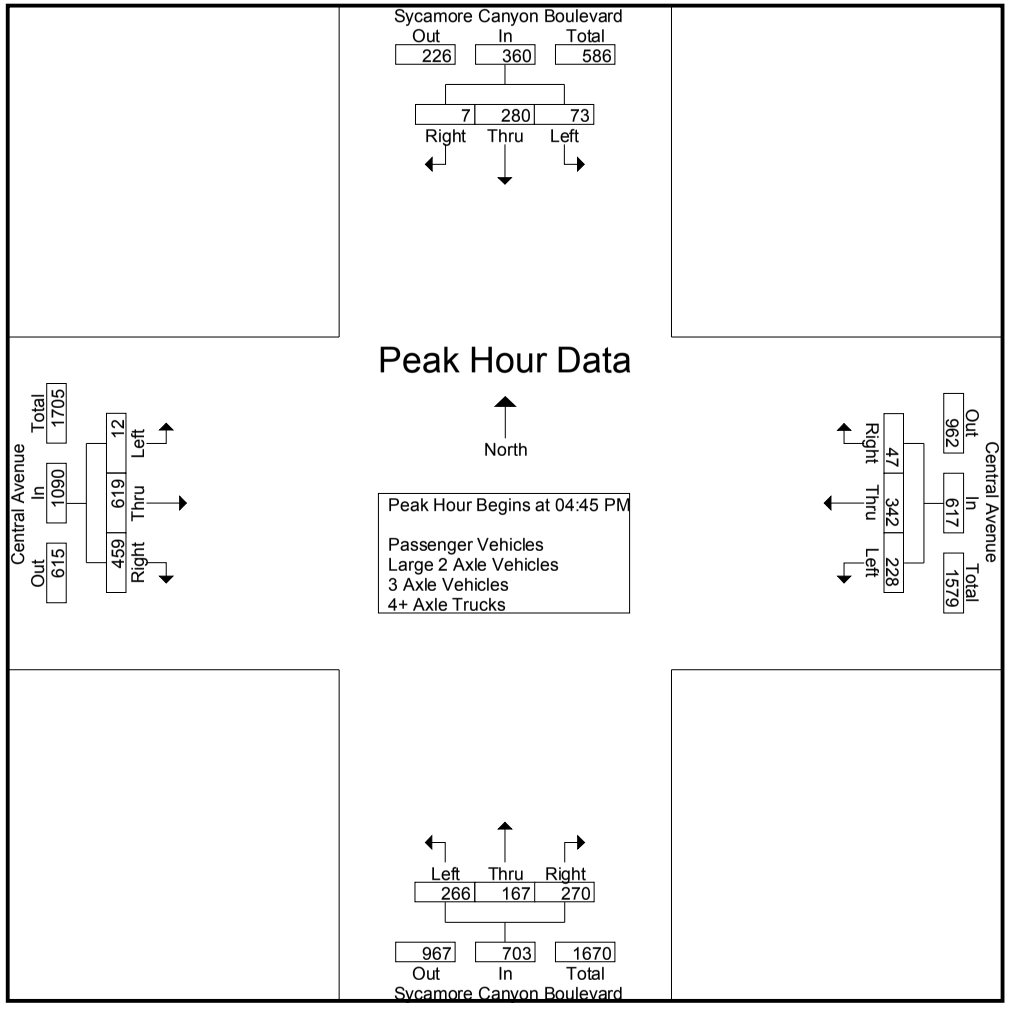

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	Sycamore Canyon Boulevard Southbound				Central Avenue Westbound				Sycamore Canyon Boulevard Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	05:00 PM				05:00 PM				04:00 PM				04:45 PM				
+0 mins.	16	65	1	82	49	74	9	132	76	46	**97**	**219**	**4**	**162**	119	**285**	
+15 mins.	23	78	**3**	104	**62**	85	**14**	161	77	46	92	215	4	137	100	241	
+30 mins.	15	**91**	2	**108**	58	**102**	14	**174**	**83**	**51**	71	205	1	160	**122**	283	
+45 mins.	**24**	61	3	88	61	99	10	170	54	44	92	190	3	160	118	281	
Total Volume	78	295	9	382	230	360	47	637	290	187	352	829	12	619	459	1090	
% App. Total	20.4	77.2	2.4		36.1	56.5	7.4		35	22.6	42.5		1.1	56.8	42.1		
PHF	.813	.810	.750	.884	.927	.882	.839	.915	.873	.917	.907	.946	.750	.955	.941	.956	

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File Name : A_CRV_Sycamore Cyn_Central PM
Site Code : 05119367
Start Date : 5/21/2019
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Groups Printed- Passenger Vehicles

	Sycamore Canyon Boulevard Southbound					Central Avenue Westbound					Sycamore Canyon Boulevard Northbound					Central Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	11	33	2	0	46	33	89	13	3	135	74	46	93	40	213	0	153	118	44	271	87	665	752
04:15 PM	16	45	3	0	64	47	87	10	3	144	75	46	90	37	211	3	159	83	21	245	61	664	725
04:30 PM	13	63	0	0	76	45	71	13	7	129	79	51	70	31	200	2	100	112	52	214	90	619	709
04:45 PM	19	46	1	0	66	58	80	10	5	148	52	44	89	44	185	3	162	117	39	282	88	681	769
Total	59	187	6	0	252	183	327	46	18	556	280	187	342	152	809	8	574	430	156	1012	326	2629	2955
05:00 PM	16	64	1	0	81	49	74	9	3	132	75	58	73	23	206	4	135	99	23	238	49	657	706
05:15 PM	23	78	3	0	104	62	85	14	3	161	73	41	71	14	185	1	159	118	34	278	51	728	779
05:30 PM	15	88	2	0	105	57	102	14	3	173	61	23	30	7	114	3	160	117	34	280	44	672	716
05:45 PM	24	61	3	0	88	60	99	10	2	169	47	30	41	12	118	0	141	116	28	257	42	632	674
Total	78	291	9	0	378	228	360	47	11	635	256	152	215	56	623	8	595	450	119	1053	186	2689	2875
Grand Total	137	478	15	0	630	411	687	93	29	1191	536	339	557	208	1432	16	1169	880	275	2065	512	5318	5830
Apprch %	21.7	75.9	2.4			34.5	57.7	7.8			37.4	23.7	38.9			0.8	56.6	42.6					
Total %	2.6	9	0.3		11.8	7.7	12.9	1.7		22.4	10.1	6.4	10.5		26.9	0.3	22	16.5		38.8	8.8	91.2	

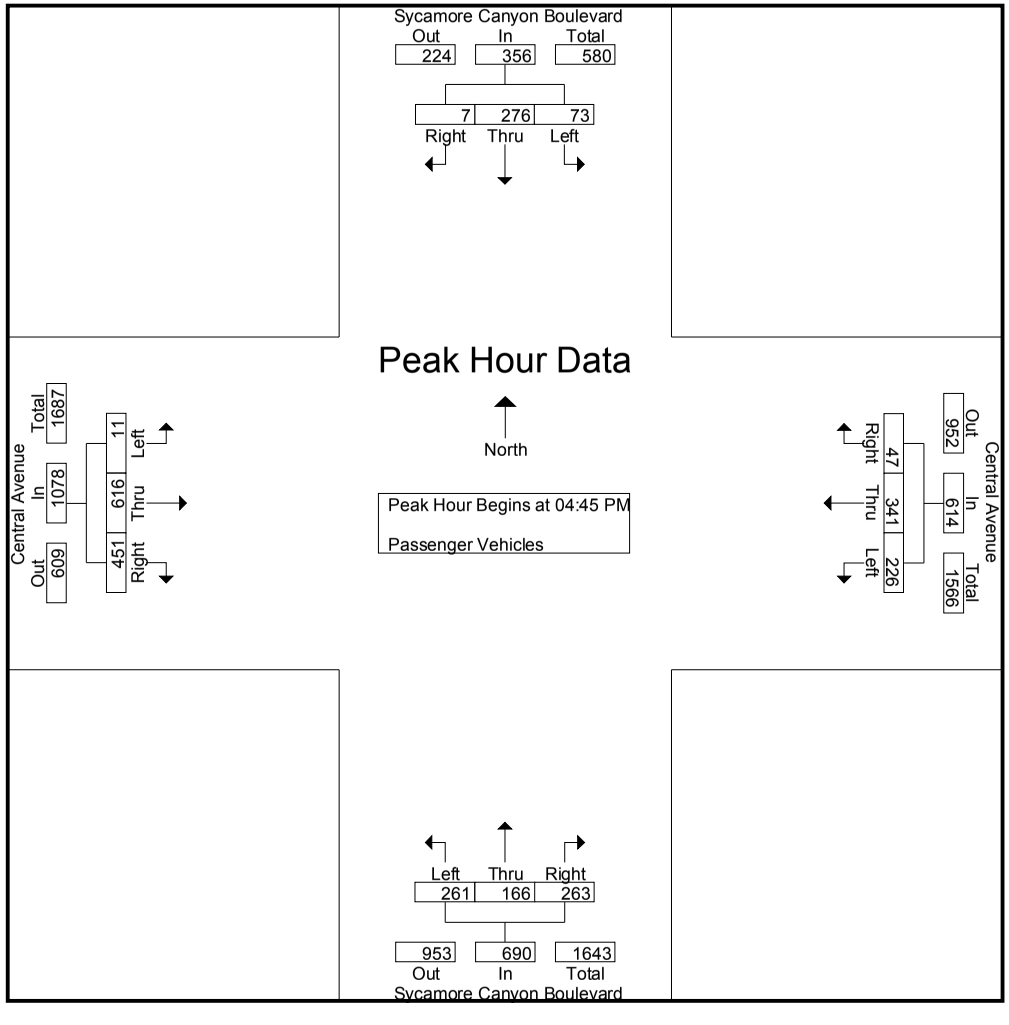
3.1-19

	Sycamore Canyon Boulevard Southbound				Central Avenue Westbound				Sycamore Canyon Boulevard Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	19	46	1	66	58	80	10	148	52	44	**89**	185	3	**162**	117	**282**	681
05:00 PM	16	64	1	81	49	74	9	132	**75**	**58**	73	**206**	**4**	135	99	238	657
05:15 PM	**23**	78	**3**	104	**62**	85	**14**	161	73	41	71	185	1	159	**118**	278	**728**
05:30 PM	15	**88**	2	**105**	57	**102**	14	**173**	61	23	30	114	3	160	117	280	672
Total Volume	73	276	7	356	226	341	47	614	261	166	263	690	11	616	451	1078	2738
% App. Total	20.5	77.5	2		36.8	55.5	7.7		37.8	24.1	38.1		1	57.1	41.8		
PHF	.793	.784	.583	.848	.911	.836	.839	.887	.870	.716	.739	.837	.688	.951	.956	.956	.940

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

County of Riverside
N/S: Sycamore Canyon Boulevard
E/W: Central Avenue
Weather: Clear

File Name : A_CRV_Sycamore Cyn_Central PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 2



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County of Riverside
N/S: Sycamore Canyon Boulevard
E/W: Central Avenue
Weather: Clear

File Name : A_CRV_Sycamore Cyn_Central PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 3

	Sycamore Canyon Boulevard Southbound				Central Avenue Westbound				Sycamore Canyon Boulevard Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	04:45 PM				04:45 PM				04:45 PM				04:45 PM				
+0 mins.	19	46	1	66	58	80	10	148	52	44	**89**	185	3	**162**	117	**282**	
+15 mins.	16	64	1	81	49	74	9	132	**75**	**58**	73	**206**	**4**	135	99	238	
+30 mins.	**23**	78	**3**	104	**62**	85	**14**	161	73	41	71	185	1	159	**118**	278	
+45 mins.	15	**88**	2	**105**	57	**102**	14	**173**	61	23	30	114	3	160	117	280	
Total Volume	73	276	7	356	226	341	47	614	261	166	263	690	11	616	451	1078	
% App. Total	20.5	77.5	2		36.8	55.5	7.7		37.8	24.1	38.1		1	57.1	41.8		
PHF	.793	.784	.583	.848	.911	.836	.839	.887	.870	.716	.739	.837	.688	.951	.956	.956	

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County of Riverside
N/S: Sycamore Canyon Boulevard
E/W: Central Avenue
Weather: Clear

File Name : A_CRV_Sycamore Cyn_Central PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 1

Groups Printed- Large 2 Axle Vehicles

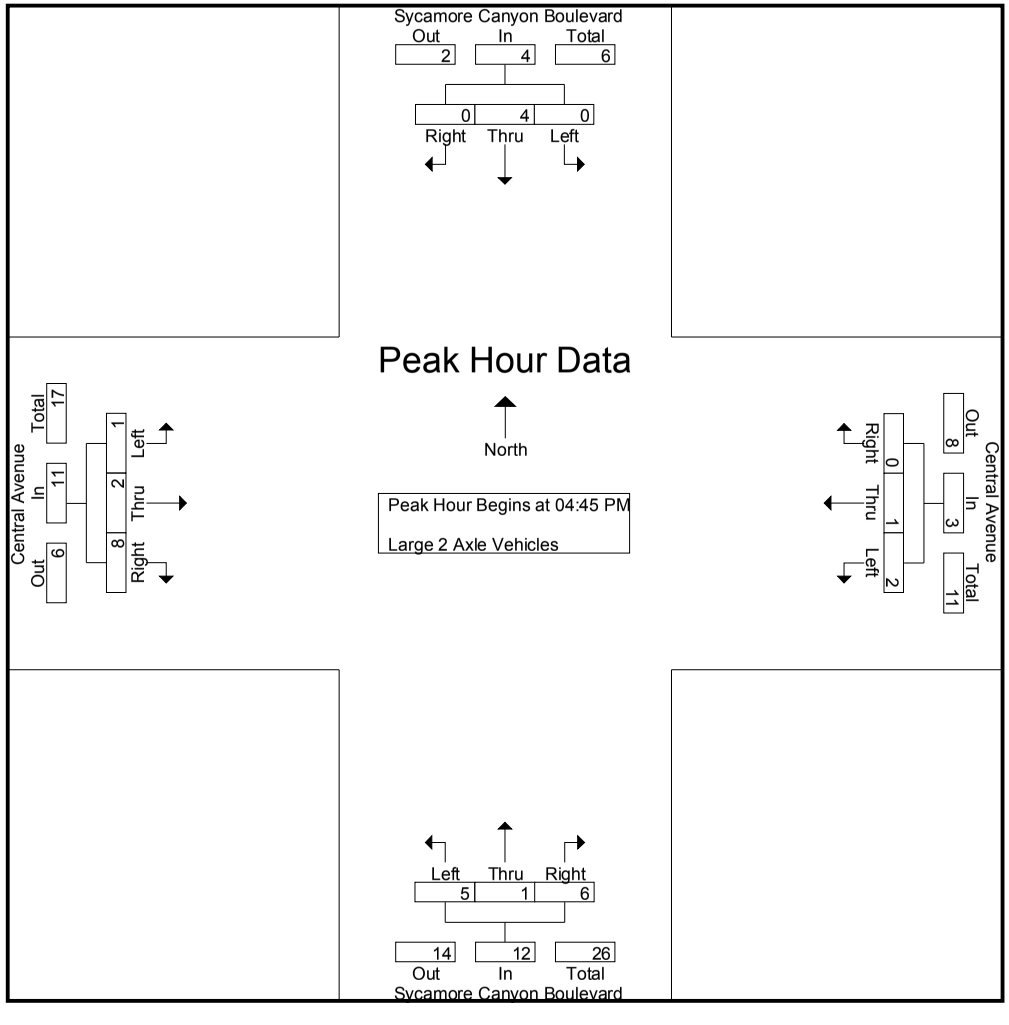
	Sycamore Canyon Boulevard Southbound					Central Avenue Westbound					Sycamore Canyon Boulevard Northbound					Central Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	2	0	0	2	2	0	4	3	6	0	5	0	0	5	3	13	16
04:15 PM	0	1	0	0	1	0	1	0	0	1	2	0	1	0	3	0	0	2	0	2	0	7	7
04:30 PM	0	0	0	0	0	0	0	0	0	0	4	0	1	0	5	0	0	1	1	1	1	6	7
04:45 PM	0	0	0	0	0	1	1	0	0	2	2	0	2	0	4	1	0	2	2	3	2	9	11
Total	0	1	0	0	1	1	4	0	0	5	10	0	8	3	18	1	5	5	3	11	6	35	41
05:00 PM	0	1	0	0	1	0	0	0	0	0	1	0	2	0	3	0	2	1	0	3	0	7	7
05:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	2	0	3	0	0	4	0	4	0	7	7
05:30 PM	0	3	0	0	3	1	0	0	0	1	1	1	0	0	2	0	0	1	1	1	1	7	8
05:45 PM	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0	0	2	0	2	0	4	4
Total	0	4	0	0	4	2	0	0	0	2	4	1	4	0	9	0	2	8	1	10	1	25	26
Grand Total	0	5	0	0	5	3	4	0	0	7	14	1	12	3	27	1	7	13	4	21	7	60	67
Apprch %	0	100	0			42.9	57.1	0			51.9	3.7	44.4			4.8	33.3	61.9					
Total %	0	8.3	0		8.3	5	6.7	0		11.7	23.3	1.7	20		45	1.7	11.7	21.7		35	10.4	89.6	

	Sycamore Canyon Boulevard Southbound				Central Avenue Westbound				Sycamore Canyon Boulevard Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	**1**	**1**	0	**2**	**2**	0	**2**	**4**	**1**	0	2	3	**9**
05:00 PM	0	1	0	1	0	0	0	0	1	0	2	3	0	**2**	1	3	7
05:15 PM	0	0	0	0	0	0	0	0	1	0	2	3	0	0	**4**	**4**	7
05:30 PM	0	**3**	0	**3**	1	0	0	1	1	**1**	0	2	0	0	1	1	7
Total Volume	0	4	0	4	2	1	0	3	5	1	6	12	1	2	8	11	30
% App. Total	0	100	0		66.7	33.3	0		41.7	8.3	50		9.1	18.2	72.7		
PHF	.000	.333	.000	.333	.500	.250	.000	.375	.625	.250	.750	.750	.250	.250	.500	.688	.833

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

County of Riverside
N/S: Sycamore Canyon Boulevard
E/W: Central Avenue
Weather: Clear

File Name : A_CRV_Sycamore Cyn_Central PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 2



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County of Riverside
N/S: Sycamore Canyon Boulevard
E/W: Central Avenue
Weather: Clear

File Name : A_CRV_Sycamore Cyn_Central PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 3

	Sycamore Canyon Boulevard Southbound				Central Avenue Westbound				Sycamore Canyon Boulevard Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	04:45 PM				04:45 PM				04:45 PM				04:45 PM				
+0 mins.	0	0	0	0	**1**	**1**	0	**2**	**2**	0	**2**	**4**	**1**	0	2	3	
+15 mins.	0	1	0	1	0	0	0	0	1	0	2	3	0	**2**	1	3	
+30 mins.	0	0	0	0	0	0	0	0	1	0	2	3	0	0	**4**	**4**	
+45 mins.	0	**3**	0	**3**	1	0	0	1	1	**1**	0	2	0	0	1	1	
Total Volume	0	4	0	4	2	1	0	3	5	1	6	12	1	2	8	11	
% App. Total	0	100	0		66.7	33.3	0		41.7	8.3	50		9.1	18.2	72.7		
PHF	.000	.333	.000	.333	.500	.250	.000	.375	.625	.250	.750	.750	.250	.250	.500	.688	

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County of Riverside
N/S: Sycamore Canyon Boulevard
E/W: Central Avenue
Weather: Clear

File Name : A_CRV_Sycamore Cyn_Central PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 1

Groups Printed- 3 Axle Vehicles

	Sycamore Canyon Boulevard Southbound					Central Avenue Westbound					Sycamore Canyon Boulevard Northbound					Central Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	2
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	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	0
Grand Total	1	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	2
Apprch %	100	0	0			0	100	0			0	0	0			0	0	0					
Total %	50	0	0		50	0	50	0		50	0	0	0		0	0	0	0		0	0	100	

	Sycamore Canyon Boulevard Southbound				Central Avenue Westbound				Sycamore Canyon Boulevard Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	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	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Counts Unlimited
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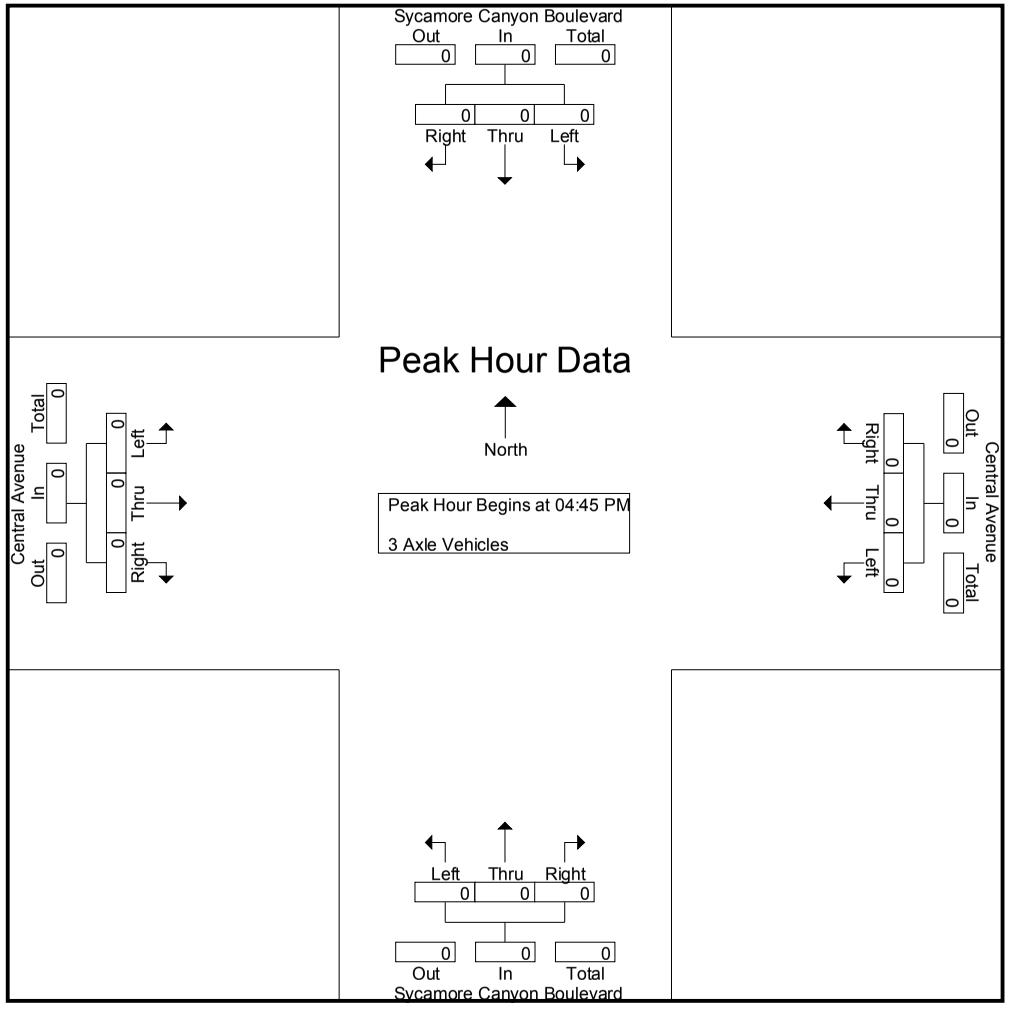
County of Riverside
N/S: Sycamore Canyon Boulevard
E/W: Central Avenue
Weather: Clear

File Name : A_CRV_Sycamore Cyn_Central PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 2



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County of Riverside
N/S: Sycamore Canyon Boulevard
E/W: Central Avenue
Weather: Clear

File Name : A_CRV_Sycamore Cyn_Central PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 3

	Sycamore Canyon Boulevard Southbound				Central Avenue Westbound				Sycamore Canyon Boulevard Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	04:45 PM				04:45 PM				04:45 PM				04:45 PM				
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
+45 mins.	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	0	0	0	
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	

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County of Riverside
N/S: Sycamore Canyon Boulevard
E/W: Central Avenue
Weather: Clear

File Name : A_CRV_Sycamore Cyn_Central PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 1

Groups Printed- 4+ Axle Trucks

	Sycamore Canyon Boulevard Southbound					Central Avenue Westbound					Sycamore Canyon Boulevard Northbound					Central Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0	0	2	2
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	2
Total	0	0	0	0	0	0	0	1	0	1	0	0	2	1	2	0	0	0	0	0	1	3	4
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	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	1	0	0	1	0	1	1
Grand Total	0	0	0	0	0	0	0	1	0	1	0	0	2	1	2	0	1	0	0	1	1	4	5
Apprch %	0	0	0			0	0	100			0	0	100			0	100	0					
Total %	0	0	0		0	0	0	25		25	0	0	50		50	0	25	0		25	20	80	

	Sycamore Canyon Boulevard Southbound				Central Avenue Westbound				Sycamore Canyon Boulevard Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	0	0	0	0	0	**1**	**1**	0	0	0	0	**1**
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**	1
05:30 PM	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	1	1	0	1	0	1	2
% App. Total	0	0	0		0	0	0		0	0	100		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.000	.250	.000	.250	.500

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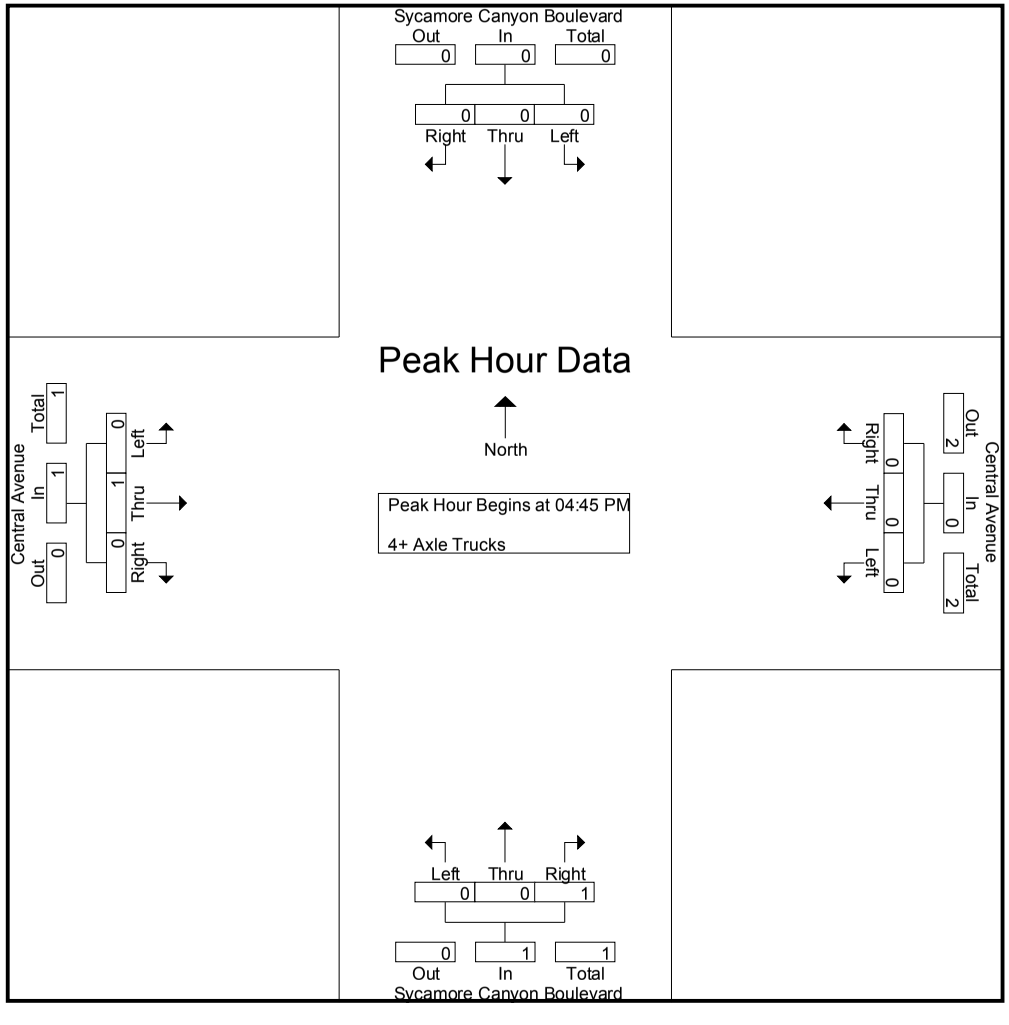
County of Riverside
N/S: Sycamore Canyon Boulevard
E/W: Central Avenue
Weather: Clear

File Name : A_CRV_Sycamore Cyn_Central PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 2



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County of Riverside
N/S: Sycamore Canyon Boulevard
E/W: Central Avenue
Weather: Clear

File Name : A_CRV_Sycamore Cyn_Central PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 3

	Sycamore Canyon Boulevard Southbound				Central Avenue Westbound				Sycamore Canyon Boulevard Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	04:45 PM				04:45 PM				04:45 PM				04:45 PM				
+0 mins.	0	0	0	0	0	0	0	0	0	0	**1**	**1**	0	0	0	0	
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**	
+45 mins.	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	1	1	0	1	0	1	
% App. Total	0	0	0		0	0	0		0	0	100		0	100	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.000	.250	.000	.250	

Location: County of Riverside
N/S: Sycamore Canyon Blvd
E/W: Central Avenue

Date: 5/21/2019
Day: Tuesday

PEDESTRIANS

	North Leg Sycamore Canyon Blvd	East Leg Central Avenue	South Leg Sycamore Canyon Blvd	West Leg Central Avenue	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0

	North Leg Sycamore Canyon Blvd	East Leg Central Avenue	South Leg Sycamore Canyon Blvd	West Leg Central Avenue	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0

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Corona, CA 92878
951-268-6268

Location: County of Riverside
N/S: Sycamore Canyon Blvd
E/W: Central Avenue

Date: 5/21/2019
Day: Tuesday

BICYCLES

	Southbound Sycamore Canyon Blvd			Westbound Central Avenue			Northbound Sycamore Canyon Blvd			Eastbound Central Avenue			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	1	0	0	0	1
TOTAL VOLUMES:	0	0	0	0	0	0	0	0	1	0	0	0	1

	Southbound Sycamore Canyon Blvd			Westbound Central Avenue			Northbound Sycamore Canyon Blvd			Eastbound Central Avenue			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	1	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	1	0	1	0	0	0	0	0	0	0	0	2
5:30 PM	0	1	0	1	0	0	0	0	0	0	0	0	2
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	0	2	0	2	0	0	1	0	0	0	0	0	5

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County of Riverside
N/S: I-215 Southbound Ramps
E/W: Central Avenue
Weather: Clear

File Name : B_CRV_215S_Central AM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	I-215 Southbound Off Ramp Southbound					Central Avenue Westbound					I-215 Southbound On Ramp Northbound					Central Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	4	0	13	5	17	36	53	0	0	89	0	0	0	0	0	0	322	47	11	369	16	475	491
07:15 AM	33	1	15	3	49	35	65	0	0	100	0	0	0	0	0	0	350	50	18	400	21	549	570
07:30 AM	45	0	5	2	50	55	84	0	0	139	0	0	0	0	0	0	333	56	24	389	26	578	604
07:45 AM	10	2	19	3	31	46	67	0	0	113	0	0	0	0	0	0	322	51	19	373	22	517	539
Total	92	3	52	13	147	172	269	0	0	441	0	0	0	0	0	0	1327	204	72	1531	85	2119	2204
08:00 AM	7	1	18	2	26	44	58	0	0	102	0	0	0	0	0	0	299	47	20	346	22	474	496
08:15 AM	16	2	13	5	31	42	48	0	0	90	0	0	0	0	0	0	278	53	22	331	27	452	479
08:30 AM	3	2	13	8	18	25	49	0	0	74	0	0	0	0	0	0	284	56	15	340	23	432	455
08:45 AM	5	2	10	6	17	39	49	0	0	88	0	0	0	0	0	0	234	39	7	273	13	378	391
Total	31	7	54	21	92	150	204	0	0	354	0	0	0	0	0	0	1095	195	64	1290	85	1736	1821
Grand Total	123	10	106	34	239	322	473	0	0	795	0	0	0	0	0	0	2422	399	136	2821	170	3855	4025
Apprch %	51.5	4.2	44.4			40.5	59.5	0			0	0	0			0	85.9	14.1					
Total %	3.2	0.3	2.7		6.2	8.4	12.3	0		20.6	0	0	0		0	0	62.8	10.4		73.2	4.2	95.8	
Passenger Vehicles	118	8	103		263	314	469	0		783	0	0	0		0	0	2358	390		2879	0	0	3925
% Passenger Vehicles	95.9	80	97.2	100	96.3	97.5	99.2	0	0	98.5	0	0	0	0	0	0	97.4	97.7	96.3	97.4	0	0	97.5
Large 2 Axle Vehicles	5	1	2		8	7	3	0		10	0	0	0		0	0	47	6		57	0	0	75
% Large 2 Axle Vehicles	4.1	10	1.9	0	2.9	2.2	0.6	0	0	1.3	0	0	0	0	0	0	1.9	1.5	2.9	1.9	0	0	1.9
3 Axle Vehicles	0	0	0		0	0	1	0		1	0	0	0		0	0	9	2		11	0	0	12
% 3 Axle Vehicles	0	0	0	0	0	0	0.2	0	0	0.1	0	0	0	0	0	0	0.4	0.5	0	0.4	0	0	0.3
4+ Axle Trucks	0	1	1		2	1	0	0		1	0	0	0		0	0	8	1		10	0	0	13
% 4+ Axle Trucks	0	10	0.9	0	0.7	0.3	0	0	0	0.1	0	0	0	0	0	0	0.3	0.3	0.7	0.3	0	0	0.3

	I-215 Southbound Off Ramp Southbound				Central Avenue Westbound				I-215 Southbound On Ramp Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	4	0	13	17	36	53	0	89	0	0	0	0	0	322	47	369	475
07:15 AM	33	1	15	49	35	65	0	100	0	0	0	0	0	**350**	50	**400**	549
07:30 AM	**45**	0	5	**50**	**55**	**84**	0	**139**	0	0	0	0	0	333	**56**	389	**578**
07:45 AM	10	**2**	**19**	31	46	67	0	113	0	0	0	0	0	322	51	373	517
Total Volume	92	3	52	147	172	269	0	441	0	0	0	0	0	1327	204	1531	2119
% App. Total	62.6	2	35.4		39	61	0		0	0	0		0	86.7	13.3		
PHF	.511	.375	.684	.735	.782	.801	.000	.793	.000	.000	.000	.000	.000	.948	.911	.957	.917

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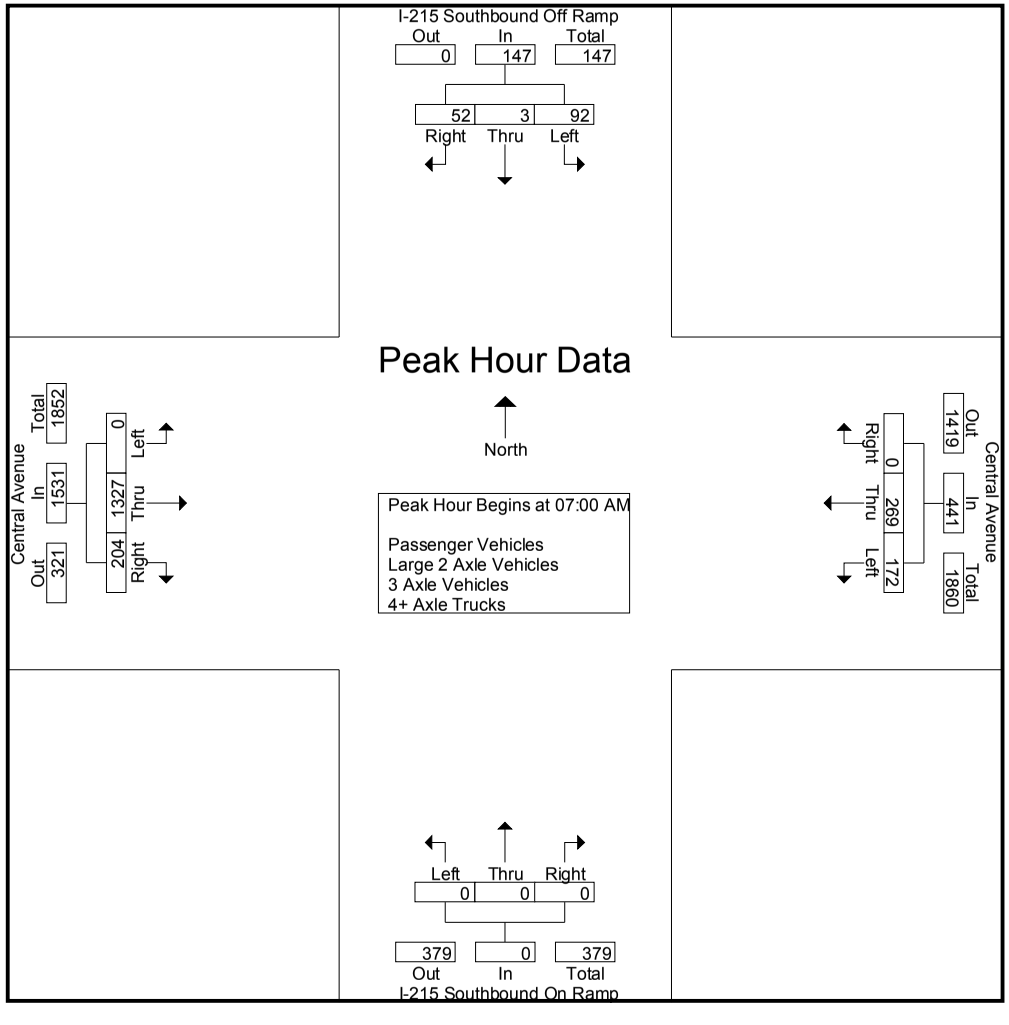
County of Riverside
N/S: I-215 Southbound Ramps
E/W: Central Avenue
Weather: Clear

File Name : B_CRV_215S_Central AM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 2



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County of Riverside
N/S: I-215 Southbound Ramps
E/W: Central Avenue
Weather: Clear

File Name : B_CRV_215S_Central AM
Site Code : 05119367
Start Date : 5/21/2019

	I-215 Southbound Off Ramp Southbound				Central Avenue Westbound				I-215 Southbound On Ramp Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:15 AM				07:15 AM				07:00 AM				07:00 AM				
+0 mins.	33	1	15	49	35	65	0	100	0	0	0	0	0	322	47	369	
+15 mins.	**45**	0	5	**50**	**55**	**84**	0	**139**	0	0	0	0	0	**350**	50	**400**	
+30 mins.	10	**2**	**19**	31	46	67	0	113	0	0	0	0	0	333	**56**	389	
+45 mins.	7	1	18	26	44	58	0	102	0	0	0	0	0	322	51	373	
Total Volume	95	4	57	156	180	274	0	454	0	0	0	0	0	1327	204	1531	
% App. Total	60.9	2.6	36.5		39.6	60.4	0		0	0	0		0	86.7	13.3		
PHF	.528	.500	.750	.780	.818	.815	.000	.817	.000	.000	.000	.000	.000	.948	.911	.957	

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County of Riverside
N/S: I-215 Southbound Ramps
E/W: Central Avenue
Weather: Clear

File Name : B_CRV_215S_Central AM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 1

Groups Printed- Passenger Vehicles

	I-215 Southbound Off Ramp Southbound					Central Avenue Westbound					I-215 Southbound On Ramp Northbound					Central Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	4	0	13	5	17	35	53	0	0	88	0	0	0	0	0	0	317	45	9	362	14	467	481
07:15 AM	32	1	14	3	47	34	65	0	0	99	0	0	0	0	0	0	344	46	16	390	19	536	555
07:30 AM	44	0	5	2	49	54	84	0	0	138	0	0	0	0	0	0	317	54	23	371	25	558	583
07:45 AM	9	2	17	3	28	45	66	0	0	111	0	0	0	0	0	0	316	51	19	367	22	506	528
Total	89	3	49	13	141	168	268	0	0	436	0	0	0	0	0	0	1294	196	67	1490	80	2067	2147
08:00 AM	7	1	18	2	26	43	57	0	0	100	0	0	0	0	0	0	292	47	20	339	22	465	487
08:15 AM	14	2	13	5	29	39	48	0	0	87	0	0	0	0	0	0	271	53	22	324	27	440	467
08:30 AM	3	1	13	8	17	25	48	0	0	73	0	0	0	0	0	0	276	55	15	331	23	421	444
08:45 AM	5	1	10	6	16	39	48	0	0	87	0	0	0	0	0	0	225	39	7	264	13	367	380
Total	29	5	54	21	88	146	201	0	0	347	0	0	0	0	0	0	1064	194	64	1258	85	1693	1778
Grand Total	118	8	103	34	229	314	469	0	0	783	0	0	0	0	0	0	2358	390	131	2748	165	3760	3925
Apprch %	51.5	3.5	45			40.1	59.9	0			0	0	0			0	85.8	14.2					
Total %	3.1	0.2	2.7		6.1	8.4	12.5	0		20.8	0	0	0		0	0	62.7	10.4		73.1	4.2	95.8	

	I-215 Southbound Off Ramp Southbound				Central Avenue Westbound				I-215 Southbound On Ramp Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	4	0	13	17	35	53	0	88	0	0	0	0	0	317	45	362	467
07:15 AM	32	1	14	47	34	65	0	99	0	0	0	0	0	**344**	46	**390**	536
07:30 AM	**44**	0	5	**49**	**54**	**84**	0	**138**	0	0	0	0	0	317	**54**	371	**558**
07:45 AM	9	**2**	**17**	28	45	66	0	111	0	0	0	0	0	316	51	367	506
Total Volume	89	3	49	141	168	268	0	436	0	0	0	0	0	1294	196	1490	2067
% App. Total	63.1	2.1	34.8		38.5	61.5	0		0	0	0		0	86.8	13.2		
PHF	.506	.375	.721	.719	.778	.798	.000	.790	.000	.000	.000	.000	.000	.940	.907	.955	.926

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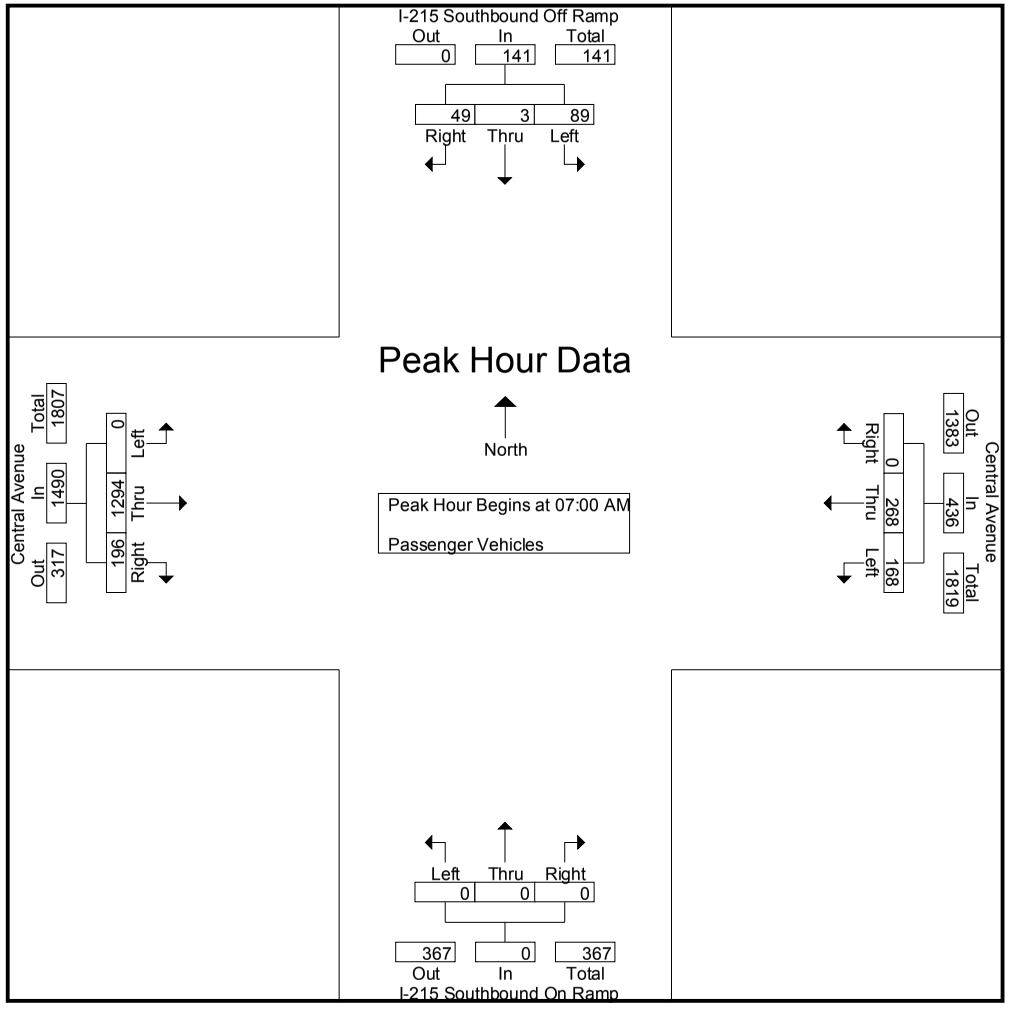
County of Riverside
N/S: I-215 Southbound Ramps
E/W: Central Avenue
Weather: Clear

File Name : B_CRV_215S_Central AM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 2



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County of Riverside
N/S: I-215 Southbound Ramps
E/W: Central Avenue
Weather: Clear

File Name : B_CRV_215S_Central AM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 3

	I-215 Southbound Off Ramp Southbound				Central Avenue Westbound				I-215 Southbound On Ramp Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:00 AM				07:00 AM				07:00 AM				07:00 AM				
+0 mins.	4	0	13	17	35	53	0	88	0	0	0	0	0	317	45	362	
+15 mins.	32	1	14	47	34	65	0	99	0	0	0	0	0	**344**	46	**390**	
+30 mins.	**44**	0	5	**49**	**54**	**84**	0	**138**	0	0	0	0	0	317	**54**	371	
+45 mins.	9	**2**	**17**	28	45	66	0	111	0	0	0	0	0	316	51	367	
Total Volume	89	3	49	141	168	268	0	436	0	0	0	0	0	1294	196	1490	
% App. Total	63.1	2.1	34.8		38.5	61.5	0		0	0	0		0	86.8	13.2		
PHF	.506	.375	.721	.719	.778	.798	.000	.790	.000	.000	.000	.000	.000	.940	.907	.955	

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County of Riverside
N/S: I-215 Southbound Ramps
E/W: Central Avenue
Weather: Clear

File Name : B_CRV_215S_Central AM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 1

Groups Printed- Large 2 Axle Vehicles

	I-215 Southbound Off Ramp Southbound					Central Avenue Westbound					I-215 Southbound On Ramp Northbound					Central Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	5	2	2	7	2	8	10
07:15 AM	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	5	1	1	6	1	8	9
07:30 AM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	12	2	1	14	1	15	16
07:45 AM	1	0	2	0	3	1	1	0	0	2	0	0	0	0	0	0	2	0	0	2	0	7	7
Total	3	0	2	0	5	3	1	0	0	4	0	0	0	0	0	0	24	5	4	29	4	38	42
08:00 AM	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	6	0	0	6	0	8	8
08:15 AM	2	0	0	0	2	3	0	0	0	3	0	0	0	0	0	0	5	0	0	5	0	10	10
08:30 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	6	1	0	7	0	8	8
08:45 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	6	0	0	6	0	7	7
Total	2	1	0	0	3	4	2	0	0	6	0	0	0	0	0	0	23	1	0	24	0	33	33
Grand Total	5	1	2	0	8	7	3	0	0	10	0	0	0	0	0	0	47	6	4	53	4	71	75
Apprch %	62.5	12.5	25			70	30	0			0	0	0			0	88.7	11.3					
Total %	7	1.4	2.8		11.3	9.9	4.2	0		14.1	0	0	0		0	0	66.2	8.5		74.6	5.3	94.7	

	I-215 Southbound Off Ramp Southbound				Central Avenue Westbound				I-215 Southbound On Ramp Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	**1**	0	0	1	0	0	0	0	0	5	**2**	7	8
07:15 AM	**1**	0	0	1	1	0	0	1	0	0	0	0	0	5	1	6	8
07:30 AM	1	0	0	1	0	0	0	0	0	0	0	0	0	**12**	2	**14**	**15**
07:45 AM	1	0	**2**	**3**	1	**1**	0	**2**	0	0	0	0	0	2	0	2	7
Total Volume	3	0	2	5	3	1	0	4	0	0	0	0	0	24	5	29	38
% App. Total	60	0	40		75	25	0		0	0	0		0	82.8	17.2		
PHF	.750	.000	.250	.417	.750	.250	.000	.500	.000	.000	.000	.000	.000	.500	.625	.518	.633

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County of Riverside
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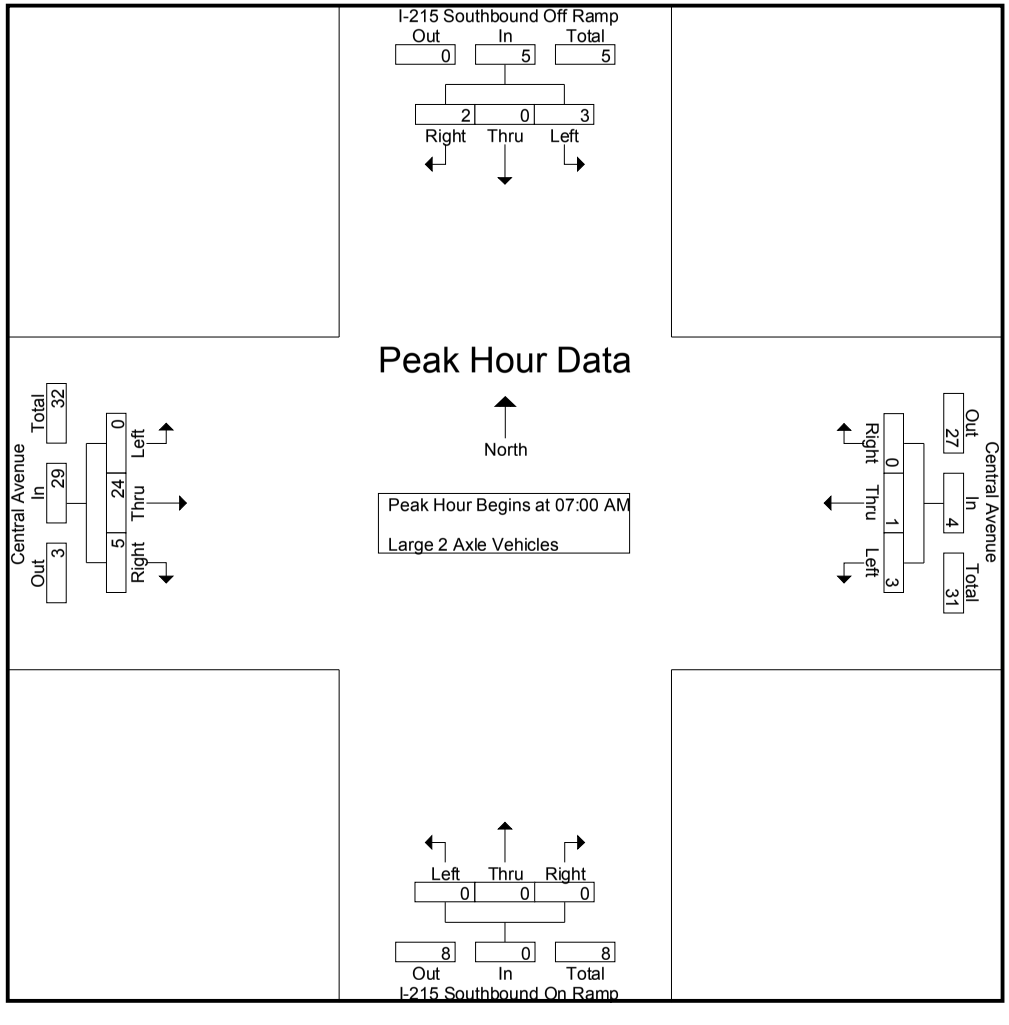
Weather: Clear

File Name : B_CRV_215S_Central AM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 2



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County of Riverside
N/S: I-215 Southbound Ramps
E/W: Central Avenue
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File Name : B_CRV_215S_Central AM
Site Code : 05119367
Start Date : 5/21/2019

	I-215 Southbound Off Ramp Southbound				Central Avenue Westbound				I-215 Southbound On Ramp Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:00 AM				07:00 AM				07:00 AM				07:00 AM				
+0 mins.	0	0	0	0	**1**	0	0	1	0	0	0	0	0	5	**2**	7	
+15 mins.	**1**	0	0	1	1	0	0	1	0	0	0	0	0	5	1	6	
+30 mins.	1	0	0	1	0	0	0	0	0	0	0	0	0	**12**	2	**14**	
+45 mins.	1	0	**2**	**3**	1	**1**	0	**2**	0	0	0	0	0	2	0	2	
Total Volume	3	0	2	5	3	1	0	4	0	0	0	0	0	24	5	29	
% App. Total	60	0	40		75	25	0		0	0	0		0	82.8	17.2		
PHF	.750	.000	.250	.417	.750	.250	.000	.500	.000	.000	.000	.000	.000	.500	.625	.518	

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County of Riverside
N/S: I-215 Southbound Ramps
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Weather: Clear

File Name : B_CRV_215S_Central AM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 1

Groups Printed- 3 Axle Vehicles

	I-215 Southbound Off Ramp Southbound					Central Avenue Westbound					I-215 Southbound On Ramp Northbound					Central Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2	2
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	3	3
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	3	3
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	2	0	8	0	8	8
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	2	2
08:30 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1
Total	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3	0	0	3	0	4	4
Grand Total	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	9	2	0	11	0	12	12
Apprch %	0	0	0			0	100	0			0	0	0			0	81.8	18.2					
Total %	0	0	0		0	0	8.3	0		8.3	0	0	0		0	0	75	16.7		91.7	0	100	

	I-215 Southbound Off Ramp Southbound				Central Avenue Westbound				I-215 Southbound On Ramp Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**	2	2
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**3**	0	**3**	**3**
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	3
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	6	2	8	8
% App. Total	0	0	0		0	0	0		0	0	0		0	75	25		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500	.250	.667	.667

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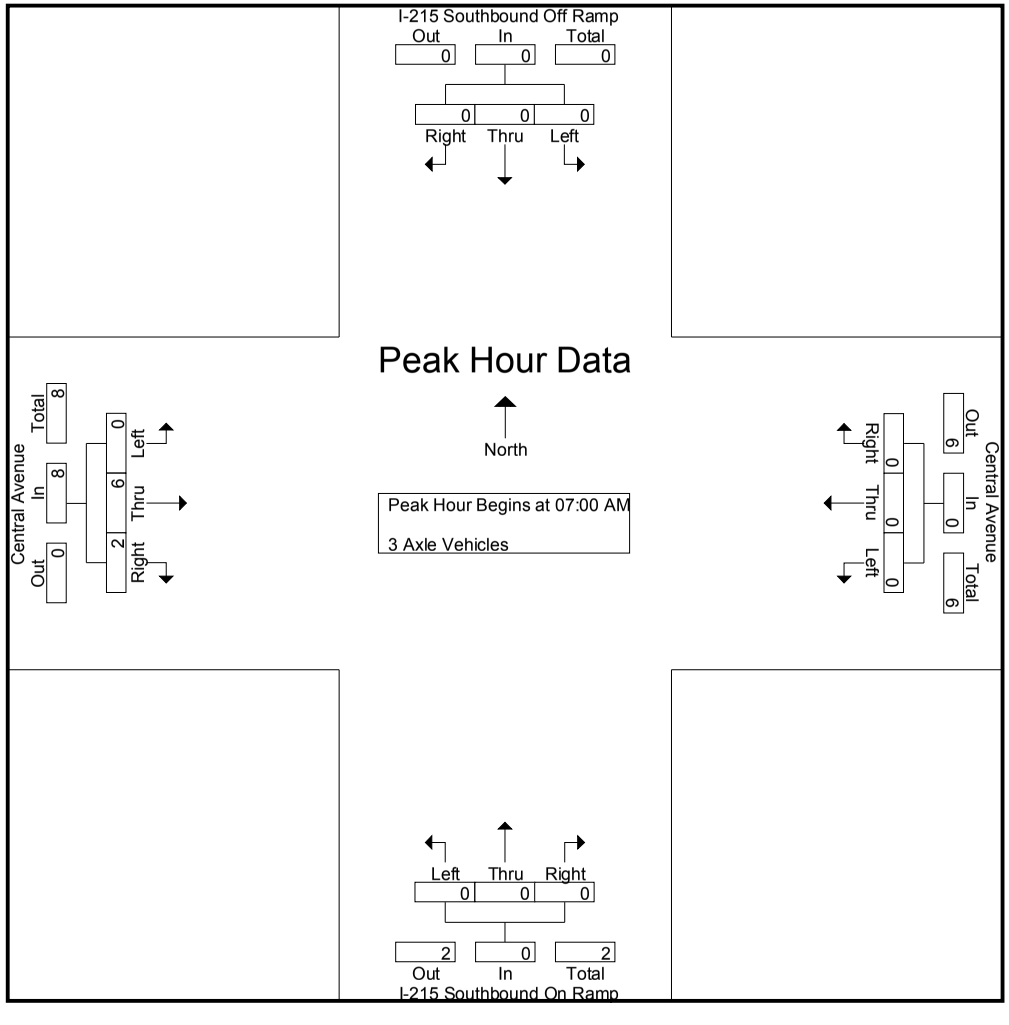
County of Riverside
N/S: I-215 Southbound Ramps
E/W: Central Avenue
Weather: Clear

File Name : B_CRV_215S_Central AM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 2



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County of Riverside
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File Name : B_CRV_215S_Central AM
Site Code : 05119367
Start Date : 5/21/2019
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	I-215 Southbound Off Ramp Southbound				Central Avenue Westbound				I-215 Southbound On Ramp Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:00 AM				07:00 AM				07:00 AM				07:00 AM				
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**	2	
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	**3**	0	**3**	
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	6	2	8	
% App. Total	0	0	0		0	0	0		0	0	0		0	75	25		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500	.250	.667	

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County of Riverside
N/S: I-215 Southbound Ramps
E/W: Central Avenue
Weather: Clear

File Name : B_CRV_215S_Central AM
Site Code : 05119367
Start Date : 5/21/2019
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Groups Printed- 4+ Axle Trucks

	I-215 Southbound Off Ramp Southbound					Central Avenue Westbound					I-215 Southbound On Ramp Northbound					Central Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	1	3	4
07:30 AM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	2	2
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1
Total	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	0	3	1	1	4	1	6	7
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	2	2
08:45 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	3	3
Total	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	6	6
Grand Total	0	1	1	0	2	1	0	0	0	1	0	0	0	0	0	0	8	1	1	9	1	12	13
Apprch %	0	50	50			100	0	0			0	0	0			0	88.9	11.1					
Total %	0	8.3	8.3		16.7	8.3	0	0		8.3	0	0	0		0	0	66.7	8.3		75	7.7	92.3	

	I-215 Southbound Off Ramp Southbound				Central Avenue Westbound				I-215 Southbound On Ramp Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	**1**	**1**	0	0	0	0	0	0	0	0	0	**1**	**1**	**2**	**3**
07:30 AM	0	0	0	0	**1**	0	0	**1**	0	0	0	0	0	1	0	1	2
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Total Volume	0	0	1	1	1	0	0	1	0	0	0	0	0	3	1	4	6
% App. Total	0	0	100		100	0	0		0	0	0		0	75	25		
PHF	.000	.000	.250	.250	.250	.000	.000	.250	.000	.000	.000	.000	.000	.750	.250	.500	.500

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Weather: Clear

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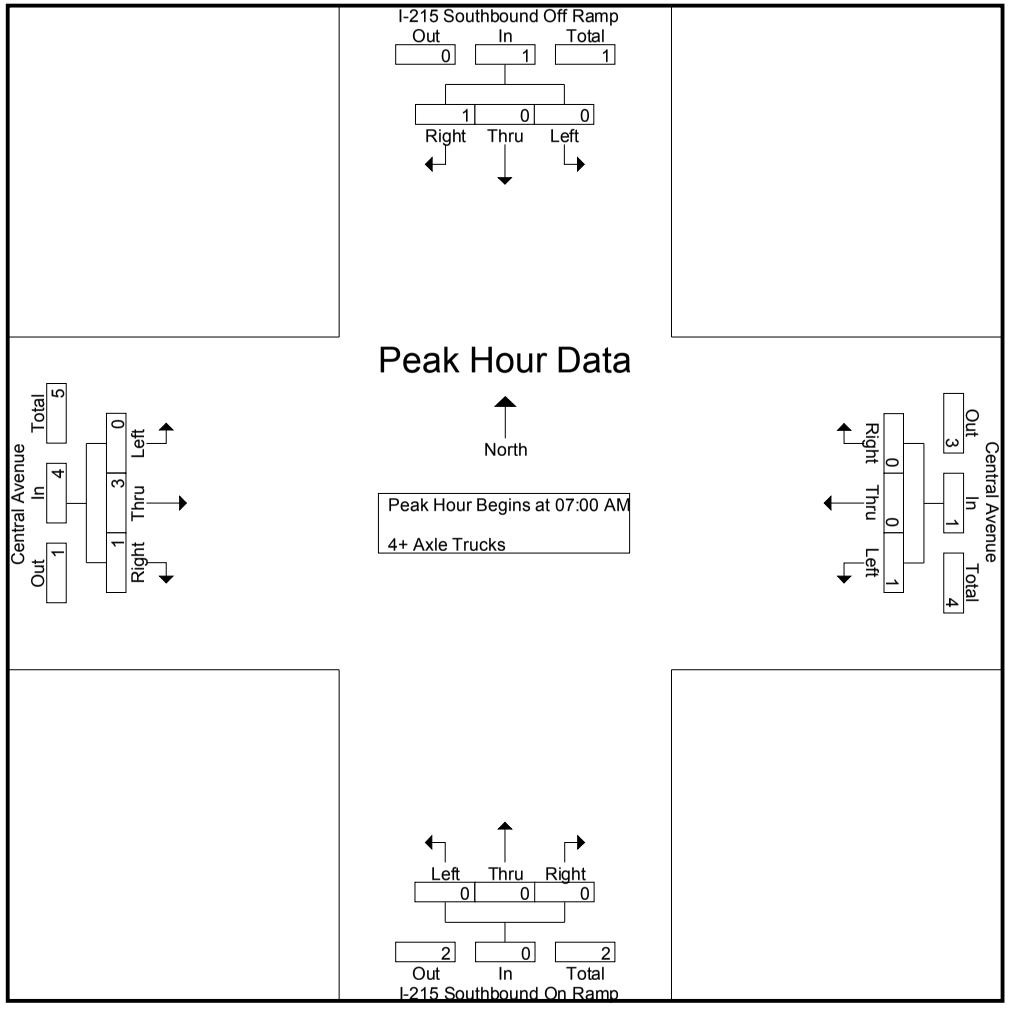

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Site Code : 05119367
Start Date : 5/21/2019
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	I-215 Southbound Off Ramp Southbound				Central Avenue Westbound				I-215 Southbound On Ramp Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:00 AM				07:00 AM				07:00 AM				07:00 AM				
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
+15 mins.	0	0	**1**	**1**	0	0	0	0	0	0	0	0	0	**1**	**1**	**2**	
+30 mins.	0	0	0	0	**1**	0	0	**1**	0	0	0	0	0	1	0	1	
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
Total Volume	0	0	1	1	1	0	0	1	0	0	0	0	0	3	1	4	
% App. Total	0	0	100		100	0	0		0	0	0		0	75	25		
PHF	.000	.000	.250	.250	.250	.000	.000	.250	.000	.000	.000	.000	.000	.750	.250	.500	

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County of Riverside
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Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	I-215 Southbound Off Ramp Southbound					Central Avenue Westbound					I-215 Southbound On Ramp Northbound					Central Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	2	2	13	5	17	127	126	0	0	253	0	0	0	0	0	0	120	140	37	260	42	530	572
04:15 PM	4	1	10	4	15	151	141	0	0	292	0	0	0	0	0	0	132	138	45	270	49	577	626
04:30 PM	6	1	8	1	15	185	119	0	0	304	0	0	0	0	0	0	86	106	36	192	37	511	548
04:45 PM	1	0	12	2	13	157	136	0	0	293	0	0	0	0	0	0	117	156	48	273	50	579	629
Total	13	4	43	12	60	620	522	0	0	1142	0	0	0	0	0	0	455	540	166	995	178	2197	2375
05:00 PM	2	1	15	3	18	168	114	0	0	282	0	0	0	0	0	0	101	131	40	232	43	532	575
05:15 PM	1	2	11	2	14	175	158	0	0	333	0	0	0	0	0	0	113	145	46	258	48	605	653
05:30 PM	3	0	14	7	17	170	164	0	0	334	0	0	0	0	0	0	55	153	40	208	47	559	606
05:45 PM	3	0	10	5	13	145	157	0	0	302	0	0	0	0	0	0	84	116	26	200	31	515	546
Total	9	3	50	17	62	658	593	0	0	1251	0	0	0	0	0	0	353	545	152	898	169	2211	2380
Grand Total	22	7	93	29	122	1278	1115	0	0	2393	0	0	0	0	0	0	808	1085	318	1893	347	4408	4755
Apprch %	18	5.7	76.2			53.4	46.6	0			0	0	0			0	42.7	57.3					
Total %	0.5	0.2	2.1		2.8	29	25.3	0		54.3	0	0	0		0	0	18.3	24.6		42.9	7.3	92.7	
Passenger Vehicles	19	6	91		145	1264	1106	0		2370	0	0	0		0	0	787	1080		2184	0	0	4699
% Passenger Vehicles	86.4	85.7	97.8	100	96	98.9	99.2	0	0	99	0	0	0	0	0	0	97.4	99.5	99.7	98.8	0	0	98.8
Large 2 Axle Vehicles	3	1	1		5	13	8	0		21	0	0	0		0	0	17	4		22	0	0	48
% Large 2 Axle Vehicles	13.6	14.3	1.1	0	3.3	1	0.7	0	0	0.9	0	0	0	0	0	0	2.1	0.4	0.3	1	0	0	1
3 Axle Vehicles	0	0	0		0	0	1	0		1	0	0	0		0	0	1	0		1	0	0	2
% 3 Axle Vehicles	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0
4+ Axle Trucks	0	0	1		1	1	0	0		1	0	0	0		0	0	3	1		4	0	0	6
% 4+ Axle Trucks	0	0	1.1	0	0.7	0.1	0	0	0	0	0	0	0	0	0	0	0.4	0.1	0	0.2	0	0	0.1

	I-215 Southbound Off Ramp Southbound				Central Avenue Westbound				I-215 Southbound On Ramp Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	1	0	12	13	157	136	0	293	0	0	0	0	0	**117**	**156**	**273**	579
05:00 PM	2	1	**15**	**18**	168	114	0	282	0	0	0	0	0	101	131	232	532
05:15 PM	1	**2**	11	14	**175**	158	0	333	0	0	0	0	0	113	145	258	**605**
05:30 PM	**3**	0	14	17	170	**164**	0	**334**	0	0	0	0	0	55	153	208	559
Total Volume	7	3	52	62	670	572	0	1242	0	0	0	0	0	386	585	971	2275
% App. Total	11.3	4.8	83.9		53.9	46.1	0		0	0	0		0	39.8	60.2		
PHF	.583	.375	.867	.861	.957	.872	.000	.930	.000	.000	.000	.000	.000	.825	.938	.889	.940

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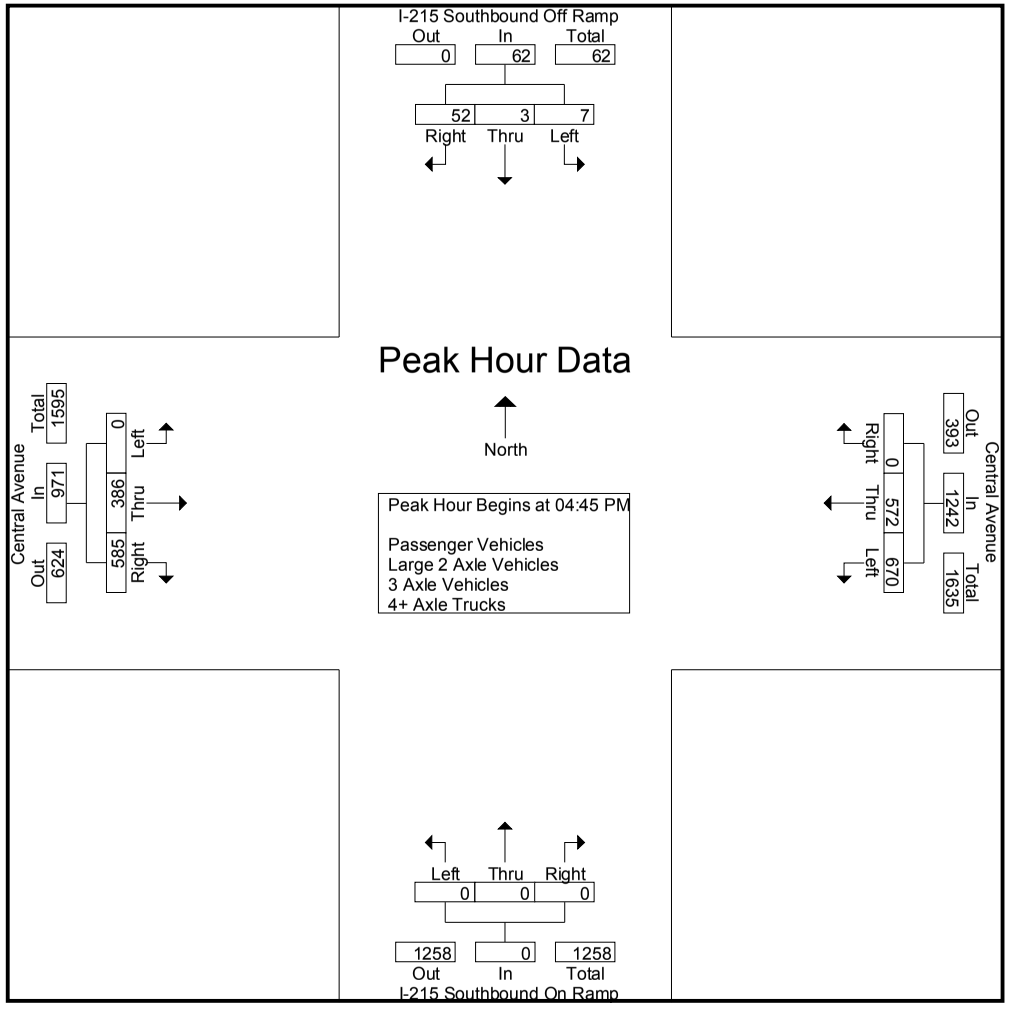

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	I-215 Southbound Off Ramp Southbound				Central Avenue Westbound				I-215 Southbound On Ramp Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	04:45 PM				05:00 PM				04:00 PM				04:00 PM				
+0 mins.	1	0	12	13	168	114	0	282	0	0	0	0	0	120	140	260	
+15 mins.	2	1	**15**	**18**	**175**	158	0	333	0	0	0	0	0	**132**	138	270	
+30 mins.	1	**2**	11	14	170	**164**	0	**334**	0	0	0	0	0	86	106	192	
+45 mins.	**3**	0	14	17	145	157	0	302	0	0	0	0	0	117	**156**	**273**	
Total Volume	7	3	52	62	658	593	0	1251	0	0	0	0	0	455	540	995	
% App. Total	11.3	4.8	83.9		52.6	47.4	0		0	0	0		0	45.7	54.3		
PHF	.583	.375	.867	.861	.940	.904	.000	.936	.000	.000	.000	.000	.000	.862	.865	.911	

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Groups Printed- Passenger Vehicles

	I-215 Southbound Off Ramp Southbound					Central Avenue Westbound					I-215 Southbound On Ramp Northbound					Central Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	1	2	12	5	15	124	123	0	0	247	0	0	0	0	0	0	112	139	36	251	41	513	554
04:15 PM	4	1	9	4	14	150	140	0	0	290	0	0	0	0	0	0	130	138	45	268	49	572	621
04:30 PM	5	1	8	1	14	184	119	0	0	303	0	0	0	0	0	0	84	106	36	190	37	507	544
04:45 PM	1	0	12	2	13	156	134	0	0	290	0	0	0	0	0	0	114	156	48	270	50	573	623
Total	11	4	41	12	56	614	516	0	0	1130	0	0	0	0	0	0	440	539	165	979	177	2165	2342
05:00 PM	2	1	15	3	18	166	114	0	0	280	0	0	0	0	0	0	99	128	40	227	43	525	568
05:15 PM	0	1	11	2	12	173	157	0	0	330	0	0	0	0	0	0	110	144	46	254	48	596	644
05:30 PM	3	0	14	7	17	168	163	0	0	331	0	0	0	0	0	0	54	153	40	207	47	555	602
05:45 PM	3	0	10	5	13	143	156	0	0	299	0	0	0	0	0	0	84	116	26	200	31	512	543
Total	8	2	50	17	60	650	590	0	0	1240	0	0	0	0	0	0	347	541	152	888	169	2188	2357
Grand Total	19	6	91	29	116	1264	1106	0	0	2370	0	0	0	0	0	0	787	1080	317	1867	346	4353	4699
Apprch %	16.4	5.2	78.4			53.3	46.7	0			0	0	0			0	42.2	57.8					
Total %	0.4	0.1	2.1		2.7	29	25.4	0		54.4	0	0	0		0	0	18.1	24.8		42.9	7.4	92.6	

	I-215 Southbound Off Ramp Southbound				Central Avenue Westbound				I-215 Southbound On Ramp Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	1	0	12	13	156	134	0	290	0	0	0	0	0	**114**	**156**	**270**	573
05:00 PM	2	**1**	**15**	**18**	166	114	0	280	0	0	0	0	0	99	128	227	525
05:15 PM	0	1	11	12	**173**	157	0	330	0	0	0	0	0	110	144	254	**596**
05:30 PM	**3**	0	14	17	168	**163**	0	**331**	0	0	0	0	0	54	153	207	555
Total Volume	6	2	52	60	663	568	0	1231	0	0	0	0	0	377	581	958	2249
% App. Total	10	3.3	86.7		53.9	46.1	0		0	0	0		0	39.4	60.6		
PHF	.500	.500	.867	.833	.958	.871	.000	.930	.000	.000	.000	.000	.000	.827	.931	.887	.943

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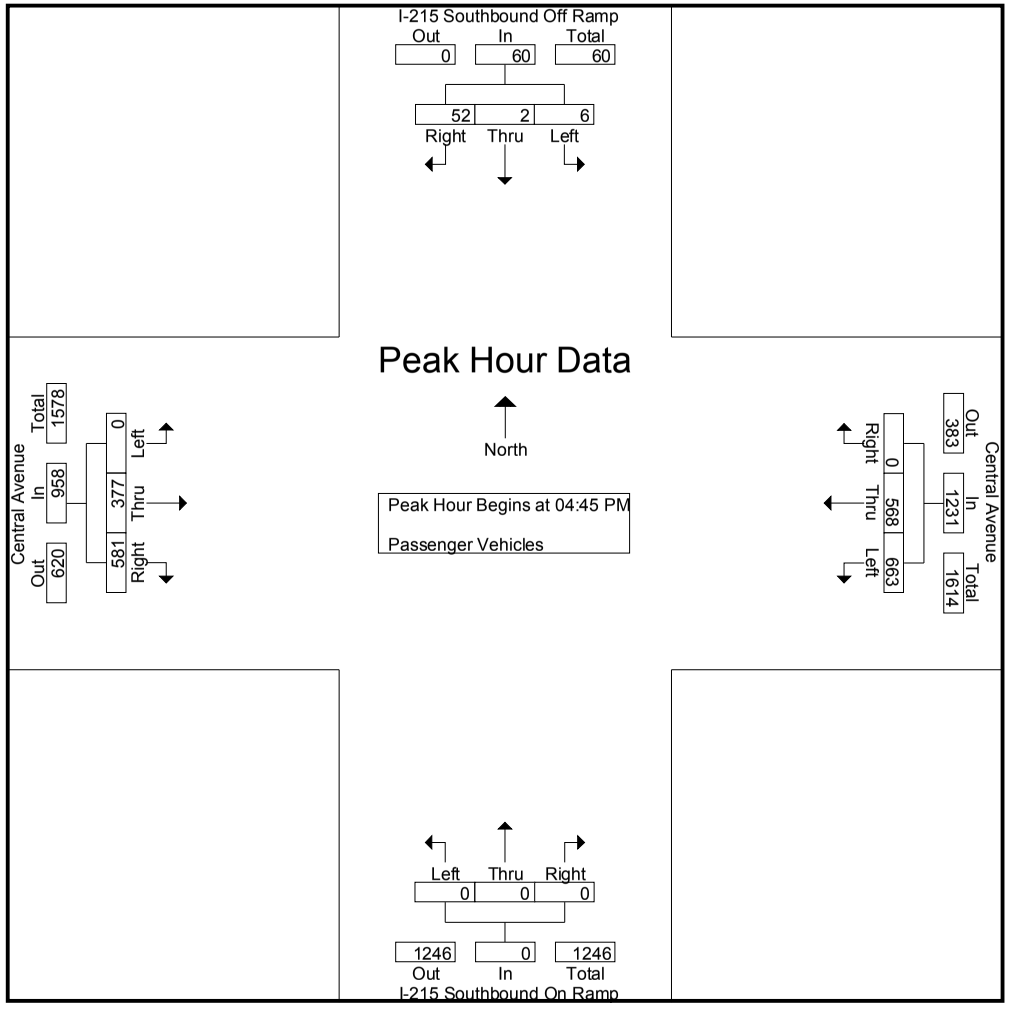

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Page No : 3

	I-215 Southbound Off Ramp Southbound				Central Avenue Westbound				I-215 Southbound On Ramp Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	04:45 PM				04:45 PM				04:45 PM				04:45 PM				
+0 mins.	1	0	12	13	156	134	0	290	0	0	0	0	0	**114**	**156**	**270**	
+15 mins.	2	**1**	**15**	**18**	166	114	0	280	0	0	0	0	0	99	128	227	
+30 mins.	0	1	11	12	**173**	157	0	330	0	0	0	0	0	110	144	254	
+45 mins.	**3**	0	14	17	168	**163**	0	**331**	0	0	0	0	0	54	153	207	
Total Volume	6	2	52	60	663	568	0	1231	0	0	0	0	0	377	581	958	
% App. Total	10	3.3	86.7		53.9	46.1	0		0	0	0		0	39.4	60.6		
PHF	.500	.500	.867	.833	.958	.871	.000	.930	.000	.000	.000	.000	.000	.827	.931	.887	

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

County of Riverside
N/S: I-215 Southbound Ramps
E/W: Central Avenue
Weather: Clear

File Name : B_CRV_215S_Central PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 1

Groups Printed- Large 2 Axle Vehicles

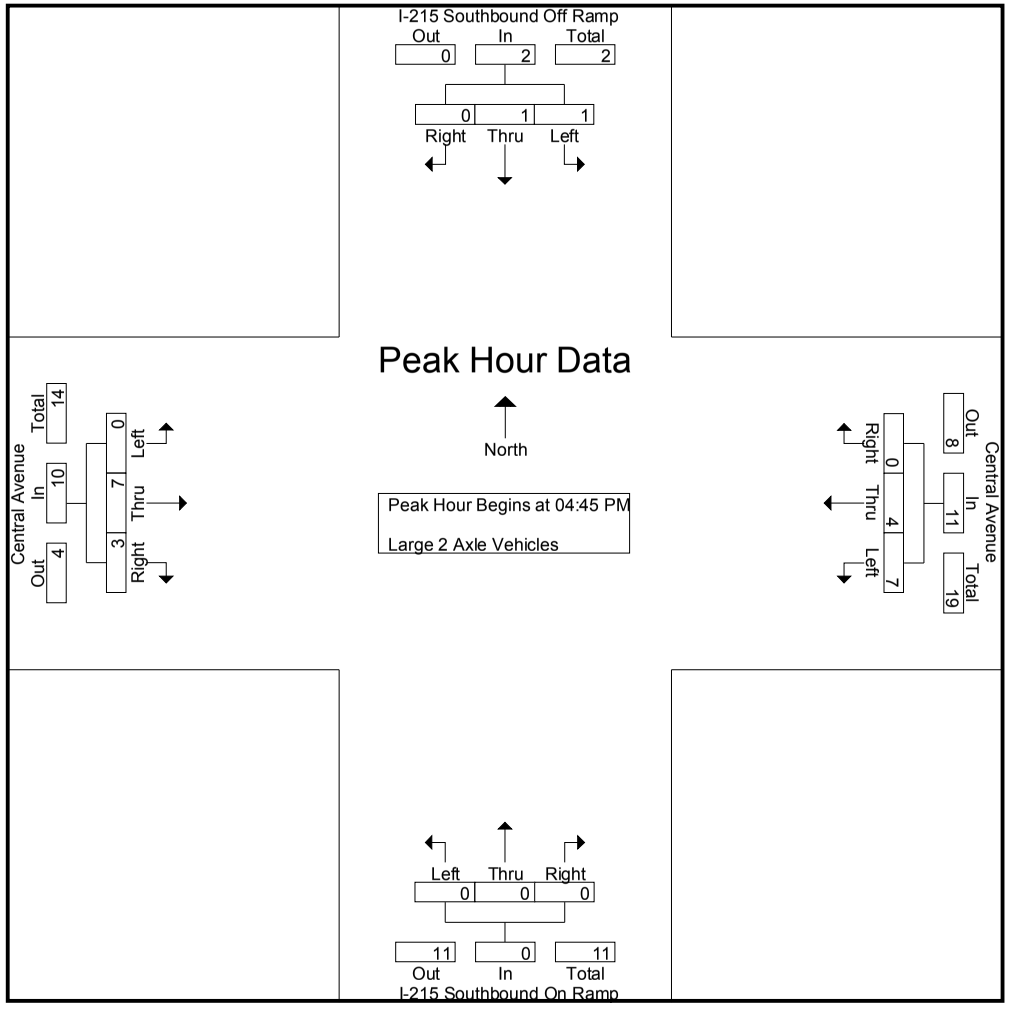
	I-215 Southbound Off Ramp Southbound					Central Avenue Westbound					I-215 Southbound On Ramp Northbound					Central Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	1	0	1	0	2	3	2	0	0	5	0	0	0	0	0	0	8	1	1	9	1	16	17
04:15 PM	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	1	0	0	1	0	3	3
04:30 PM	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	3	3
04:45 PM	0	0	0	0	0	1	2	0	0	3	0	0	0	0	0	0	1	0	0	1	0	4	4
Total	2	0	1	0	3	6	5	0	0	11	0	0	0	0	0	0	11	1	1	12	1	26	27
05:00 PM	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	2	3	0	5	0	7	7
05:15 PM	1	1	0	0	2	2	1	0	0	3	0	0	0	0	0	0	3	0	0	3	0	8	8
05:30 PM	0	0	0	0	0	2	1	0	0	3	0	0	0	0	0	0	1	0	0	1	0	4	4
05:45 PM	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	2
Total	1	1	0	0	2	7	3	0	0	10	0	0	0	0	0	0	6	3	0	9	0	21	21
Grand Total	3	1	1	0	5	13	8	0	0	21	0	0	0	0	0	0	17	4	1	21	1	47	48
Apprch %	60	20	20			61.9	38.1	0			0	0	0			0	81	19					
Total %	6.4	2.1	2.1		10.6	27.7	17	0		44.7	0	0	0		0	0	36.2	8.5		44.7	2.1	97.9	

	I-215 Southbound Off Ramp Southbound				Central Avenue Westbound				I-215 Southbound On Ramp Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	1	**2**	0	**3**	0	0	0	0	0	1	0	1	4
05:00 PM	0	0	0	0	**2**	0	0	2	0	0	0	0	0	2	**3**	**5**	7
05:15 PM	**1**	**1**	0	**2**	2	1	0	3	0	0	0	0	0	**3**	0	3	**8**
05:30 PM	0	0	0	0	2	1	0	3	0	0	0	0	0	1	0	1	4
Total Volume	1	1	0	2	7	4	0	11	0	0	0	0	0	7	3	10	23
% App. Total	50	50	0		63.6	36.4	0		0	0	0		0	70	30		
PHF	.250	.250	.000	.250	.875	.500	.000	.917	.000	.000	.000	.000	.000	.583	.250	.500	.719

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

County of Riverside
N/S: I-215 Southbound Ramps
E/W: Central Avenue
Weather: Clear

File Name : B_CRV_215S_Central PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 2



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(951) 268-6268

County of Riverside
N/S: I-215 Southbound Ramps
E/W: Central Avenue
Weather: Clear

File Name : B_CRV_215S_Central PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 3

	I-215 Southbound Off Ramp Southbound				Central Avenue Westbound				I-215 Southbound On Ramp Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	04:45 PM				04:45 PM				04:45 PM				04:45 PM				
+0 mins.	0	0	0	0	1	**2**	0	**3**	0	0	0	0	0	1	0	1	
+15 mins.	0	0	0	0	**2**	0	0	2	0	0	0	0	0	2	**3**	**5**	
+30 mins.	**1**	**1**	0	**2**	2	1	0	3	0	0	0	0	0	**3**	0	3	
+45 mins.	0	0	0	0	2	1	0	3	0	0	0	0	0	1	0	1	
Total Volume	1	1	0	2	7	4	0	11	0	0	0	0	0	7	3	10	
% App. Total	50	50	0		63.6	36.4	0		0	0	0		0	70	30		
PHF	.250	.250	.000	.250	.875	.500	.000	.917	.000	.000	.000	.000	.000	.583	.250	.500	

Counts Unlimited
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County of Riverside
N/S: I-215 Southbound Ramps
E/W: Central Avenue
Weather: Clear

File Name : B_CRV_215S_Central PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 1

Groups Printed- 3 Axle Vehicles

	I-215 Southbound Off Ramp Southbound					Central Avenue Westbound					I-215 Southbound On Ramp Northbound					Central Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1
04:45 PM	0	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	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	2	2
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	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	0
Grand Total	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	2	2
Apprch %	0	0	0			0	100	0			0	0	0			0	100	0					
Total %	0	0	0		0	0	50	0		50	0	0	0		0	0	50	0		50	0	100	

	I-215 Southbound Off Ramp Southbound				Central Avenue Westbound				I-215 Southbound On Ramp Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	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	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Counts Unlimited
PO Box 1178
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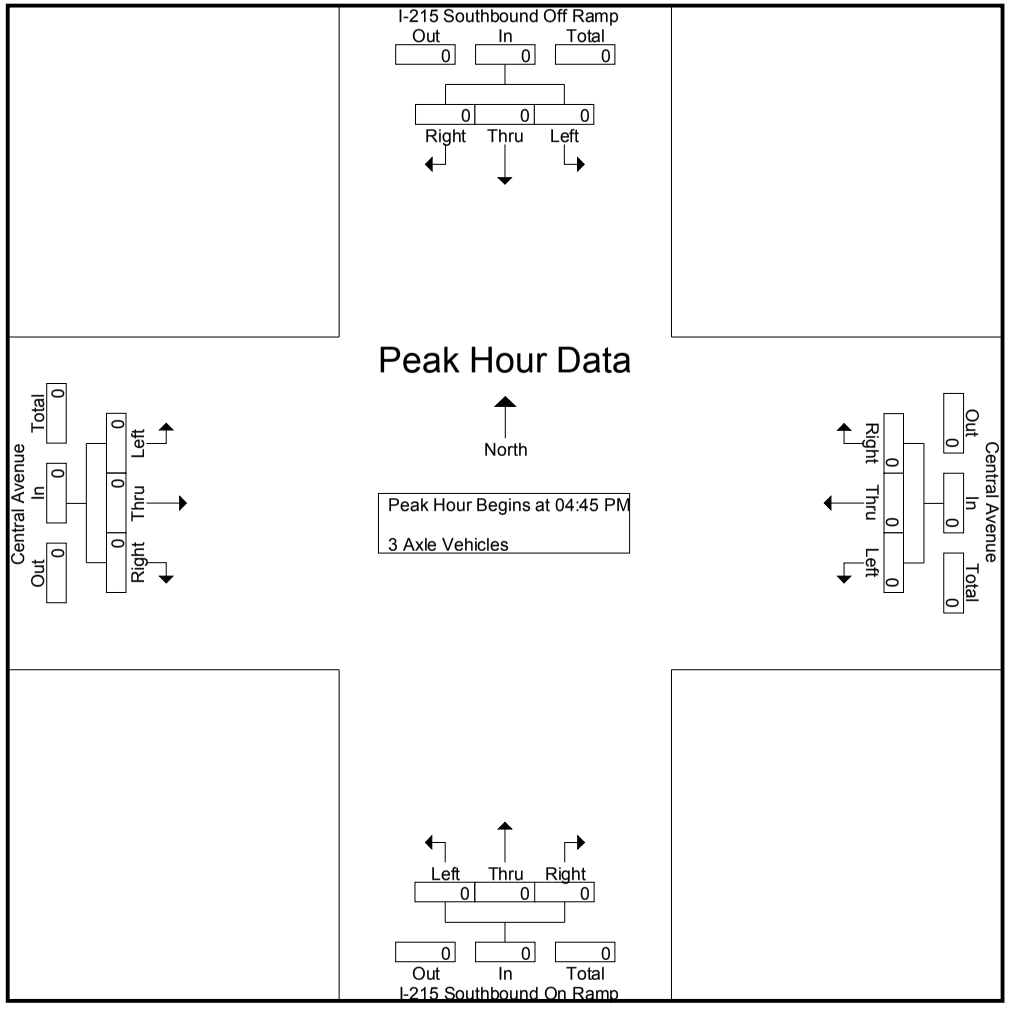
(951) 268-6268

County of Riverside
N/S: I-215 Southbound Ramps
E/W: Central Avenue
Weather: Clear

File Name : B_CRV_215S_Central PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 2



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County of Riverside
N/S: I-215 Southbound Ramps
E/W: Central Avenue
Weather: Clear

File Name : B_CRV_215S_Central PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 3

	I-215 Southbound Off Ramp Southbound				Central Avenue Westbound				I-215 Southbound On Ramp Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	04:45 PM				04:45 PM				04:45 PM				04:45 PM				
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
+45 mins.	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	0	0	0	
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	

Counts Unlimited
PO Box 1178
Corona, CA 92878
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County of Riverside
N/S: I-215 Southbound Ramps
E/W: Central Avenue
Weather: Clear

File Name : B_CRV_215S_Central PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 1

Groups Printed- 4+ Axle Trucks

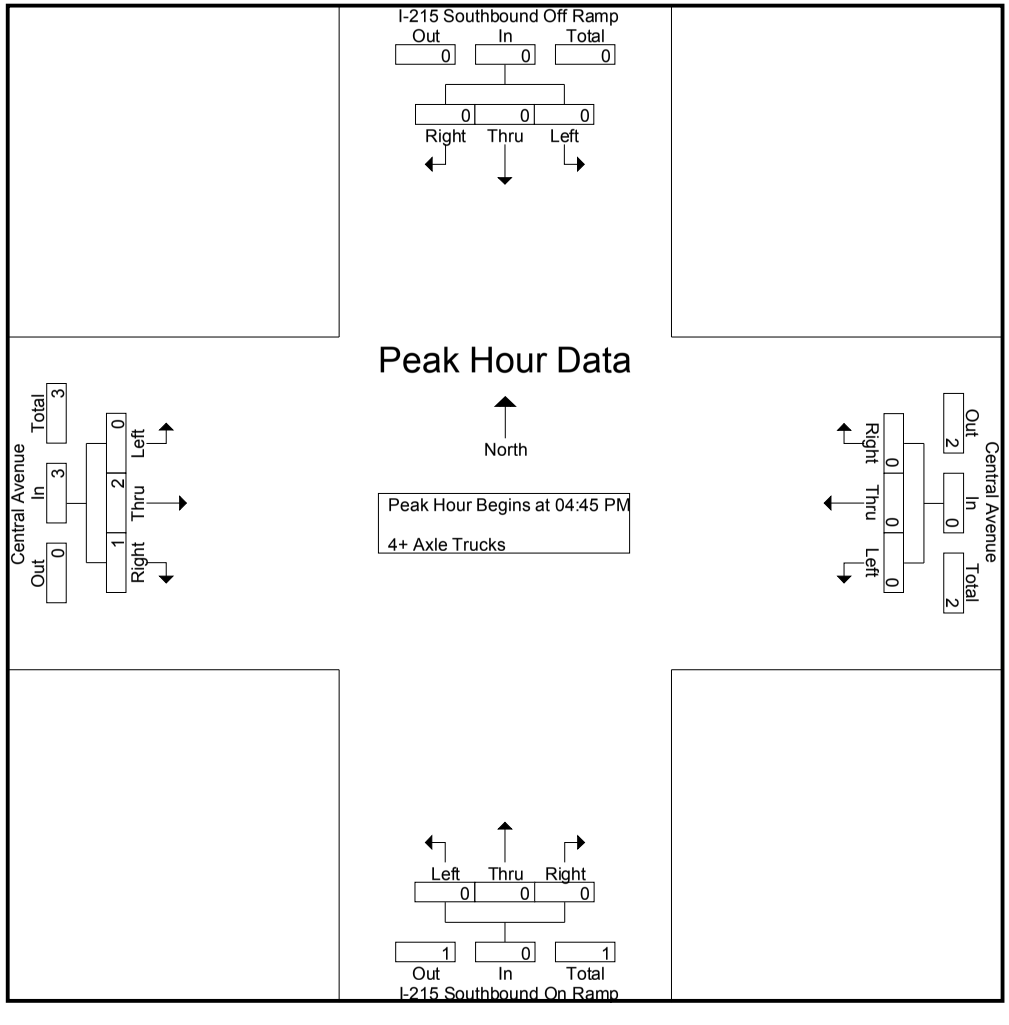
	I-215 Southbound Off Ramp Southbound					Central Avenue Westbound					I-215 Southbound On Ramp Northbound					Central Avenue Eastbound							
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2	2
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	2	2
Total	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	4	4
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1
Total	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	2	2
Grand Total	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	0	3	1	0	4	0	6	6
Apprch %	0	0	100			100	0	0			0	0	0			0	75	25					
Total %	0	0	16.7		16.7	16.7	0	0		16.7	0	0	0		0	0	50	16.7		66.7	0	100	

	I-215 Southbound Off Ramp Southbound				Central Avenue Westbound				I-215 Southbound On Ramp Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**	0	**2**	**2**
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	1	1
05:30 PM	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	2	1	3	3
% App. Total	0	0	0		0	0	0		0	0	0		0	66.7	33.3		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.375	.375

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

County of Riverside
N/S: I-215 Southbound Ramps
E/W: Central Avenue
Weather: Clear

File Name : B_CRV_215S_Central PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 2



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County of Riverside
N/S: I-215 Southbound Ramps
E/W: Central Avenue
Weather: Clear

File Name : B_CRV_215S_Central PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 3

	I-215 Southbound Off Ramp Southbound				Central Avenue Westbound				I-215 Southbound On Ramp Northbound				Central Avenue Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:30 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	04:45 PM				04:45 PM				04:45 PM				04:45 PM				
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**	0	**2**	
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	1	
+45 mins.	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	2	1	3	
% App. Total	0	0	0		0	0	0		0	0	0		0	66.7	33.3		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.250	.375	

Location: County of Riverside
N/S: I-215 Southbound Ramps
E/W: Central Avenue

Date: 5/21/2019
Day: Tuesday

PEDESTRIANS

	North Leg I-215 Southbound Ramps	East Leg Central Avenue	South Leg I-215 Southbound Ramps	West Leg Central Avenue	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0

	North Leg I-215 Southbound Ramps	East Leg Central Avenue	South Leg I-215 Southbound Ramps	West Leg Central Avenue	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0

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

Location: County of Riverside
N/S: I-215 Southbound Ramps
E/W: Central Avenue

Date: 5/21/2019
Day: Tuesday

BICYCLES

	Southbound I-215 Southbound Ramps			Westbound Central Avenue			Northbound I-215 Southbound Ramps			Eastbound Central Avenue			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
TOTAL VOLUMES:	0	0	0	0	0	0	0	0	0	0	1	0	1

	Southbound I-215 Southbound Ramps			Westbound Central Avenue			Northbound I-215 Southbound Ramps			Eastbound Central Avenue			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
5:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	2	0	0	0	0	0	0	0	2

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

County of Riverside
N/S: Watkins Drive/Central Avenue
E/W: I-215 Northbound Off Ramp
Weather: Clear

File Name : C_CRV_Watkins_Central_215N Off Ramp AM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	Watkins Drive Southbound				I-215 Northbound Off Ramp Westbound				Central Avenue Northbound						
Start Time	Left	Thru	RTOR	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	61	0	61	27	108	36	135	326	0	0	326	36	522	558
07:15 AM	0	70	0	70	32	92	15	124	379	0	0	379	15	573	588
07:30 AM	0	107	0	107	29	88	18	117	374	0	0	374	18	598	616
07:45 AM	0	84	0	84	28	104	15	132	331	0	0	331	15	547	562
Total	0	322	0	322	116	392	84	508	1410	0	0	1410	84	2240	2324
08:00 AM	0	74	0	74	28	69	17	97	308	0	0	308	17	479	496
08:15 AM	0	63	0	63	27	86	11	113	301	0	0	301	11	477	488
08:30 AM	0	39	0	39	34	81	9	115	288	0	0	288	9	442	451
08:45 AM	0	55	0	55	35	71	16	106	244	0	0	244	16	405	421
Total	0	231	0	231	124	307	53	431	1141	0	0	1141	53	1803	1856
Grand Total	0	553	0	553	240	699	137	939	2551	0	0	2551	137	4043	4180
Apprch %	0	100			25.6	74.4			100	0					
Total %	0	13.7		13.7	5.9	17.3		23.2	63.1	0		63.1	3.3	96.7	
Passenger Vehicles	0	546		546	232	694		1062	2476	0		2476	0	0	4084
% Passenger Vehicles	0	98.7	0	98.7	96.7	99.3	99.3	98.7	97.1	0	0	97.1	0	0	97.7
Large 2 Axle Vehicles	0	7		7	5	1		6	58	0		58	0	0	71
% Large 2 Axle Vehicles	0	1.3	0	1.3	2.1	0.1	0	0.6	2.3	0	0	2.3	0	0	1.7
3 Axle Vehicles	0	0		0	2	2		5	9	0		9	0	0	14
% 3 Axle Vehicles	0	0	0	0	0.8	0.3	0.7	0.5	0.4	0	0	0.4	0	0	0.3
4+ Axle Trucks	0	0		0	1	2		3	8	0		8	0	0	11
% 4+ Axle Trucks	0	0	0	0	0.4	0.3	0	0.3	0.3	0	0	0.3	0	0	0.3

	Watkins Drive Southbound			I-215 Northbound Off Ramp Westbound			Central Avenue Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	61	61	27	**108**	**135**	326	0	326	522
07:15 AM	0	70	70	**32**	92	124	**379**	0	**379**	573
07:30 AM	0	**107**	**107**	29	88	117	374	0	374	**598**
07:45 AM	0	84	84	28	104	132	331	0	331	547
Total Volume	0	322	322	116	392	508	1410	0	1410	2240
% App. Total	0	100		22.8	77.2		100	0		
PHF	.000	.752	.752	.906	.907	.941	.930	.000	.930	.936

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County of Riverside
N/S: Watkins Drive/Central Avenue
E/W: I-215 Northbound Off Ramp
Weather: Clear

File Name : C_CRV_Watkins_Central_215N Off Ramp AM
Site Code : 05119367
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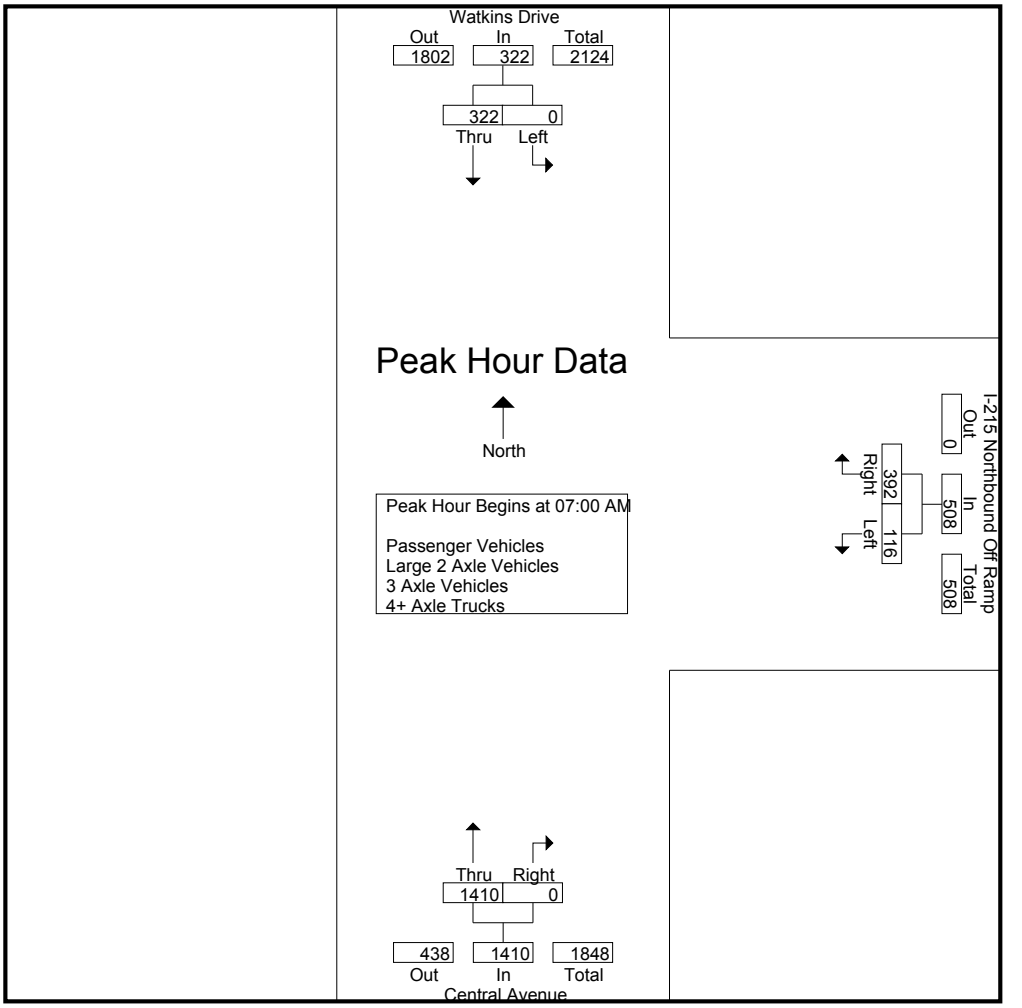

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM			07:00 AM			07:00 AM		
+0 mins.	0	70	70	27	**108**	**135**	326	0	326
+15 mins.	0	**107**	**107**	**32**	92	124	**379**	0	**379**
+30 mins.	0	84	84	29	88	117	374	0	374
+45 mins.	0	74	74	28	104	132	331	0	331
Total Volume	0	335	335	116	392	508	1410	0	1410
% App. Total	0	100		22.8	77.2		100	0	
PHF	.000	.783	.783	.906	.907	.941	.930	.000	.930

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County of Riverside
N/S: Watkins Drive/Central Avenue
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File Name : C_CRV_Watkins_Central_215N Off Ramp AM
Site Code : 05119367
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Groups Printed- Passenger Vehicles

	Watkins Drive Southbound				I-215 Northbound Off Ramp Westbound				Central Avenue Northbound						
Start Time	Left	Thru	RTOR	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	60	0	60	27	108	36	135	320	0	0	320	36	515	551
07:15 AM	0	70	0	70	31	91	14	122	369	0	0	369	14	561	575
07:30 AM	0	107	0	107	29	88	18	117	358	0	0	358	18	582	600
07:45 AM	0	82	0	82	28	104	15	132	323	0	0	323	15	537	552
Total	0	319	0	319	115	391	83	506	1370	0	0	1370	83	2195	2278
08:00 AM	0	72	0	72	27	69	17	96	301	0	0	301	17	469	486
08:15 AM	0	61	0	61	25	84	11	109	290	0	0	290	11	460	471
08:30 AM	0	39	0	39	32	81	9	113	279	0	0	279	9	431	440
08:45 AM	0	55	0	55	33	69	16	102	236	0	0	236	16	393	409
Total	0	227	0	227	117	303	53	420	1106	0	0	1106	53	1753	1806
Grand Total	0	546	0	546	232	694	136	926	2476	0	0	2476	136	3948	4084
Apprch %	0	100			25.1	74.9			100	0					
Total %	0	13.8		13.8	5.9	17.6		23.5	62.7	0		62.7	3.3	96.7	

	Watkins Drive Southbound			I-215 Northbound Off Ramp Westbound			Central Avenue Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	60	60	27	**108**	**135**	320	0	320	515
07:15 AM	0	70	70	**31**	91	122	**369**	0	**369**	561
07:30 AM	0	**107**	**107**	29	88	117	358	0	358	**582**
07:45 AM	0	82	82	28	104	132	323	0	323	537
Total Volume	0	319	319	115	391	506	1370	0	1370	2195
% App. Total	0	100		22.7	77.3		100	0		
PHF	.000	.745	.745	.927	.905	.937	.928	.000	.928	.943

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Weather: Clear

File Name : C_CRV_Watkins_Central_215N Off Ramp AM
Site Code : 05119367
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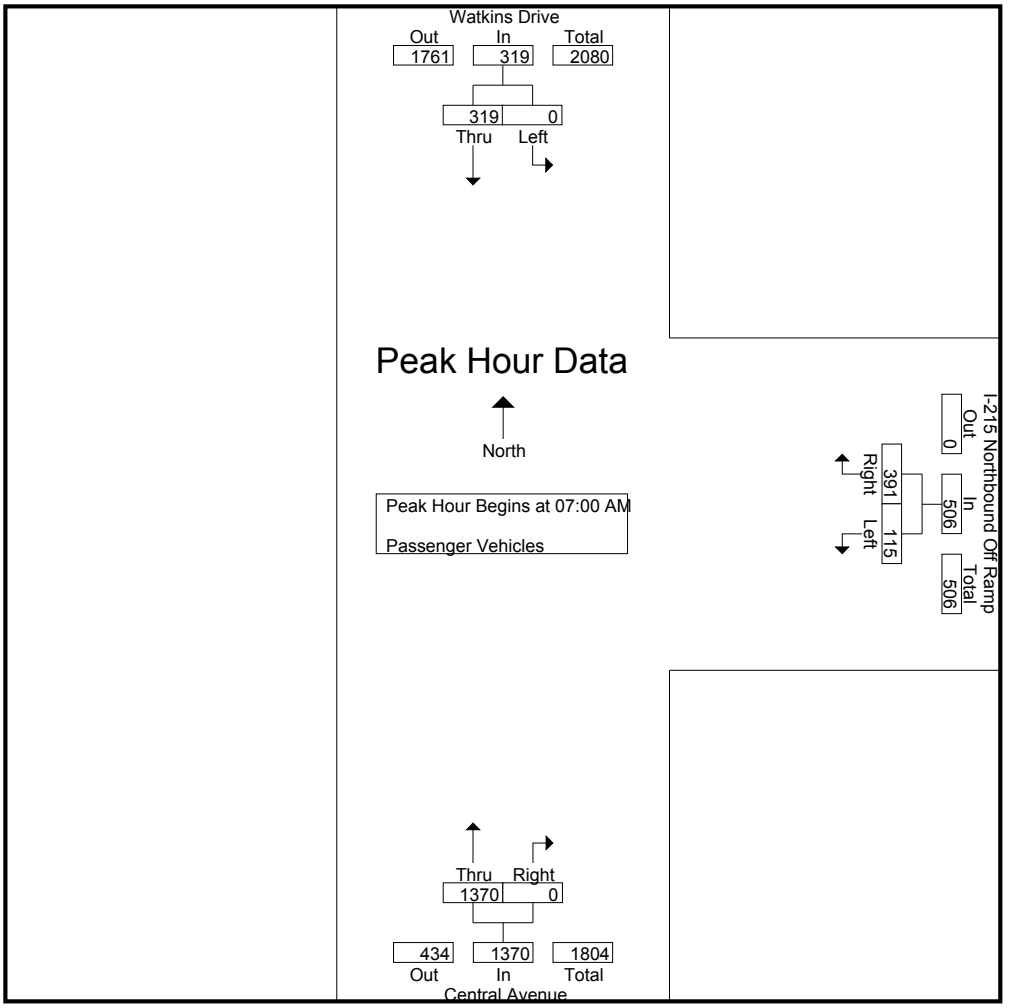

Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM			07:00 AM			07:00 AM		
+0 mins.	0	60	60	27	**108**	**135**	320	0	320
+15 mins.	0	70	70	**31**	91	122	**369**	0	**369**
+30 mins.	0	**107**	**107**	29	88	117	358	0	358
+45 mins.	0	82	82	28	104	132	323	0	323
Total Volume	0	319	319	115	391	506	1370	0	1370
% App. Total	0	100		22.7	77.3		100	0	
PHF	.000	.745	.745	.927	.905	.937	.928	.000	.928

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Weather: Clear

File Name : C_CRV_Watkins_Central_215N Off Ramp AM
Site Code : 05119367
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Groups Printed- Large 2 Axle Vehicles

	Watkins Drive Southbound				I-215 Northbound Off Ramp Westbound				Central Avenue Northbound						
Start Time	Left	Thru	RTOR	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	1	0	1	0	0	0	0	6	0	0	6	0	7	7
07:15 AM	0	0	0	0	1	0	0	1	9	0	0	9	0	10	10
07:30 AM	0	0	0	0	0	0	0	0	14	0	0	14	0	14	14
07:45 AM	0	2	0	2	0	0	0	0	3	0	0	3	0	5	5
Total	0	3	0	3	1	0	0	1	32	0	0	32	0	36	36
08:00 AM	0	2	0	2	1	0	0	1	6	0	0	6	0	9	9
08:15 AM	0	2	0	2	2	1	0	3	9	0	0	9	0	14	14
08:30 AM	0	0	0	0	0	0	0	0	5	0	0	5	0	5	5
08:45 AM	0	0	0	0	1	0	0	1	6	0	0	6	0	7	7
Total	0	4	0	4	4	1	0	5	26	0	0	26	0	35	35
Grand Total	0	7	0	7	5	1	0	6	58	0	0	58	0	71	71
Apprch %	0	100			83.3	16.7			100	0					
Total %	0	9.9		9.9	7	1.4		8.5	81.7	0		81.7	0	100	

	Watkins Drive Southbound			I-215 Northbound Off Ramp Westbound			Central Avenue Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	1	1	0	0	0	6	0	6	7
07:15 AM	0	0	0	**1**	0	**1**	9	0	9	10
07:30 AM	0	0	0	0	0	0	**14**	0	**14**	**14**
07:45 AM	0	**2**	**2**	0	0	0	3	0	3	5
Total Volume	0	3	3	1	0	1	32	0	32	36
% App. Total	0	100		100	0		100	0		
PHF	.000	.375	.375	.250	.000	.250	.571	.000	.571	.643

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File Name : C_CRV_Watkins_Central_215N Off Ramp AM
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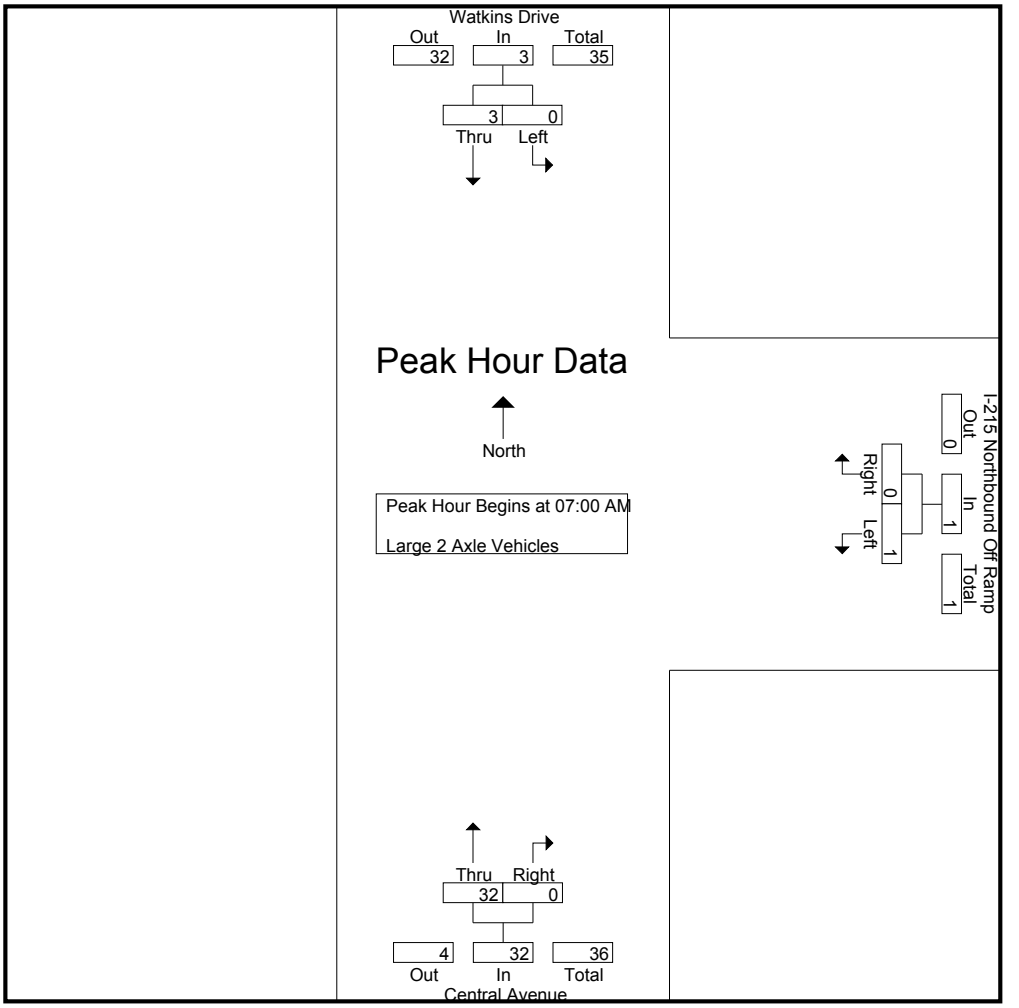

Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM			07:00 AM			07:00 AM		
+0 mins.	0	1	1	0	0	0	6	0	6
+15 mins.	0	0	0	**1**	0	**1**	9	0	9
+30 mins.	0	0	0	0	0	0	**14**	0	**14**
+45 mins.	0	**2**	**2**	0	0	0	3	0	3
Total Volume	0	3	3	1	0	1	32	0	32
% App. Total	0	100		100	0		100	0	
PHF	.000	.375	.375	.250	.000	.250	.571	.000	.571

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File Name : C_CRV_Watkins_Central_215N Off Ramp AM
Site Code : 05119367
Start Date : 5/21/2019

Groups Printed- 3 Axle Vehicles

	Watkins Drive Southbound				I-215 Northbound Off Ramp Westbound				Central Avenue Northbound						
Start Time	Left	Thru	RTOR	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	1	1	1	0	0	0	0	1	1	2
07:30 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1
07:45 AM	0	0	0	0	0	0	0	0	4	0	0	4	0	4	4
Total	0	0	0	0	0	1	1	1	5	0	0	5	1	6	7
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	2	0	0	2	0	2	2
08:30 AM	0	0	0	0	1	0	0	1	1	0	0	1	0	2	2
08:45 AM	0	0	0	0	1	1	0	2	1	0	0	1	0	3	3
Total	0	0	0	0	2	1	0	3	4	0	0	4	0	7	7
Grand Total	0	0	0	0	2	2	1	4	9	0	0	9	1	13	14
Apprch %	0	0			50	50			100	0					
Total %	0	0		0	15.4	15.4		30.8	69.2	0		69.2	7.1	92.9	

	Watkins Drive Southbound			I-215 Northbound Off Ramp Westbound			Central Avenue Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	**1**	**1**	0	0	0	1
07:30 AM	0	0	0	0	0	0	1	0	1	1
07:45 AM	0	0	0	0	0	0	**4**	0	**4**	**4**
Total Volume	0	0	0	0	1	1	5	0	5	6
% App. Total	0	0		0	100		100	0		
PHF	.000	.000	.000	.000	.250	.250	.313	.000	.313	.375

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County of Riverside
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E/W: I-215 Northbound Off Ramp
Weather: Clear

File Name : C_CRV_Watkins_Central_215N Off Ramp AM
Site Code : 05119367
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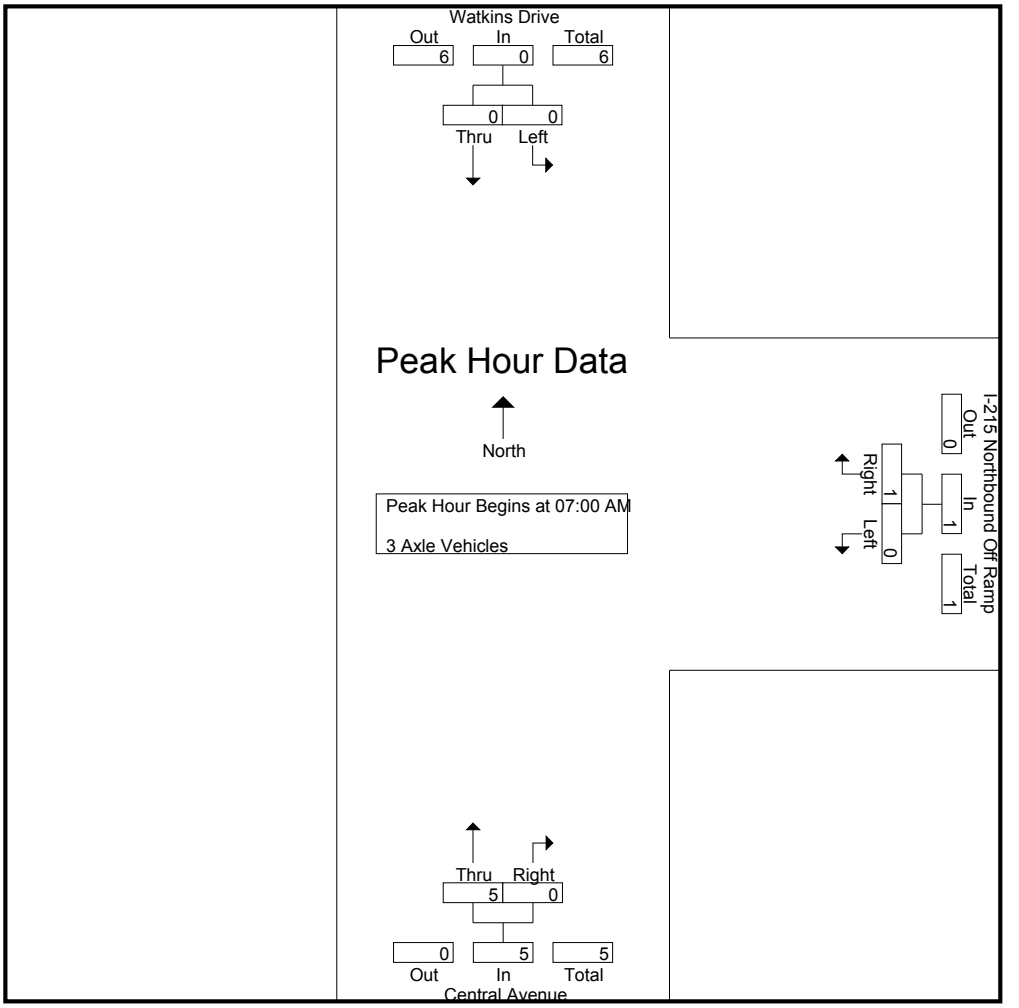

Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM			07:00 AM			07:00 AM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	**1**	**1**	0	0	0
+30 mins.	0	0	0	0	0	0	1	0	1
+45 mins.	0	0	0	0	0	0	**4**	0	**4**
Total Volume	0	0	0	0	1	1	5	0	5
% App. Total	0	0		0	100		100	0	
PHF	.000	.000	.000	.000	.250	.250	.313	.000	.313

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County of Riverside
N/S: Watkins Drive/Central Avenue
E/W: I-215 Northbound Off Ramp
Weather: Clear

File Name : C_CRV_Watkins_Central_215N Off Ramp AM
Site Code : 05119367
Start Date : 5/21/2019

Groups Printed- 4+ Axle Trucks

	Watkins Drive Southbound				I-215 Northbound Off Ramp Westbound				Central Avenue Northbound						
Start Time	Left	Thru	RTOR	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1
07:30 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1
07:45 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1
Total	0	0	0	0	0	0	0	0	3	0	0	3	0	3	3
08:00 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1
08:15 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	1	1
08:30 AM	0	0	0	0	1	0	0	1	3	0	0	3	0	4	4
08:45 AM	0	0	0	0	0	1	0	1	1	0	0	1	0	2	2
Total	0	0	0	0	1	2	0	3	5	0	0	5	0	8	8
Grand Total	0	0	0	0	1	2	0	3	8	0	0	8	0	11	11
Apprch %	0	0			33.3	66.7			100	0					
Total %	0	0		0	9.1	18.2		27.3	72.7	0		72.7	0	100	

	Watkins Drive Southbound			I-215 Northbound Off Ramp Westbound			Central Avenue Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	**1**	0	**1**	**1**
07:30 AM	0	0	0	0	0	0	1	0	1	1
07:45 AM	0	0	0	0	0	0	1	0	1	1
Total Volume	0	0	0	0	0	0	3	0	3	3
% App. Total	0	0		0	0		100	0		
PHF	.000	.000	.000	.000	.000	.000	.750	.000	.750	.750

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County of Riverside
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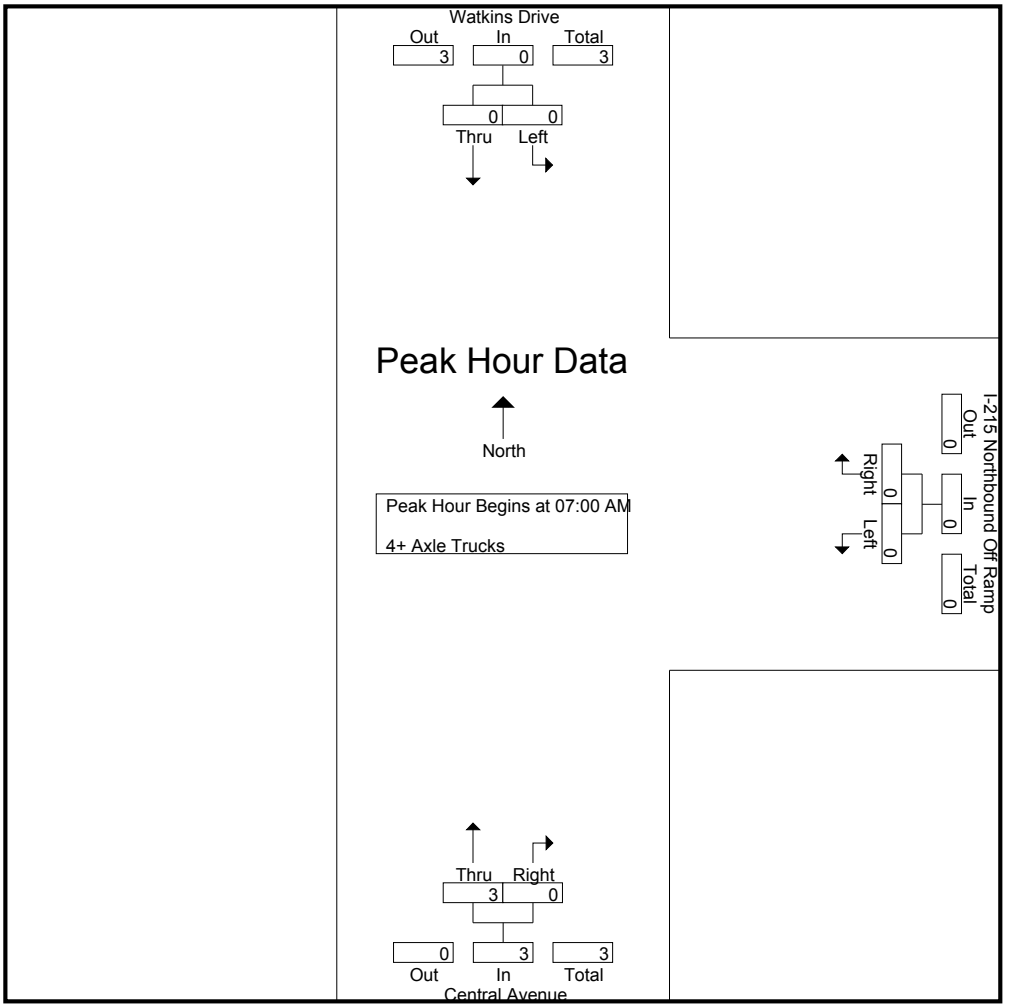

Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM			07:00 AM			07:00 AM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	**1**	0	**1**
+30 mins.	0	0	0	0	0	0	1	0	1
+45 mins.	0	0	0	0	0	0	1	0	1
Total Volume	0	0	0	0	0	0	3	0	3
% App. Total	0	0		0	0		100	0	
PHF	.000	.000	.000	.000	.000	.000	.750	.000	.750

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County of Riverside
N/S: Watkins Drive/Central Avenue
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Weather: Clear

File Name : C_CRV_Watkins_Central_215N Off Ramp PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	Watkins Drive Southbound				I-215 Northbound Off Ramp Westbound				Central Avenue Northbound						
Start Time	Left	Thru	RTOR	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	173	0	173	73	66	27	139	120	0	0	120	27	432	459
04:15 PM	0	225	0	225	76	82	37	158	138	0	0	138	37	521	558
04:30 PM	0	235	0	235	69	83	49	152	88	0	0	88	49	475	524
04:45 PM	0	221	0	221	64	69	38	133	110	0	0	110	38	464	502
Total	0	854	0	854	282	300	151	582	456	0	0	456	151	1892	2043
05:00 PM	0	218	0	218	66	87	43	153	90	0	0	90	43	461	504
05:15 PM	0	275	0	275	65	88	44	153	130	2	0	132	44	560	604
05:30 PM	0	251	0	251	78	78	38	156	62	0	0	62	38	469	507
05:45 PM	0	225	0	225	73	66	39	139	82	0	0	82	39	446	485
Total	0	969	0	969	282	319	164	601	364	2	0	366	164	1936	2100
Grand Total	0	1823	0	1823	564	619	315	1183	820	2	0	822	315	3828	4143
Apprch %	0	100			47.7	52.3			99.8	0.2					
Total %	0	47.6		47.6	14.7	16.2		30.9	21.4	0.1		21.5	7.6	92.4	
Passenger Vehicles	0	1803		1803	558	612		1484	798	2		800	0	0	4087
% Passenger Vehicles	0	98.9	0	98.9	98.9	98.9	99.7	99.1	97.3	100	0	97.3	0	0	98.6
Large 2 Axle Vehicles	0	19		19	4	6		11	19	0		19	0	0	49
% Large 2 Axle Vehicles	0	1	0	1	0.7	1	0.3	0.7	2.3	0	0	2.3	0	0	1.2
3 Axle Vehicles	0	1		1	1	0		1	0	0		0	0	0	2
% 3 Axle Vehicles	0	0.1	0	0.1	0.2	0	0	0.1	0	0	0	0	0	0	0
4+ Axle Trucks	0	0		0	1	1		2	3	0		3	0	0	5
% 4+ Axle Trucks	0	0	0	0	0.2	0.2	0	0.1	0.4	0	0	0.4	0	0	0.1

	Watkins Drive Southbound			I-215 Northbound Off Ramp Westbound			Central Avenue Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	0	235	235	**69**	83	152	88	0	88	475
04:45 PM	0	221	221	64	69	133	110	0	110	464
05:00 PM	0	218	218	66	87	**153**	90	0	90	461
05:15 PM	0	**275**	**275**	65	**88**	153	**130**	**2**	**132**	**560**
Total Volume	0	949	949	264	327	591	418	2	420	1960
% App. Total	0	100		44.7	55.3		99.5	0.5		
PHF	.000	.863	.863	.957	.929	.966	.804	.250	.795	.875

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County of Riverside
N/S: Watkins Drive/Central Avenue
E/W: I-215 Northbound Off Ramp
Weather: Clear

File Name : C_CRV_Watkins_Central_215N Off Ramp PM
Site Code : 05119367
Start Date : 5/21/2019
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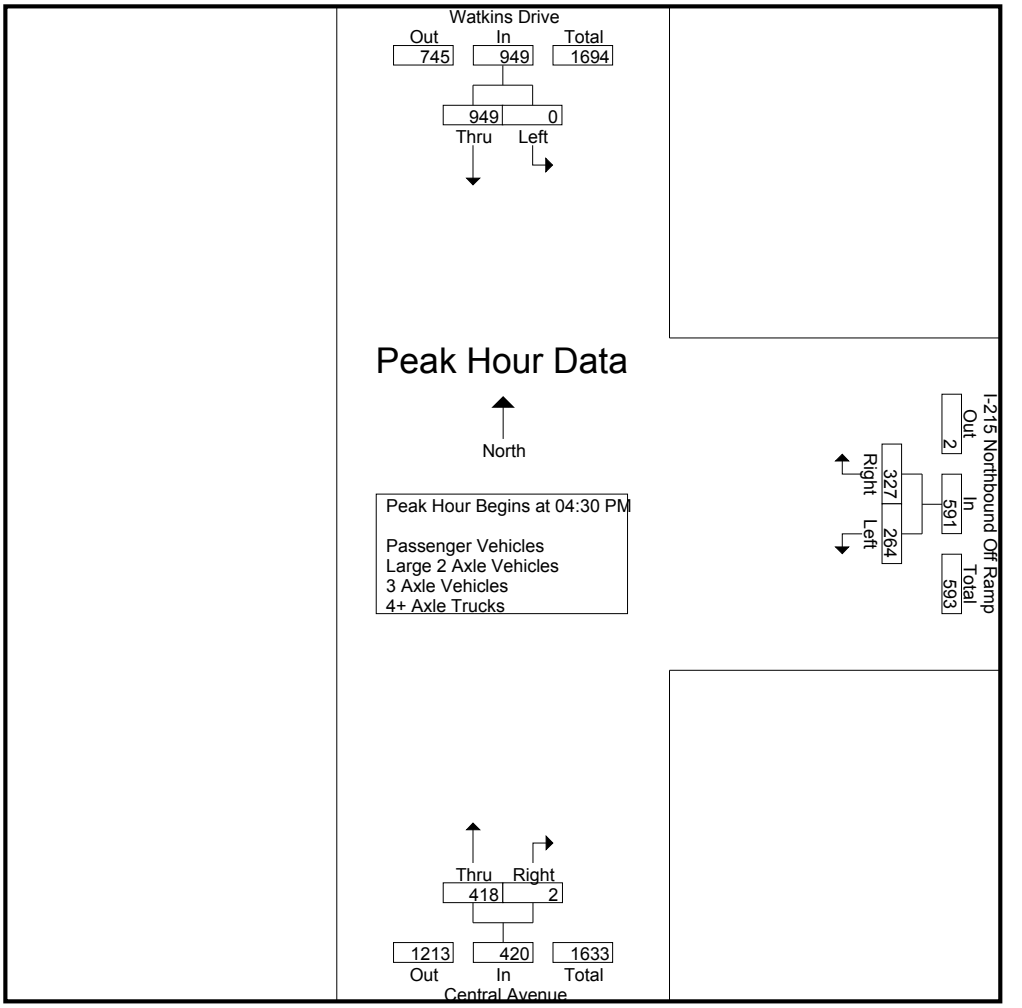

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM			05:00 PM			04:00 PM		
+0 mins.	0	218	218	66	87	153	120	0	120
+15 mins.	0	**275**	**275**	65	**88**	153	**138**	0	**138**
+30 mins.	0	251	251	**78**	78	**156**	88	0	88
+45 mins.	0	225	225	73	66	139	110	0	110
Total Volume	0	969	969	282	319	601	456	0	456
% App. Total	0	100		46.9	53.1		100	0	
PHF	.000	.881	.881	.904	.906	.963	.826	.000	.826

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County of Riverside
N/S: Watkins Drive/Central Avenue
E/W: I-215 Northbound Off Ramp
Weather: Clear

File Name : C_CRV_Watkins_Central_215N Off Ramp PM
Site Code : 05119367
Start Date : 5/21/2019
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Groups Printed- Passenger Vehicles

	Watkins Drive Southbound				I-215 Northbound Off Ramp Westbound				Central Avenue Northbound						
Start Time	Left	Thru	RTOR	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	170	0	170	71	64	27	135	111	0	0	111	27	416	443
04:15 PM	0	224	0	224	75	81	37	156	137	0	0	137	37	517	554
04:30 PM	0	234	0	234	69	83	49	152	86	0	0	86	49	472	521
04:45 PM	0	219	0	219	63	67	38	130	107	0	0	107	38	456	494
Total	0	847	0	847	278	295	151	573	441	0	0	441	151	1861	2012
05:00 PM	0	214	0	214	66	87	43	153	88	0	0	88	43	455	498
05:15 PM	0	273	0	273	64	88	44	152	126	2	0	128	44	553	597
05:30 PM	0	248	0	248	78	78	38	156	61	0	0	61	38	465	503
05:45 PM	0	221	0	221	72	64	38	136	82	0	0	82	38	439	477
Total	0	956	0	956	280	317	163	597	357	2	0	359	163	1912	2075
Grand Total	0	1803	0	1803	558	612	314	1170	798	2	0	800	314	3773	4087
Apprch %	0	100			47.7	52.3			99.8	0.2					
Total %	0	47.8		47.8	14.8	16.2		31	21.2	0.1		21.2	7.7	92.3	

	Watkins Drive Southbound			I-215 Northbound Off Ramp Westbound			Central Avenue Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	0	234	234	**69**	83	152	86	0	86	472
04:45 PM	0	219	219	63	67	130	107	0	107	456
05:00 PM	0	214	214	66	87	**153**	88	0	88	455
05:15 PM	0	**273**	**273**	64	**88**	152	**126**	**2**	**128**	**553**
Total Volume	0	940	940	262	325	587	407	2	409	1936
% App. Total	0	100		44.6	55.4		99.5	0.5		
PHF	.000	.861	.861	.949	.923	.959	.808	.250	.799	.875

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County of Riverside
N/S: Watkins Drive/Central Avenue
E/W: I-215 Northbound Off Ramp
Weather: Clear

File Name : C_CRV_Watkins_Central_215N Off Ramp PM
Site Code : 05119367
Start Date : 5/21/2019
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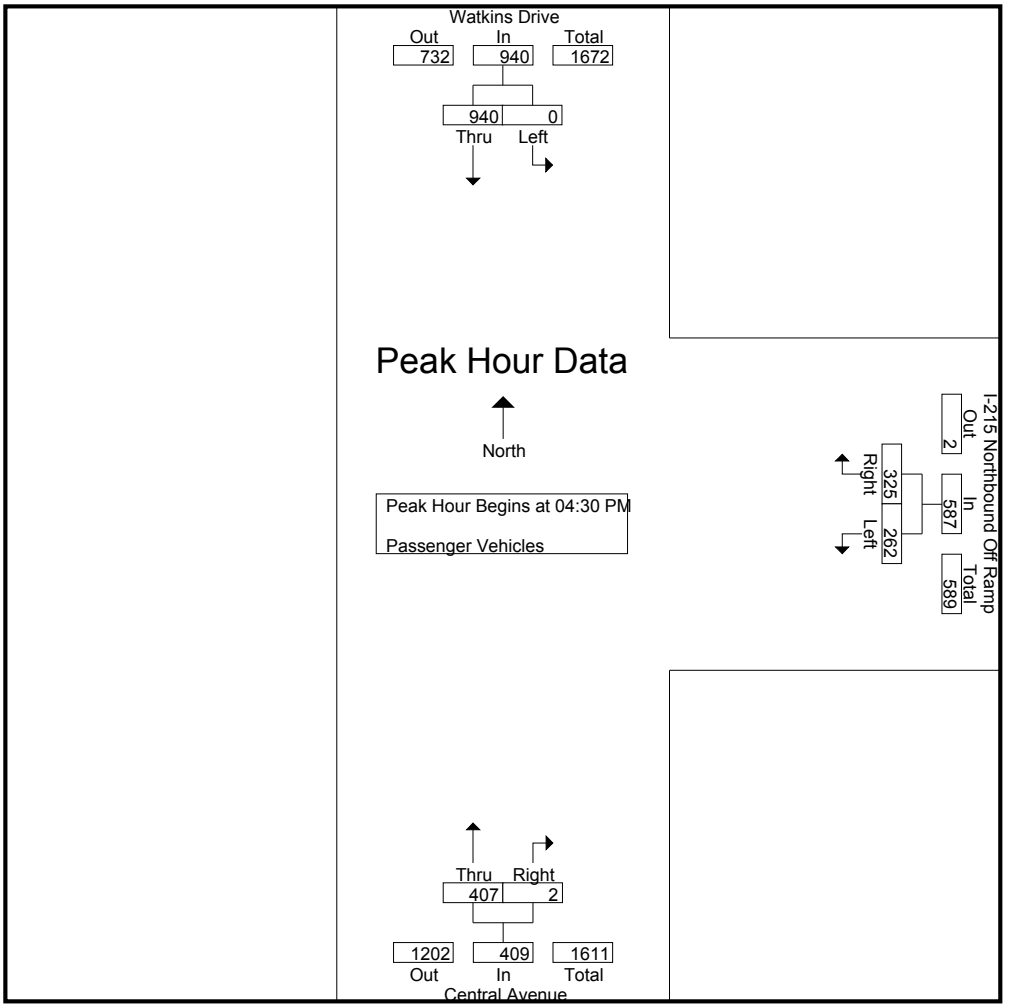

Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM			04:30 PM			04:30 PM		
+0 mins.	0	234	234	**69**	83	152	86	0	86
+15 mins.	0	219	219	63	67	130	107	0	107
+30 mins.	0	214	214	66	87	**153**	88	0	88
+45 mins.	0	**273**	**273**	64	**88**	152	**126**	**2**	**128**
Total Volume	0	940	940	262	325	587	407	2	409
% App. Total	0	100		44.6	55.4		99.5	0.5	
PHF	.000	.861	.861	.949	.923	.959	.808	.250	.799

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County of Riverside
N/S: Watkins Drive/Central Avenue
E/W: I-215 Northbound Off Ramp
Weather: Clear

File Name : C_CRV_Watkins_Central_215N Off Ramp PM
Site Code : 05119367
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Groups Printed- Large 2 Axle Vehicles

	Watkins Drive Southbound				I-215 Northbound Off Ramp Westbound				Central Avenue Northbound						
Start Time	Left	Thru	RTOR	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	3	0	3	1	2	0	3	9	0	0	9	0	15	15
04:15 PM	0	1	0	1	1	1	0	2	0	0	0	0	0	3	3
04:30 PM	0	1	0	1	0	0	0	0	2	0	0	2	0	3	3
04:45 PM	0	2	0	2	1	1	0	2	1	0	0	1	0	5	5
Total	0	7	0	7	3	4	0	7	12	0	0	12	0	26	26
05:00 PM	0	3	0	3	0	0	0	0	2	0	0	2	0	5	5
05:15 PM	0	2	0	2	1	0	0	1	4	0	0	4	0	7	7
05:30 PM	0	3	0	3	0	0	0	0	1	0	0	1	0	4	4
05:45 PM	0	4	0	4	0	2	1	2	0	0	0	0	1	6	7
Total	0	12	0	12	1	2	1	3	7	0	0	7	1	22	23
Grand Total	0	19	0	19	4	6	1	10	19	0	0	19	1	48	49
Apprch %	0	100			40	60			100	0					
Total %	0	39.6		39.6	8.3	12.5		20.8	39.6	0		39.6	2	98	

	Watkins Drive Southbound			I-215 Northbound Off Ramp Westbound			Central Avenue Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	0	1	1	0	0	0	2	0	2	3
04:45 PM	0	2	2	**1**	**1**	**2**	1	0	1	5
05:00 PM	0	**3**	**3**	0	0	0	2	0	2	5
05:15 PM	0	2	2	1	0	1	**4**	0	**4**	**7**
Total Volume	0	8	8	2	1	3	9	0	9	20
% App. Total	0	100		66.7	33.3		100	0		
PHF	.000	.667	.667	.500	.250	.375	.563	.000	.563	.714

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County of Riverside
N/S: Watkins Drive/Central Avenue
E/W: I-215 Northbound Off Ramp
Weather: Clear

File Name : C_CRV_Watkins_Central_215N Off Ramp PM
Site Code : 05119367
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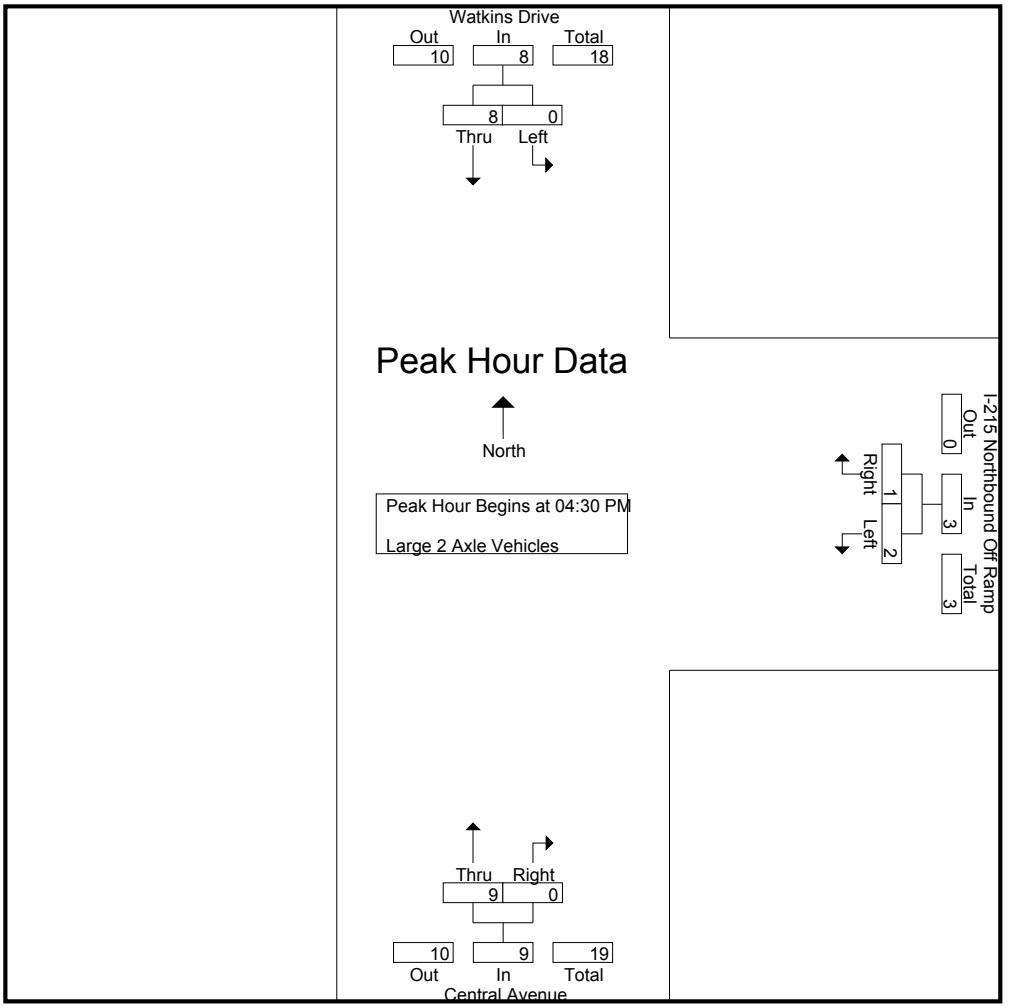

Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM			04:30 PM			04:30 PM		
+0 mins.	0	1	1	0	0	0	2	0	2
+15 mins.	0	2	2	**1**	**1**	**2**	1	0	1
+30 mins.	0	**3**	**3**	0	0	0	2	0	2
+45 mins.	0	2	2	1	0	1	**4**	0	**4**
Total Volume	0	8	8	2	1	3	9	0	9
% App. Total	0	100		66.7	33.3		100	0	
PHF	.000	.667	.667	.500	.250	.375	.563	.000	.563

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County of Riverside
N/S: Watkins Drive/Central Avenue
E/W: I-215 Northbound Off Ramp
Weather: Clear

File Name : C_CRV_Watkins_Central_215N Off Ramp PM
Site Code : 05119367
Start Date : 5/21/2019

Groups Printed- 3 Axle Vehicles

	Watkins Drive Southbound				I-215 Northbound Off Ramp Westbound				Central Avenue Northbound						
Start Time	Left	Thru	RTOR	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	1	1
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	1	0	0	1	0	0	0	0	0	1	1
05:00 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1
Grand Total	0	1	0	1	1	0	0	1	0	0	0	0	0	2	2
Apprch %	0	100			100	0			0	0					
Total %	0	50		50	50	0		50	0	0		0	0	100	

	Watkins Drive Southbound			I-215 Northbound Off Ramp Westbound			Central Avenue Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	**1**	**1**	0	0	0	0	0	0	**1**
05:15 PM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	1	1	0	0	0	0	0	0	1
% App. Total	0	100		0	0		0	0		
PHF	.000	.250	.250	.000	.000	.000	.000	.000	.000	.250

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County of Riverside
N/S: Watkins Drive/Central Avenue
E/W: I-215 Northbound Off Ramp
Weather: Clear

File Name : C_CRV_Watkins_Central_215N Off Ramp PM
Site Code : 05119367
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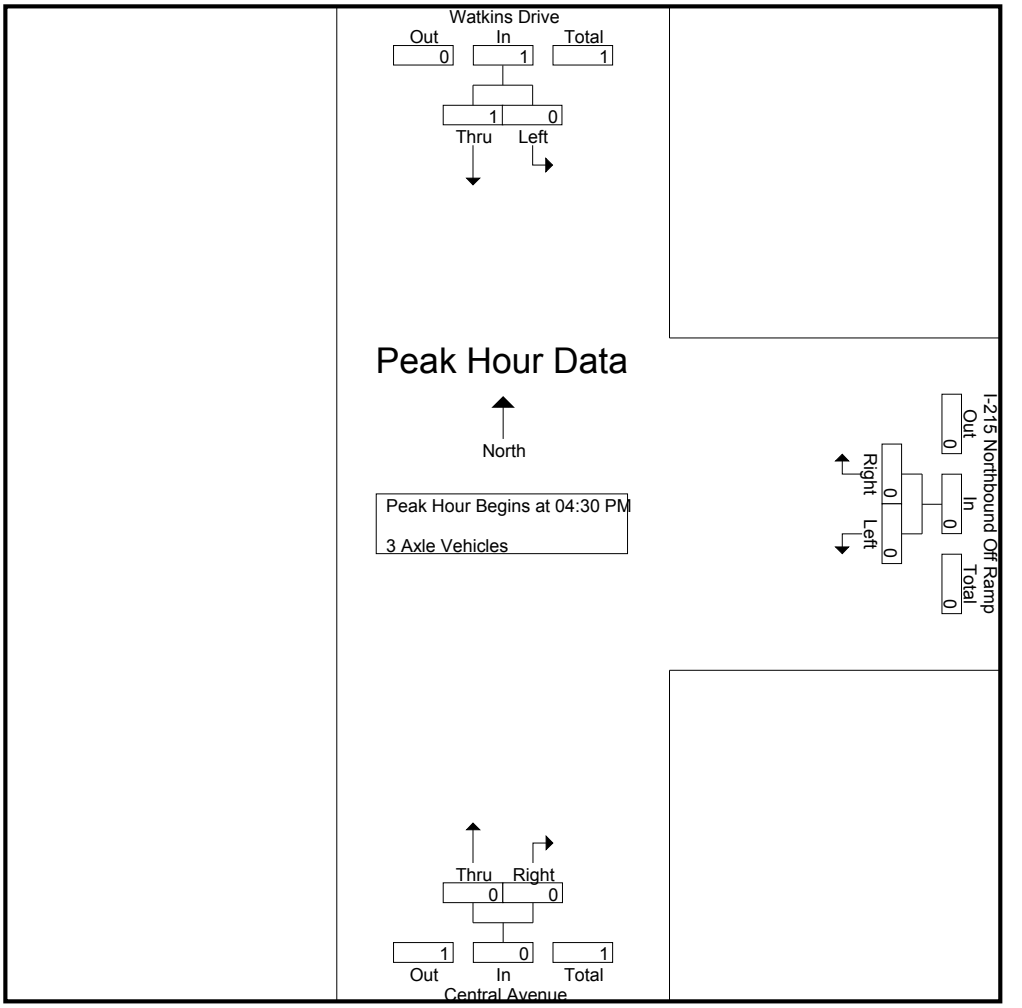

Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM			04:30 PM			04:30 PM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0
+30 mins.	0	**1**	**1**	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0
Total Volume	0	1	1	0	0	0	0	0	0
% App. Total	0	100		0	0		0	0	
PHF	.000	.250	.250	.000	.000	.000	.000	.000	.000

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County of Riverside
N/S: Watkins Drive/Central Avenue
E/W: I-215 Northbound Off Ramp
Weather: Clear

File Name : C_CRV_Watkins_Central_215N Off Ramp PM
Site Code : 05119367
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Groups Printed- 4+ Axle Trucks

	Watkins Drive Southbound				I-215 Northbound Off Ramp Westbound				Central Avenue Northbound						
Start Time	Left	Thru	RTOR	App. Total	Left	Right	RTOR	App. Total	Thru	Right	RTOR	App. Total	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	1	0	1	2	0	0	2	0	3	3
Total	0	0	0	0	0	1	0	1	3	0	0	3	0	4	4
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	1	1
Total	0	0	0	0	1	0	0	1	0	0	0	0	0	1	1
Grand Total	0	0	0	0	1	1	0	2	3	0	0	3	0	5	5
Apprch %	0	0			50	50			100	0					
Total %	0	0		0	20	20		40	60	0		60	0	100	

	Watkins Drive Southbound			I-215 Northbound Off Ramp Westbound			Central Avenue Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	**1**	**1**	**2**	0	**2**	**3**
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	1	1	2	0	2	3
% App. Total	0	0		0	100		100	0		
PHF	.000	.000	.000	.000	.250	.250	.250	.000	.250	.250

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County of Riverside
N/S: Watkins Drive/Central Avenue
E/W: I-215 Northbound Off Ramp
Weather: Clear

File Name : C_CRV_Watkins_Central_215N Off Ramp PM
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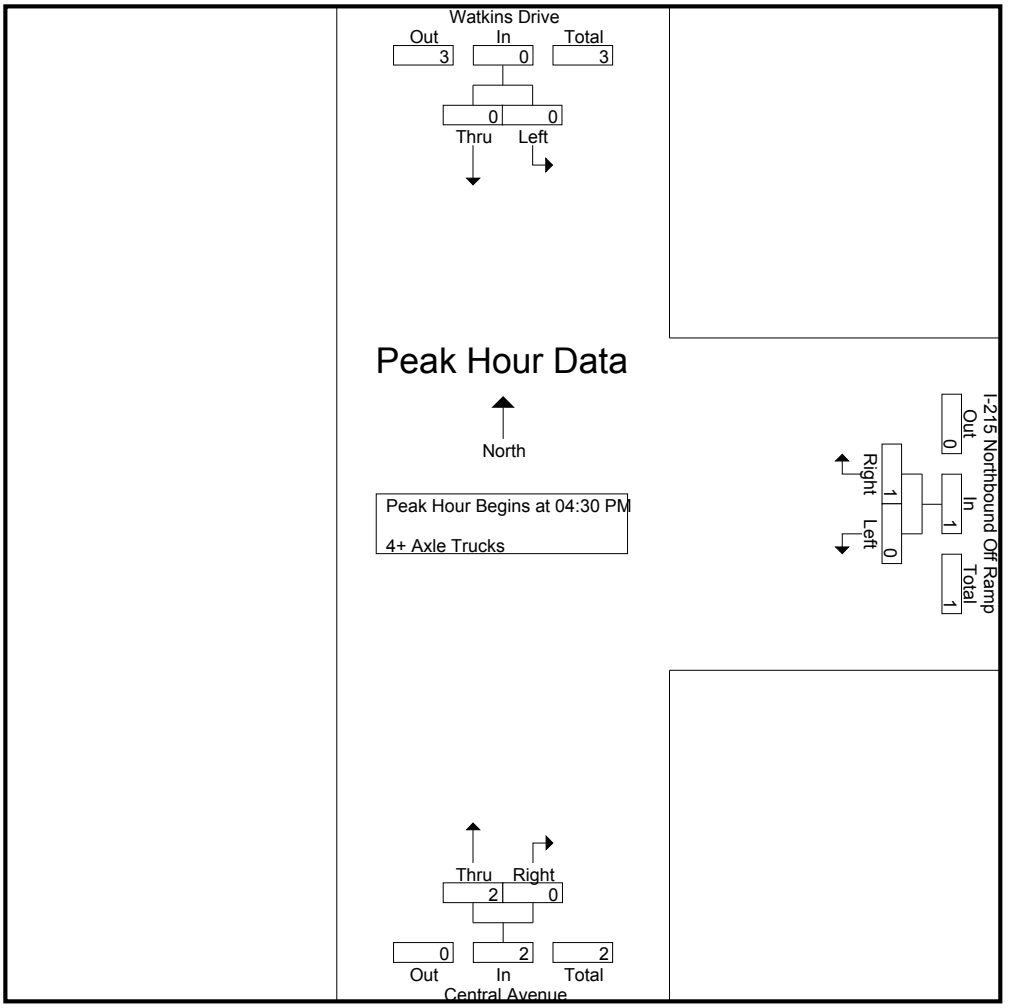

Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM			04:30 PM			04:30 PM		
+0 mins.	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	**1**	**1**	**2**	0	**2**
+30 mins.	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	1	1	2	0	2
% App. Total	0	0		0	100		100	0	
PHF	.000	.000	.000	.000	.250	.250	.250	.000	.250

Location: County of Riverside
N/S: Watkins Drive/Central Avenue
E/W: I-215 NB Off Ramp

Date: 5/21/2019
Day: Tuesday

PEDESTRIANS

	North Leg Watkins Drive	East Leg I-215 NB Off Ramp	South Leg Central Avenue	West Leg Dead End	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0

	North Leg Watkins Drive	East Leg I-215 NB Off Ramp	South Leg Central Avenue	West Leg Dead End	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0

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Location: County of Riverside
N/S: Watkins Drive/Central Avenue
E/W: I-215 NB Off Ramp

Date: 5/21/2019
Day: Tuesday

BICYCLES

	Southbound Watkins Drive			Westbound I-215 NB Off Ramp			Northbound Central Avenue			Eastbound Dead End			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0	0	0	0	0	0	0	0	0

	Southbound Watkins Drive			Westbound I-215 NB Off Ramp			Northbound Central Avenue			Eastbound Dead End			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	0	2	0	0	0	0	0	0	0	0	0	0	2

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County of Riverside
N/S: Watkins Drive
E/W: I-215 NB On Ramp/Poarch Road
Weather: Clear

File Name : D_CRV_Watkins_215N On Ramp_Poarch AM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	Watkins Drive Southbound				Poarch Road Westbound				Watkins Drive Northbound				I-215 Northbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	60	4	64	0	0	0	0	214	229	0	443	0	0	0	0	507
07:15 AM	0	72	20	92	0	0	0	0	199	273	0	472	0	0	0	0	564
07:30 AM	0	113	32	145	0	0	0	0	160	306	0	466	0	0	0	0	611
07:45 AM	0	86	29	115	0	0	0	0	193	244	0	437	0	0	0	0	552
Total	0	331	85	416	0	0	0	0	766	1052	0	1818	0	0	0	0	2234
08:00 AM	0	67	6	73	0	0	0	0	189	199	0	388	0	0	0	0	461
08:15 AM	0	64	7	71	0	0	0	0	181	202	0	383	0	0	0	0	454
08:30 AM	0	41	3	44	0	0	0	0	198	177	0	375	0	0	0	0	419
08:45 AM	0	55	7	62	0	0	0	0	163	152	0	315	0	0	0	0	377
Total	0	227	23	250	0	0	0	0	731	730	0	1461	0	0	0	0	1711
Grand Total	0	558	108	666	0	0	0	0	1497	1782	0	3279	0	0	0	0	3945
Apprch %	0	83.8	16.2		0	0	0		45.7	54.3	0		0	0	0		
Total %	0	14.1	2.7	16.9	0	0	0	0	37.9	45.2	0	83.1	0	0	0	0	
Passenger Vehicles	0	552	108	660	0	0	0	0	1429	1759	0	3188	0	0	0	0	3848
% Passenger Vehicles	0	98.9	100	99.1	0	0	0	0	95.5	98.7	0	97.2	0	0	0	0	97.5
Large 2 Axle Vehicles	0	6	0	6	0	0	0	0	51	21	0	72	0	0	0	0	78
% Large 2 Axle Vehicles	0	1.1	0	0.9	0	0	0	0	3.4	1.2	0	2.2	0	0	0	0	2
3 Axle Vehicles	0	0	0	0	0	0	0	0	8	2	0	10	0	0	0	0	10
% 3 Axle Vehicles	0	0	0	0	0	0	0	0	0.5	0.1	0	0.3	0	0	0	0	0.3
4+ Axle Trucks	0	0	0	0	0	0	0	0	9	0	0	9	0	0	0	0	9
% 4+ Axle Trucks	0	0	0	0	0	0	0	0	0.6	0	0	0.3	0	0	0	0	0.2

	Watkins Drive Southbound				Poarch Road Westbound				Watkins Drive Northbound				I-215 Northbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	60	4	64	0	0	0	0	**214**	229	0	443	0	0	0	0	507
07:15 AM	0	72	20	92	0	0	0	0	199	273	0	**472**	0	0	0	0	564
07:30 AM	0	**113**	**32**	**145**	0	0	0	0	160	**306**	0	466	0	0	0	0	**611**
07:45 AM	0	86	29	115	0	0	0	0	193	244	0	437	0	0	0	0	552
Total Volume	0	331	85	416	0	0	0	0	766	1052	0	1818	0	0	0	0	2234
% App. Total	0	79.6	20.4		0	0	0		42.1	57.9	0		0	0	0		
PHF	.000	.732	.664	.717	.000	.000	.000	.000	.895	.859	.000	.963	.000	.000	.000	.000	.914

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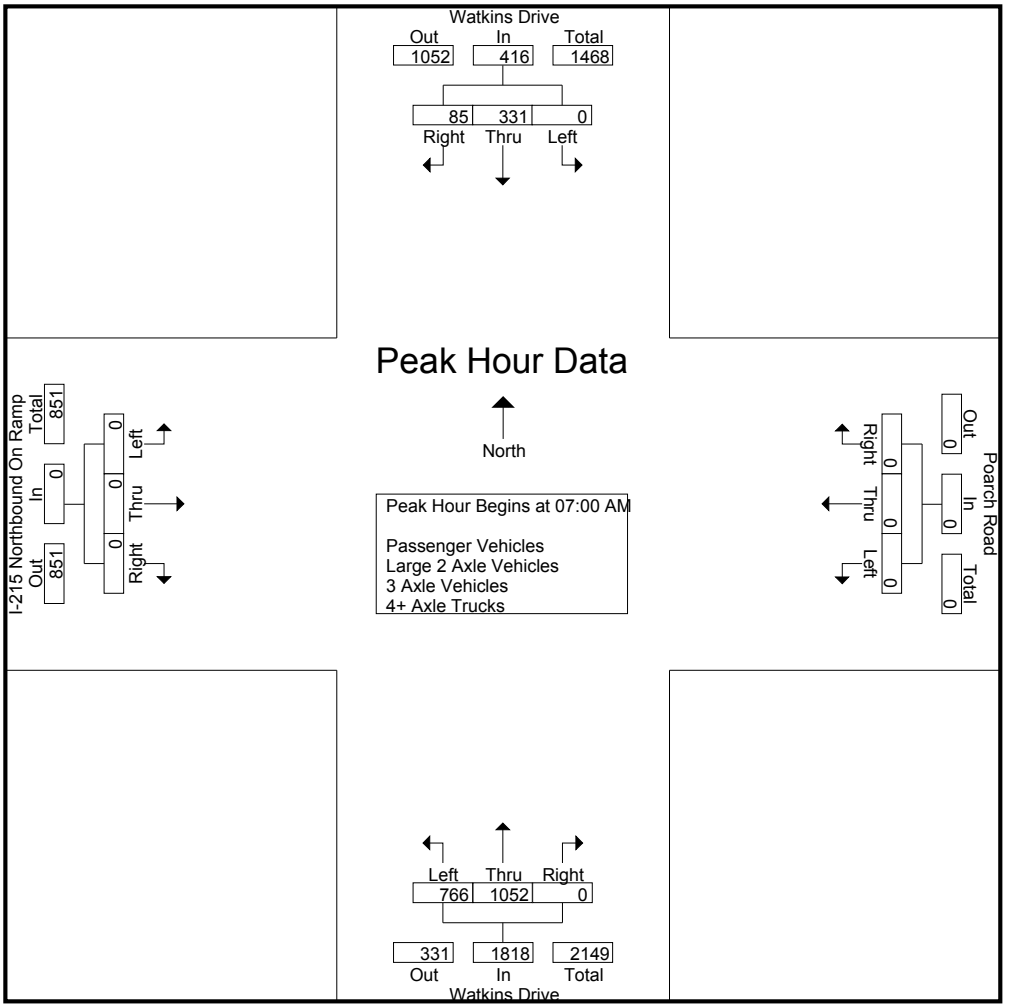
County of Riverside
N/S: Watkins Drive
E/W: I-215 NB On Ramp/Poarch Road
Weather: Clear

File Name : D_CRV_Watkins_215N On Ramp_Poarch AM
Site Code : 05119367
Start Date : 5/21/2019



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

	07:15 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	72	20	92	0	0	0	0	**214**	229	0	443	0	0	0	0
+15 mins.	0	**113**	**32**	**145**	0	0	0	0	199	273	0	**472**	0	0	0	0
+30 mins.	0	86	29	115	0	0	0	0	160	**306**	0	466	0	0	0	0
+45 mins.	0	67	6	73	0	0	0	0	193	244	0	437	0	0	0	0
Total Volume	0	338	87	425	0	0	0	0	766	1052	0	1818	0	0	0	0
% App. Total	0	79.5	20.5		0	0	0		42.1	57.9	0		0	0	0	
PHF	.000	.748	.680	.733	.000	.000	.000	.000	.895	.859	.000	.963	.000	.000	.000	.000

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County of Riverside
N/S: Watkins Drive
E/W: I-215 NB On Ramp/Poarch Road
Weather: Clear

File Name : D_CRV_Watkins_215N On Ramp_Poarch AM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 1

Groups Printed- Passenger Vehicles

	Watkins Drive Southbound				Poarch Road Westbound				Watkins Drive Northbound				I-215 Northbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	59	4	63	0	0	0	0	208	227	0	435	0	0	0	0	498
07:15 AM	0	71	20	91	0	0	0	0	189	271	0	460	0	0	0	0	551
07:30 AM	0	113	32	145	0	0	0	0	149	299	0	448	0	0	0	0	593
07:45 AM	0	84	29	113	0	0	0	0	186	243	0	429	0	0	0	0	542
Total	0	327	85	412	0	0	0	0	732	1040	0	1772	0	0	0	0	2184
08:00 AM	0	66	6	72	0	0	0	0	179	198	0	377	0	0	0	0	449
08:15 AM	0	63	7	70	0	0	0	0	174	199	0	373	0	0	0	0	443
08:30 AM	0	41	3	44	0	0	0	0	188	171	0	359	0	0	0	0	403
08:45 AM	0	55	7	62	0	0	0	0	156	151	0	307	0	0	0	0	369
Total	0	225	23	248	0	0	0	0	697	719	0	1416	0	0	0	0	1664
Grand Total	0	552	108	660	0	0	0	0	1429	1759	0	3188	0	0	0	0	3848
Apprch %	0	83.6	16.4		0	0	0		44.8	55.2	0		0	0	0		
Total %	0	14.3	2.8	17.2	0	0	0	0	37.1	45.7	0	82.8	0	0	0	0	

	Watkins Drive Southbound				Poarch Road Westbound				Watkins Drive Northbound				I-215 Northbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	59	4	63	0	0	0	0	**208**	227	0	435	0	0	0	0	498
07:15 AM	0	71	20	91	0	0	0	0	189	271	0	**460**	0	0	0	0	551
07:30 AM	0	**113**	**32**	**145**	0	0	0	0	149	**299**	0	448	0	0	0	0	**593**
07:45 AM	0	84	29	113	0	0	0	0	186	243	0	429	0	0	0	0	542
Total Volume	0	327	85	412	0	0	0	0	732	1040	0	1772	0	0	0	0	2184
% App. Total	0	79.4	20.6		0	0	0		41.3	58.7	0		0	0	0		
PHF	.000	.723	.664	.710	.000	.000	.000	.000	.880	.870	.000	.963	.000	.000	.000	.000	.921

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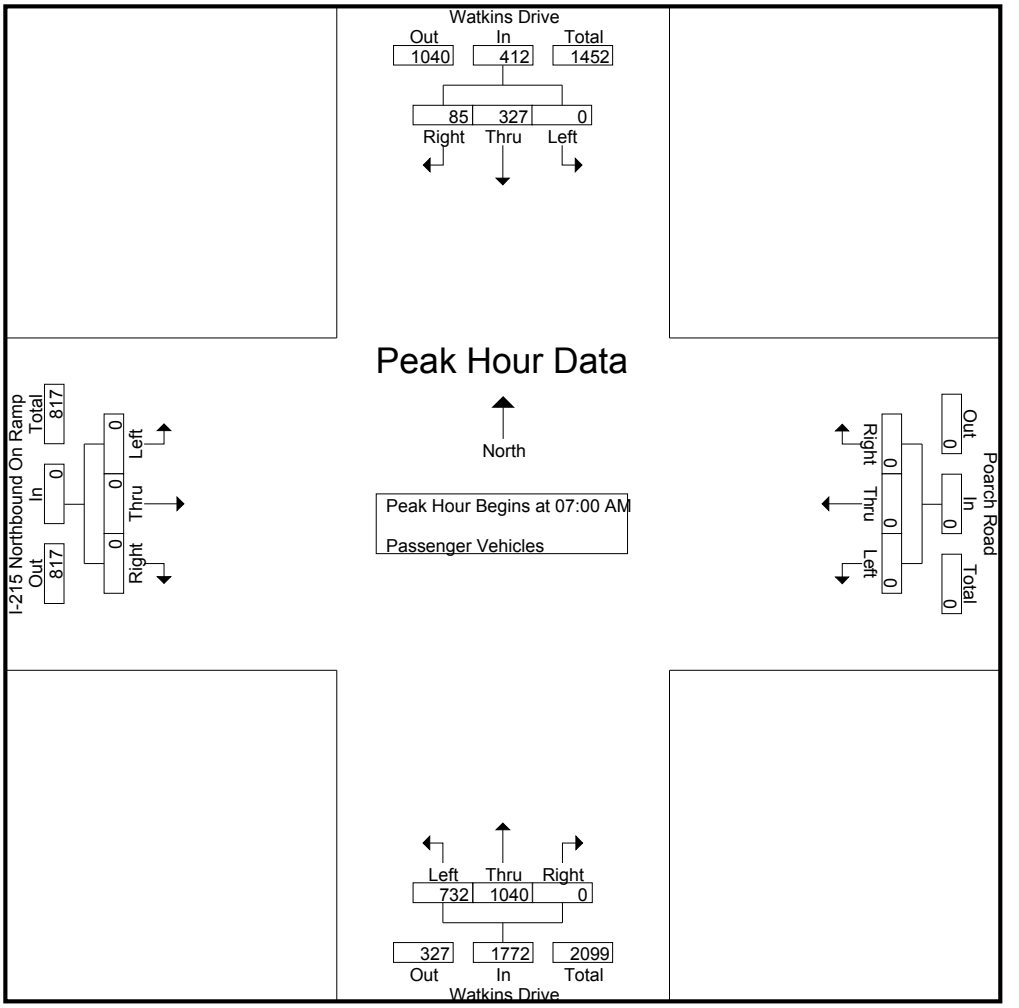
County of Riverside
N/S: Watkins Drive
E/W: I-215 NB On Ramp/Poarch Road
Weather: Clear

File Name : D_CRV_Watkins_215N On Ramp_Poarch AM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 2



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

	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	59	4	63	0	0	0	0	**208**	227	0	435	0	0	0	0
+15 mins.	0	71	20	91	0	0	0	0	189	271	0	**460**	0	0	0	0
+30 mins.	0	**113**	**32**	**145**	0	0	0	0	149	**299**	0	448	0	0	0	0
+45 mins.	0	84	29	113	0	0	0	0	186	243	0	429	0	0	0	0
Total Volume	0	327	85	412	0	0	0	0	732	1040	0	1772	0	0	0	0
% App. Total	0	79.4	20.6		0	0	0		41.3	58.7	0		0	0	0	
PHF	.000	.723	.664	.710	.000	.000	.000	.000	.880	.870	.000	.963	.000	.000	.000	.000

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County of Riverside
N/S: Watkins Drive
E/W: I-215 NB On Ramp/Poarch Road
Weather: Clear

File Name : D_CRV_Watkins_215N On Ramp_Poarch AM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 1

Groups Printed- Large 2 Axle Vehicles

	Watkins Drive Southbound				Poarch Road Westbound				Watkins Drive Northbound				I-215 Northbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	1	0	1	0	0	0	0	6	2	0	8	0	0	0	0	9
07:15 AM	0	1	0	1	0	0	0	0	8	2	0	10	0	0	0	0	11
07:30 AM	0	0	0	0	0	0	0	0	6	6	0	12	0	0	0	0	12
07:45 AM	0	2	0	2	0	0	0	0	6	1	0	7	0	0	0	0	9
Total	0	4	0	4	0	0	0	0	26	11	0	37	0	0	0	0	41
08:00 AM	0	1	0	1	0	0	0	0	7	1	0	8	0	0	0	0	9
08:15 AM	0	1	0	1	0	0	0	0	6	3	0	9	0	0	0	0	10
08:30 AM	0	0	0	0	0	0	0	0	7	5	0	12	0	0	0	0	12
08:45 AM	0	0	0	0	0	0	0	0	5	1	0	6	0	0	0	0	6
Total	0	2	0	2	0	0	0	0	25	10	0	35	0	0	0	0	37
Grand Total	0	6	0	6	0	0	0	0	51	21	0	72	0	0	0	0	78
Apprch %	0	100	0		0	0	0		70.8	29.2	0		0	0	0		
Total %	0	7.7	0	7.7	0	0	0	0	65.4	26.9	0	92.3	0	0	0	0	

	Watkins Drive Southbound				Poarch Road Westbound				Watkins Drive Northbound				I-215 Northbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	1	0	1	0	0	0	0	6	2	0	8	0	0	0	0	9
07:15 AM	0	1	0	1	0	0	0	0	**8**	2	0	10	0	0	0	0	11
07:30 AM	0	0	0	0	0	0	0	0	6	**6**	0	**12**	0	0	0	0	**12**
07:45 AM	0	**2**	0	**2**	0	0	0	0	6	1	0	7	0	0	0	0	9
Total Volume	0	4	0	4	0	0	0	0	26	11	0	37	0	0	0	0	41
% App. Total	0	100	0		0	0	0		70.3	29.7	0		0	0	0		
PHF	.000	.500	.000	.500	.000	.000	.000	.000	.813	.458	.000	.771	.000	.000	.000	.000	.854

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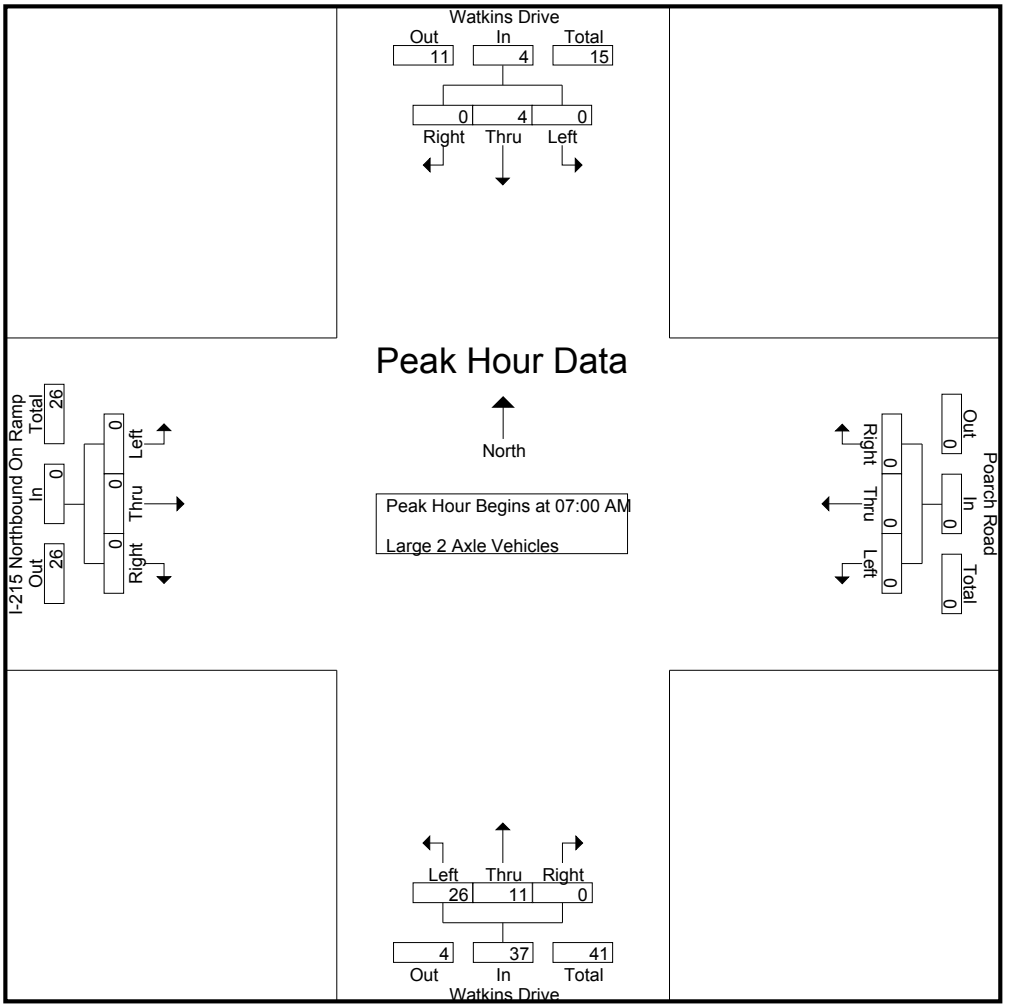
County of Riverside
N/S: Watkins Drive
E/W: I-215 NB On Ramp/Poarch Road
Weather: Clear

File Name : D_CRV_Watkins_215N On Ramp_Poarch AM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 2



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

	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	1	0	1	0	0	0	0	6	2	0	8	0	0	0	0
+15 mins.	0	1	0	1	0	0	0	0	**8**	2	0	10	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	6	**6**	0	**12**	0	0	0	0
+45 mins.	0	**2**	0	**2**	0	0	0	0	6	1	0	7	0	0	0	0
Total Volume	0	4	0	4	0	0	0	0	26	11	0	37	0	0	0	0
% App. Total	0	100	0		0	0	0		70.3	29.7	0		0	0	0	
PHF	.000	.500	.000	.500	.000	.000	.000	.000	.813	.458	.000	.771	.000	.000	.000	.000

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County of Riverside
N/S: Watkins Drive
E/W: I-215 NB On Ramp/Poarch Road
Weather: Clear

File Name : D_CRV_Watkins_215N On Ramp_Poarch AM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 1

Groups Printed- 3 Axle Vehicles

	Watkins Drive Southbound				Poarch Road Westbound				Watkins Drive Northbound				I-215 Northbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	4	1	0	5	0	0	0	0	5
07:45 AM	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	5	1	0	6	0	0	0	0	6
08:00 AM	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	2
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	2
08:45 AM	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	3	1	0	4	0	0	0	0	4
Grand Total	0	0	0	0	0	0	0	0	8	2	0	10	0	0	0	0	10
Apprch %	0	0	0		0	0	0		80	20	0		0	0	0		
Total %	0	0	0	0	0	0	0	0	80	20	0	100	0	0	0	0	

	Watkins Drive Southbound				Poarch Road Westbound				Watkins Drive Northbound				I-215 Northbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	**4**	**1**	0	**5**	0	0	0	0	**5**
07:45 AM	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	5	1	0	6	0	0	0	0	6
% App. Total	0	0	0		0	0	0		83.3	16.7	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.313	.250	.000	.300	.000	.000	.000	.000	.300

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County of Riverside
N/S: Watkins Drive
E/W: I-215 NB On Ramp/Poarch Road
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File Name : D_CRV_Watkins_215N On Ramp_Poarch AM
Site Code : 05119367
Start Date : 5/21/2019
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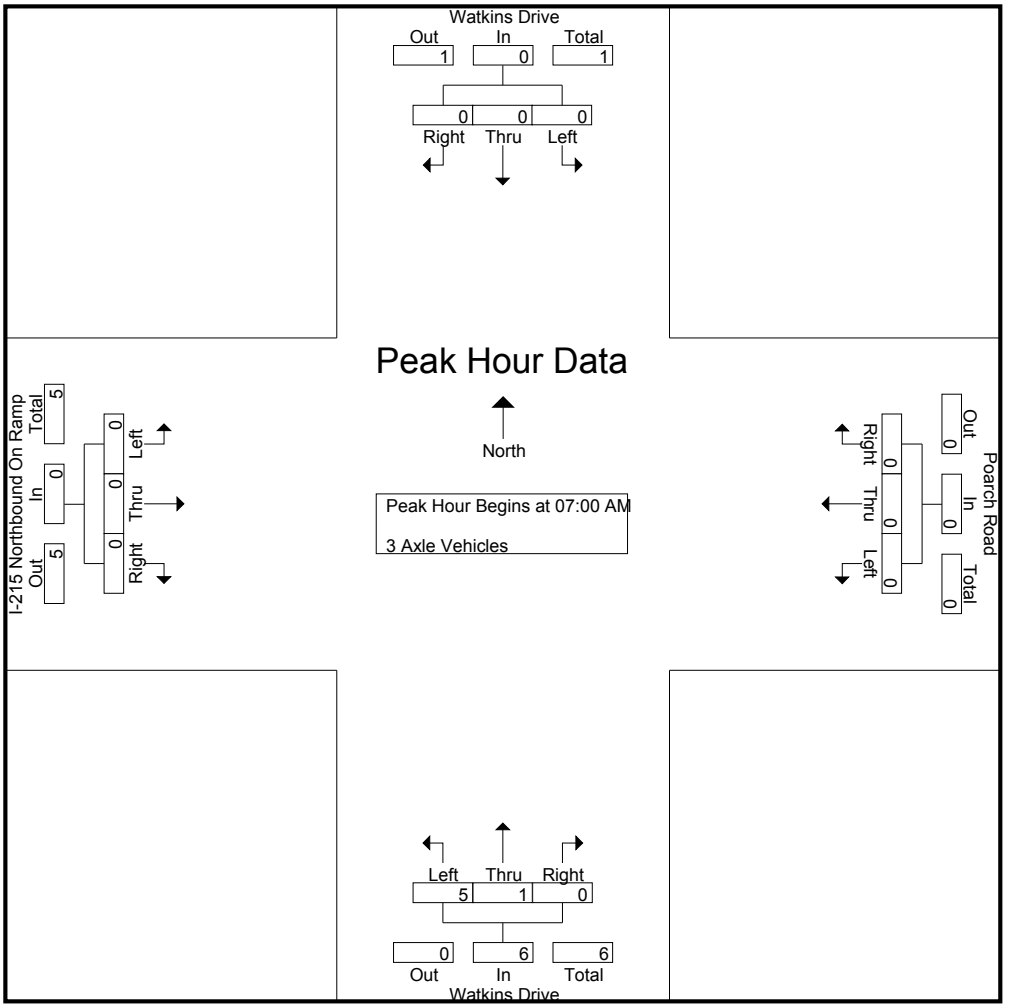

Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	**4**	**1**	0	**5**	0	0	0	0
+45 mins.	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	5	1	0	6	0	0	0	0
% App. Total	0	0	0		0	0	0		83.3	16.7	0		0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.313	.250	.000	.300	.000	.000	.000	.000

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County of Riverside
N/S: Watkins Drive
E/W: I-215 NB On Ramp/Poarch Road
Weather: Clear

File Name : D_CRV_Watkins_215N On Ramp_Poarch AM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 1

Groups Printed- 4+ Axle Trucks

	Watkins Drive Southbound				Poarch Road Westbound				Watkins Drive Northbound				I-215 Northbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
07:45 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	3
08:00 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
08:15 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
08:30 AM	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	2
08:45 AM	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	2
Total	0	0	0	0	0	0	0	0	6	0	0	6	0	0	0	0	6
Grand Total	0	0	0	0	0	0	0	0	9	0	0	9	0	0	0	0	9
Apprch %	0	0	0		0	0	0		100	0	0		0	0	0		
Total %	0	0	0	0	0	0	0	0	100	0	0	100	0	0	0	0	

	Watkins Drive Southbound				Poarch Road Westbound				Watkins Drive Northbound				I-215 Northbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	**1**	0	0	**1**	0	0	0	0	**1**
07:30 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
07:45 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
Total Volume	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	3
% App. Total	0	0	0		0	0	0		100	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.750	.000	.000	.750	.000	.000	.000	.000	.750

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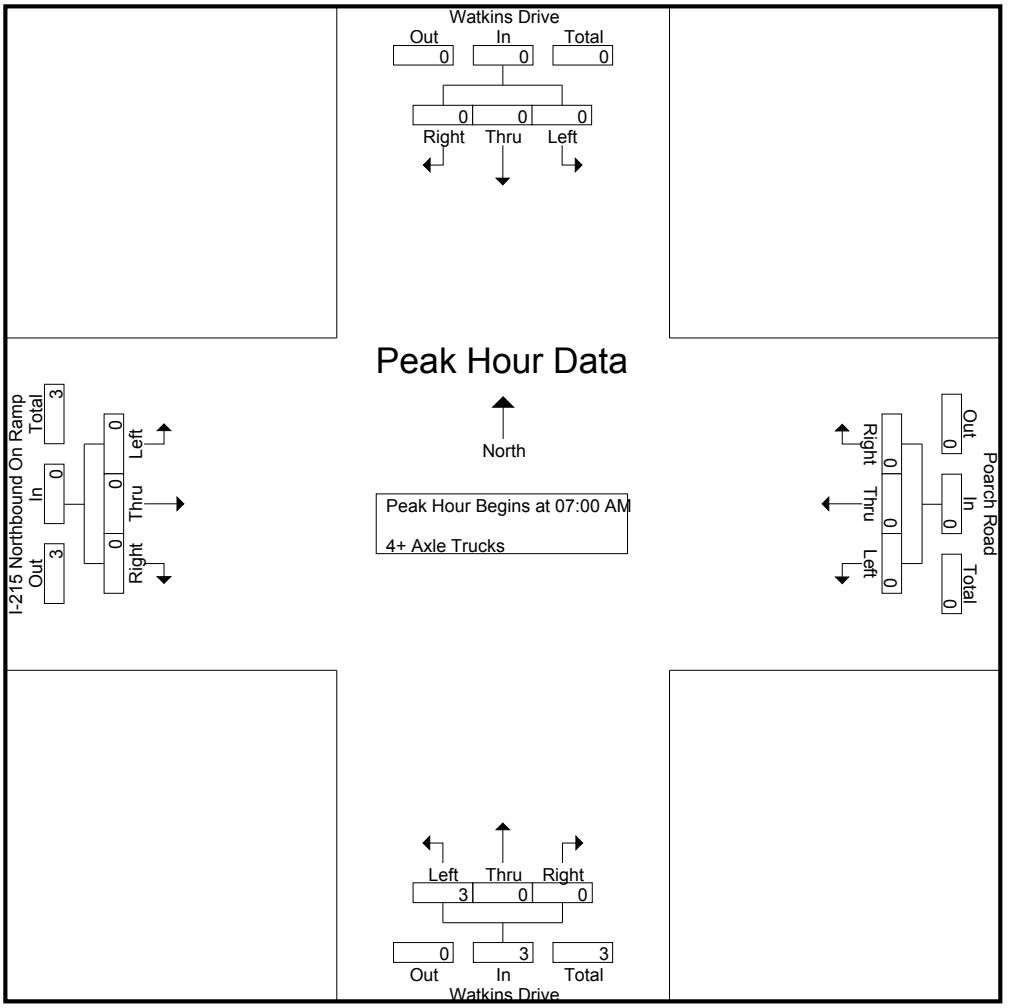
County of Riverside
N/S: Watkins Drive
E/W: I-215 NB On Ramp/Poarch Road
Weather: Clear

File Name : D_CRV_Watkins_215N On Ramp_Poarch AM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 2



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

	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	**1**	0	0	**1**	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0
% App. Total	0	0	0		0	0	0		100	0	0		0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.750	.000	.000	.750	.000	.000	.000	.000

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County of Riverside
N/S: Watkins Drive
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Weather: Clear

File Name : D_CRV_Watkins_215N On Ramp_Poarch PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	Watkins Drive Southbound				Poarch Road Westbound				Watkins Drive Northbound				I-215 Northbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	177	3	180	0	0	0	0	73	118	0	191	0	0	0	0	371
04:15 PM	0	224	3	227	0	0	0	0	87	128	0	215	0	0	0	0	442
04:30 PM	0	238	2	240	0	0	0	0	61	118	0	179	0	0	0	0	419
04:45 PM	0	223	3	226	0	0	0	0	53	132	0	185	0	0	0	0	411
Total	0	862	11	873	0	0	0	0	274	496	0	770	0	0	0	0	1643
05:00 PM	0	226	2	228	0	0	0	0	41	144	0	185	0	0	0	0	413
05:15 PM	0	265	4	269	0	0	0	0	64	140	0	204	0	0	0	0	473
05:30 PM	0	255	7	262	0	0	0	0	36	111	0	147	0	0	0	0	409
05:45 PM	0	229	3	232	0	0	0	0	37	111	0	148	0	0	0	0	380
Total	0	975	16	991	0	0	0	0	178	506	0	684	0	0	0	0	1675
Grand Total	0	1837	27	1864	0	0	0	0	452	1002	0	1454	0	0	0	0	3318
Apprch %	0	98.6	1.4		0	0	0		31.1	68.9	0		0	0	0		
Total %	0	55.4	0.8	56.2	0	0	0	0	13.6	30.2	0	43.8	0	0	0	0	
Passenger Vehicles	0	1814	25	1839	0	0	0	0	427	990	0	1417	0	0	0	0	3256
% Passenger Vehicles	0	98.7	92.6	98.7	0	0	0	0	94.5	98.8	0	97.5	0	0	0	0	98.1
Large 2 Axle Vehicles	0	23	2	25	0	0	0	0	21	11	0	32	0	0	0	0	57
% Large 2 Axle Vehicles	0	1.3	7.4	1.3	0	0	0	0	4.6	1.1	0	2.2	0	0	0	0	1.7
3 Axle Vehicles	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
% 3 Axle Vehicles	0	0	0	0	0	0	0	0	0	0.1	0	0.1	0	0	0	0	0
4+ Axle Trucks	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	4
% 4+ Axle Trucks	0	0	0	0	0	0	0	0	0.9	0	0	0.3	0	0	0	0	0.1

	Watkins Drive Southbound				Poarch Road Westbound				Watkins Drive Northbound				I-215 Northbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	238	2	240	0	0	0	0	61	118	0	179	0	0	0	0	419
04:45 PM	0	223	3	226	0	0	0	0	53	132	0	185	0	0	0	0	411
05:00 PM	0	226	2	228	0	0	0	0	41	**144**	0	185	0	0	0	0	413
05:15 PM	0	**265**	**4**	**269**	0	0	0	0	**64**	140	0	**204**	0	0	0	0	**473**
Total Volume	0	952	11	963	0	0	0	0	219	534	0	753	0	0	0	0	1716
% App. Total	0	98.9	1.1		0	0	0		29.1	70.9	0		0	0	0		
PHF	.000	.898	.688	.895	.000	.000	.000	.000	.855	.927	.000	.923	.000	.000	.000	.000	.907

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County of Riverside
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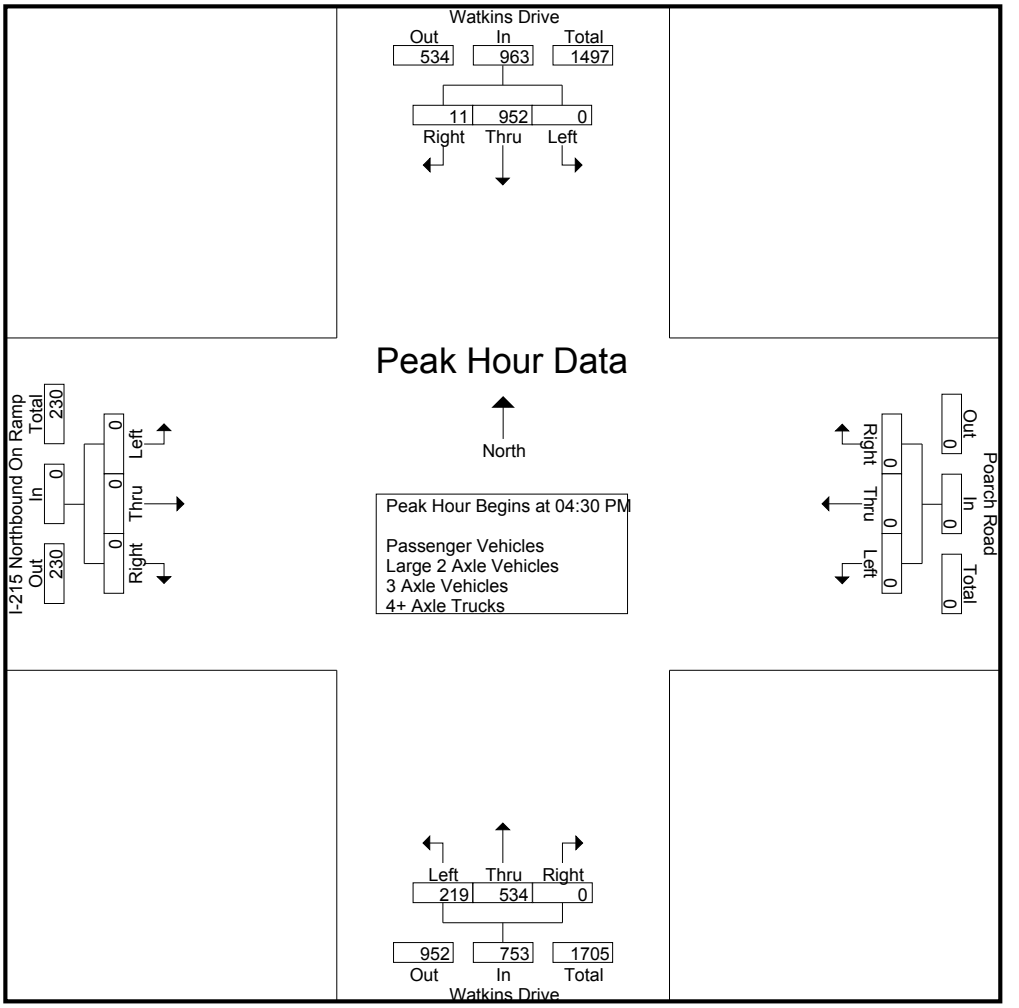
E/W: I-215 NB On Ramp/Poarch Road
Weather: Clear

File Name : D_CRV_Watkins_215N On Ramp_Poarch PM
Site Code : 05119367
Start Date : 5/21/2019



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

	05:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	226	2	228	0	0	0	0	73	118	0	191	0	0	0	0
+15 mins.	0	**265**	4	**269**	0	0	0	0	**87**	128	0	**215**	0	0	0	0
+30 mins.	0	255	**7**	262	0	0	0	0	61	118	0	179	0	0	0	0
+45 mins.	0	229	3	232	0	0	0	0	53	**132**	0	185	0	0	0	0
Total Volume	0	975	16	991	0	0	0	0	274	496	0	770	0	0	0	0
% App. Total	0	98.4	1.6		0	0	0		35.6	64.4	0		0	0	0	
PHF	.000	.920	.571	.921	.000	.000	.000	.000	.787	.939	.000	.895	.000	.000	.000	.000

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County of Riverside
N/S: Watkins Drive
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File Name : D_CRV_Watkins_215N On Ramp_Poarch PM
Site Code : 05119367
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Page No : 1

Groups Printed- Passenger Vehicles

	Watkins Drive Southbound				Poarch Road Westbound				Watkins Drive Northbound				I-215 Northbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	174	3	177	0	0	0	0	65	113	0	178	0	0	0	0	355
04:15 PM	0	223	3	226	0	0	0	0	84	126	0	210	0	0	0	0	436
04:30 PM	0	236	2	238	0	0	0	0	59	117	0	176	0	0	0	0	414
04:45 PM	0	220	2	222	0	0	0	0	49	131	0	180	0	0	0	0	402
Total	0	853	10	863	0	0	0	0	257	487	0	744	0	0	0	0	1607
05:00 PM	0	222	2	224	0	0	0	0	38	143	0	181	0	0	0	0	405
05:15 PM	0	262	4	266	0	0	0	0	61	139	0	200	0	0	0	0	466
05:30 PM	0	251	7	258	0	0	0	0	35	111	0	146	0	0	0	0	404
05:45 PM	0	226	2	228	0	0	0	0	36	110	0	146	0	0	0	0	374
Total	0	961	15	976	0	0	0	0	170	503	0	673	0	0	0	0	1649
Grand Total	0	1814	25	1839	0	0	0	0	427	990	0	1417	0	0	0	0	3256
Apprch %	0	98.6	1.4		0	0	0		30.1	69.9	0		0	0	0		
Total %	0	55.7	0.8	56.5	0	0	0	0	13.1	30.4	0	43.5	0	0	0	0	

	Watkins Drive Southbound				Poarch Road Westbound				Watkins Drive Northbound				I-215 Northbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	236	2	238	0	0	0	0	59	117	0	176	0	0	0	0	414
04:45 PM	0	220	2	222	0	0	0	0	49	131	0	180	0	0	0	0	402
05:00 PM	0	222	2	224	0	0	0	0	38	**143**	0	181	0	0	0	0	405
05:15 PM	0	**262**	**4**	**266**	0	0	0	0	**61**	139	0	**200**	0	0	0	0	**466**
Total Volume	0	940	10	950	0	0	0	0	207	530	0	737	0	0	0	0	1687
% App. Total	0	98.9	1.1		0	0	0		28.1	71.9	0		0	0	0		
PHF	.000	.897	.625	.893	.000	.000	.000	.000	.848	.927	.000	.921	.000	.000	.000	.000	.905

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Weather: Clear

File Name : D_CRV_Watkins_215N On Ramp_Poarch PM
Site Code : 05119367
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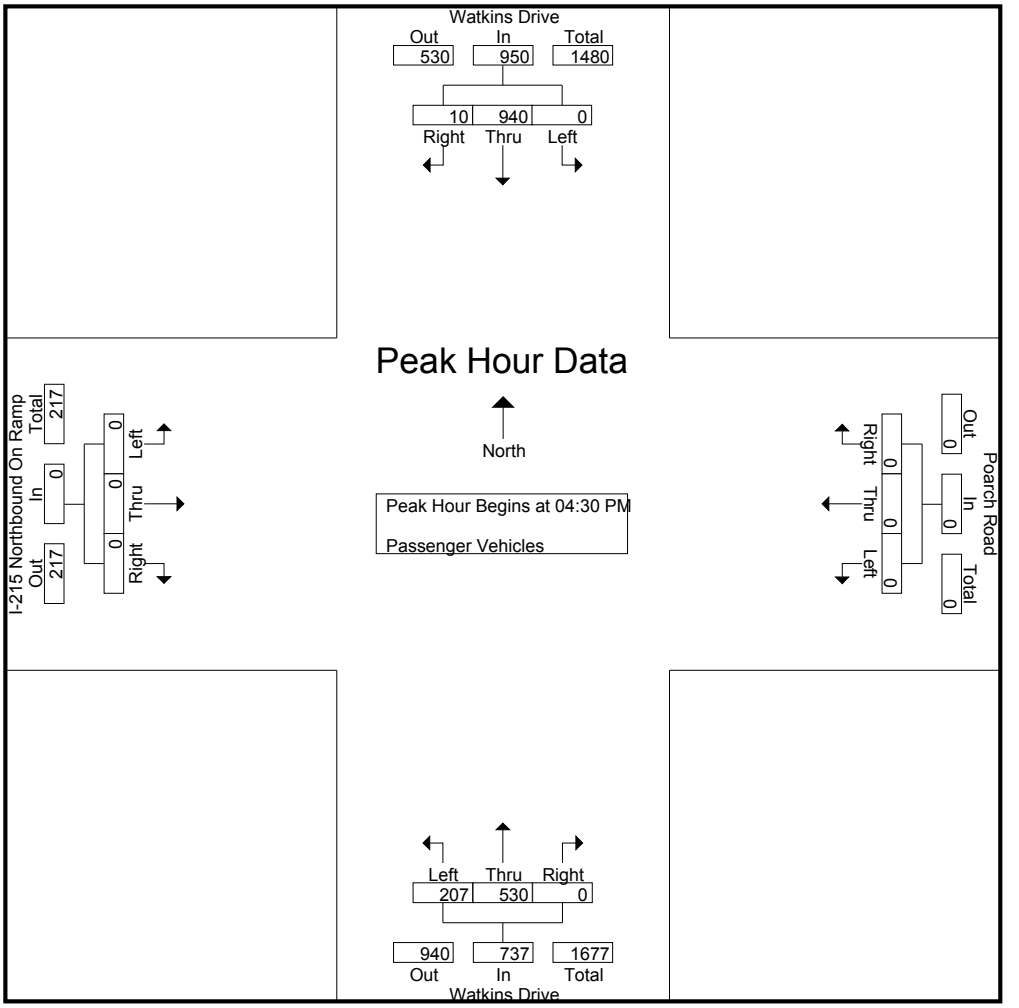

Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	236	2	238	0	0	0	0	59	117	0	176	0	0	0	0
+15 mins.	0	220	2	222	0	0	0	0	49	131	0	180	0	0	0	0
+30 mins.	0	222	2	224	0	0	0	0	38	**143**	0	181	0	0	0	0
+45 mins.	0	**262**	**4**	**266**	0	0	0	0	**61**	139	0	**200**	0	0	0	0
Total Volume	0	940	10	950	0	0	0	0	207	530	0	737	0	0	0	0
% App. Total	0	98.9	1.1		0	0	0		28.1	71.9	0		0	0	0	
PHF	.000	.897	.625	.893	.000	.000	.000	.000	.848	.927	.000	.921	.000	.000	.000	.000

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File Name : D_CRV_Watkins_215N On Ramp_Poarch PM
Site Code : 05119367
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Page No : 1

Groups Printed- Large 2 Axle Vehicles

	Watkins Drive Southbound				Poarch Road Westbound				Watkins Drive Northbound				I-215 Northbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	3	0	3	0	0	0	0	8	5	0	13	0	0	0	0	16
04:15 PM	0	1	0	1	0	0	0	0	2	2	0	4	0	0	0	0	5
04:30 PM	0	2	0	2	0	0	0	0	2	0	0	2	0	0	0	0	4
04:45 PM	0	3	1	4	0	0	0	0	1	1	0	2	0	0	0	0	6
Total	0	9	1	10	0	0	0	0	13	8	0	21	0	0	0	0	31
05:00 PM	0	4	0	4	0	0	0	0	3	1	0	4	0	0	0	0	8
05:15 PM	0	3	0	3	0	0	0	0	3	1	0	4	0	0	0	0	7
05:30 PM	0	4	0	4	0	0	0	0	1	0	0	1	0	0	0	0	5
05:45 PM	0	3	1	4	0	0	0	0	1	1	0	2	0	0	0	0	6
Total	0	14	1	15	0	0	0	0	8	3	0	11	0	0	0	0	26
Grand Total	0	23	2	25	0	0	0	0	21	11	0	32	0	0	0	0	57
Apprch %	0	92	8		0	0	0		65.6	34.4	0		0	0	0		
Total %	0	40.4	3.5	43.9	0	0	0	0	36.8	19.3	0	56.1	0	0	0	0	

	Watkins Drive Southbound				Poarch Road Westbound				Watkins Drive Northbound				I-215 Northbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	2	0	2	0	0	0	0	2	0	0	2	0	0	0	0	4
04:45 PM	0	3	**1**	**4**	0	0	0	0	1	**1**	0	2	0	0	0	0	6
05:00 PM	0	**4**	0	4	0	0	0	0	**3**	1	0	**4**	0	0	0	0	**8**
05:15 PM	0	3	0	3	0	0	0	0	3	1	0	4	0	0	0	0	7
Total Volume	0	12	1	13	0	0	0	0	9	3	0	12	0	0	0	0	25
% App. Total	0	92.3	7.7		0	0	0		75	25	0		0	0	0		
PHF	.000	.750	.250	.813	.000	.000	.000	.000	.750	.750	.000	.750	.000	.000	.000	.000	.781

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Weather: Clear

File Name : D_CRV_Watkins_215N On Ramp_Poarch PM
Site Code : 05119367
Start Date : 5/21/2019
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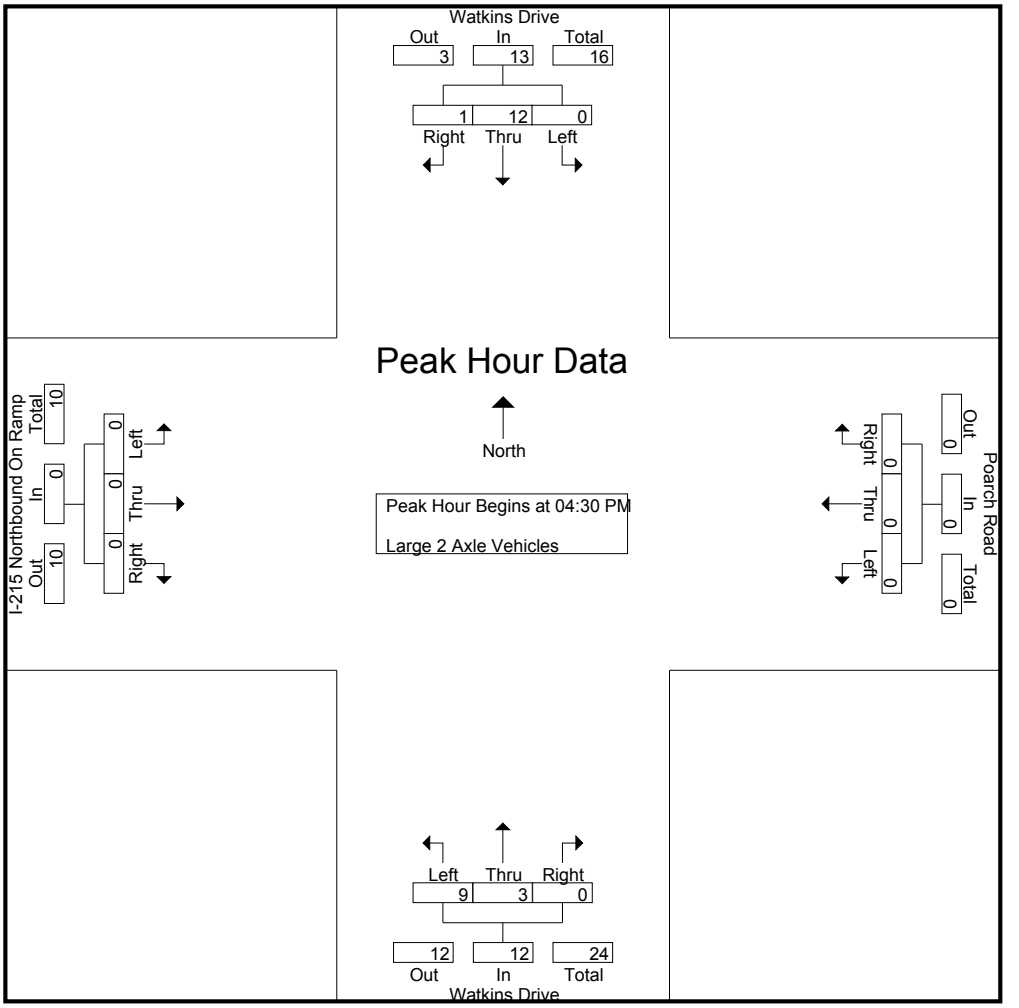

Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	2	0	2	0	0	0	0	2	0	0	2	0	0	0	0
+15 mins.	0	3	**1**	**4**	0	0	0	0	1	**1**	0	2	0	0	0	0
+30 mins.	0	**4**	0	4	0	0	0	0	**3**	1	0	**4**	0	0	0	0
+45 mins.	0	3	0	3	0	0	0	0	3	1	0	4	0	0	0	0
Total Volume	0	12	1	13	0	0	0	0	9	3	0	12	0	0	0	0
% App. Total	0	92.3	7.7		0	0	0		75	25	0		0	0	0	
PHF	.000	.750	.250	.813	.000	.000	.000	.000	.750	.750	.000	.750	.000	.000	.000	.000

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File Name : D_CRV_Watkins_215N On Ramp_Poarch PM
Site Code : 05119367
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Groups Printed- 3 Axle Vehicles

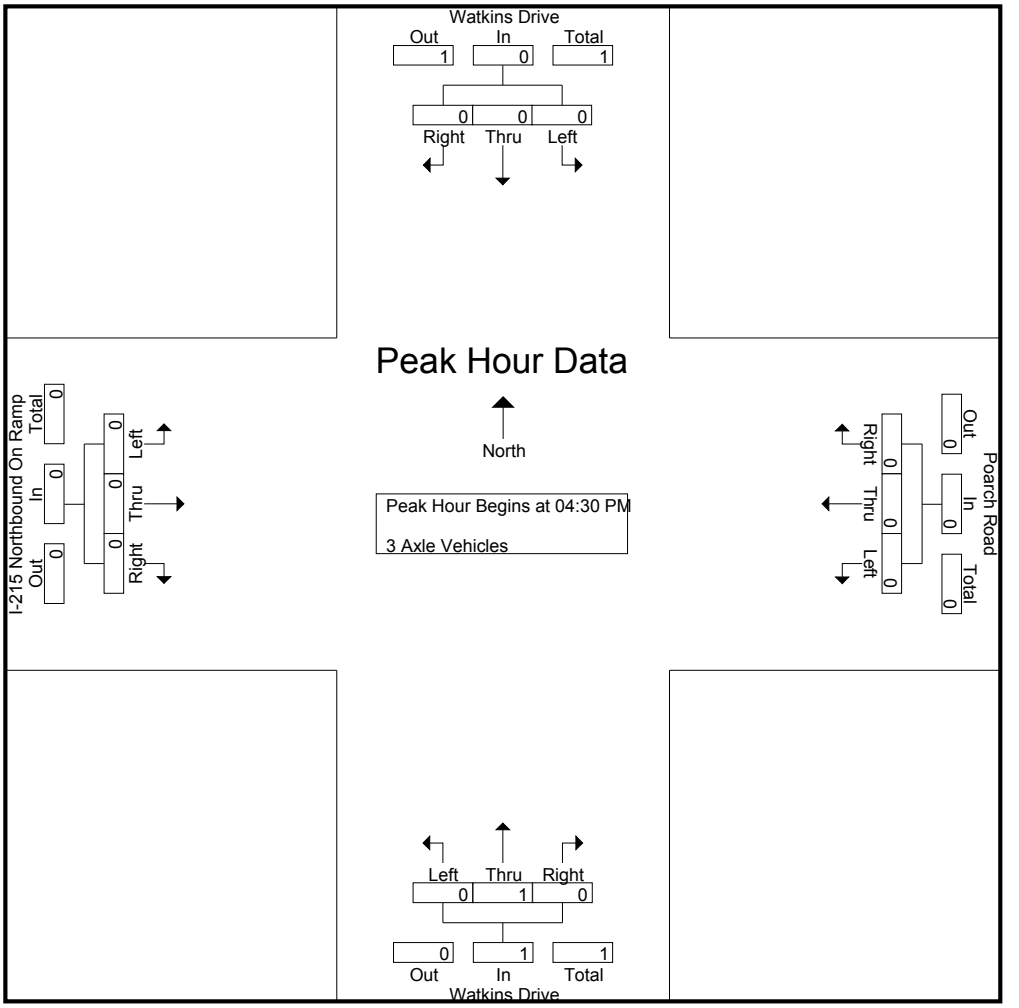
	Watkins Drive Southbound				Poarch Road Westbound				Watkins Drive Northbound				I-215 Northbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
04:45 PM	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	1	0	1	0	0	0	0	1
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	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
Grand Total	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
Apprch %	0	0	0		0	0	0		0	100	0		0	0	0		
Total %	0	0	0	0	0	0	0	0	0	100	0	100	0	0	0	0	

	Watkins Drive Southbound				Poarch Road Westbound				Watkins Drive Northbound				I-215 Northbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	0	0	0	0	**1**	0	**1**	0	0	0	0	**1**
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	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	1	0	1	0	0	0	0	1
% App. Total	0	0	0		0	0	0		0	100	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.250

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

County of Riverside
N/S: Watkins Drive
E/W: I-215 NB On Ramp/Poarch Road
Weather: Clear

File Name : D_CRV_Watkins_215N On Ramp_Poarch PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 2



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	**1**	0	**1**	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	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	1	0	1	0	0	0	0
% App. Total	0	0	0		0	0	0		0	100	0		0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000

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

County of Riverside
N/S: Watkins Drive
E/W: I-215 NB On Ramp/Poarch Road
Weather: Clear

File Name : D_CRV_Watkins_215N On Ramp_Poarch PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 1

Groups Printed- 4+ Axle Trucks

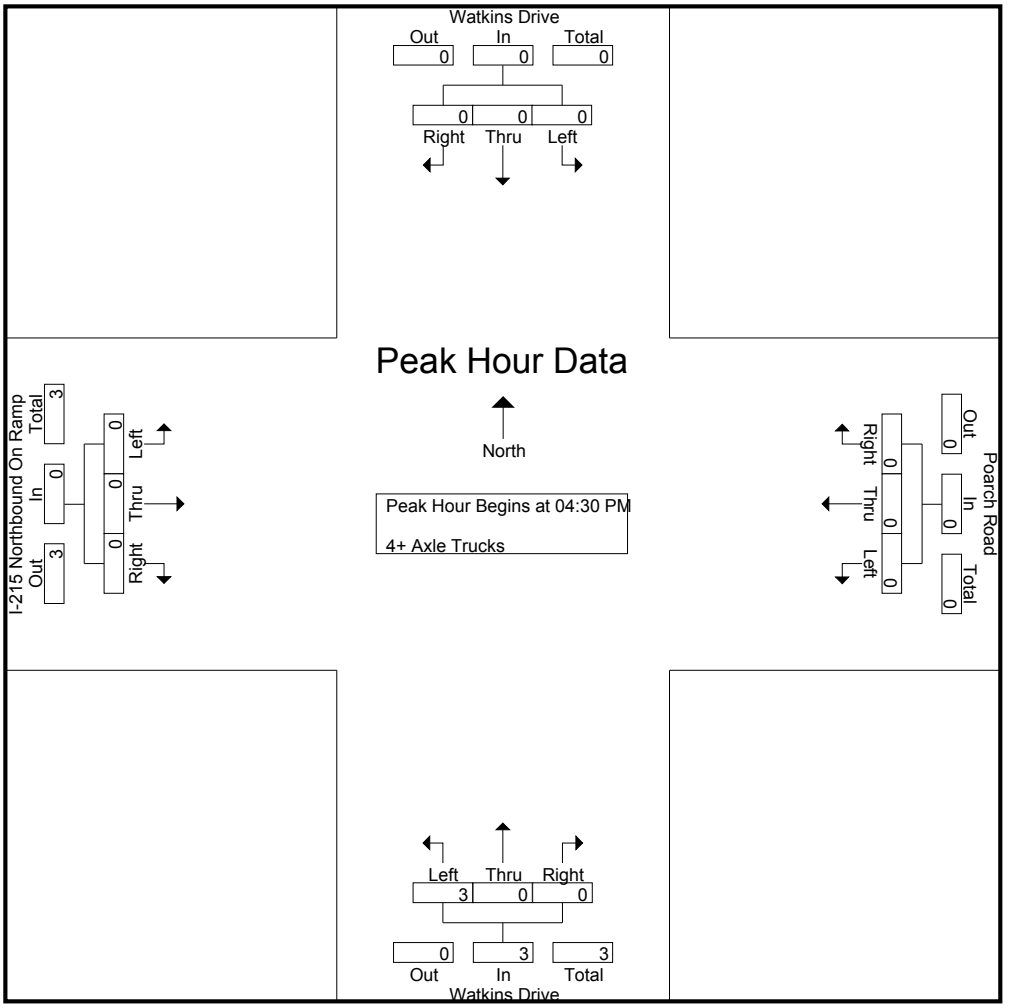
	Watkins Drive Southbound				Poarch Road Westbound				Watkins Drive Northbound				I-215 Northbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	3
Total	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	4
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	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
Grand Total	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	4
Apprch %	0	0	0		0	0	0		100	0	0		0	0	0		
Total %	0	0	0	0	0	0	0	0	100	0	0	100	0	0	0	0	

	Watkins Drive Southbound				Poarch Road Westbound				Watkins Drive Northbound				I-215 Northbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	**3**	0	0	**3**	0	0	0	0	**3**
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	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	3	0	0	3	0	0	0	0	3
% App. Total	0	0	0		0	0	0		100	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.000	.000	.000	.000	.250

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

County of Riverside
N/S: Watkins Drive
E/W: I-215 NB On Ramp/Poarch Road
Weather: Clear

File Name : D_CRV_Watkins_215N On Ramp_Poarch PM
Site Code : 05119367
Start Date : 5/21/2019
Page No : 2



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	**3**	0	0	**3**	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	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	3	0	0	3	0	0	0	0
% App. Total	0	0	0		0	0	0		100	0	0		0	0	0	
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.000	.000	.000	.000

Location: County of Riverside
N/S: Watkins Drive
E/W: I-215 NB On Ramp/Poarch Road

Date: 5/21/2019
Day: Tuesday

PEDESTRIANS

	North Leg Watkins Drive	East Leg Poarch Road	South Leg Watkins Drive	West Leg I-215 NB On Ramp	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0

	North Leg Watkins Drive	East Leg Poarch Road	South Leg Watkins Drive	West Leg I-215 NB On Ramp	
	Pedestrians	Pedestrians	Pedestrians	Pedestrians	
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
TOTAL VOLUMES:	0	0	0	0	0

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
951-268-0268

Location: County of Riverside
N/S: Watkins Drive
E/W: I-215 NB On Ramp/Poarch Road

Date: 5/21/2019
Day: Tuesday

BICYCLES

	Southbound Watkins Drive			Westbound Poarch Road			Northbound Watkins Drive			Eastbound I-215 NB On Ramp			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	1
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	1	0	0	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	0	1	0	0	0	0	0	1	0	0	0	0	2

	Southbound Watkins Drive			Westbound Poarch Road			Northbound Watkins Drive			Eastbound I-215 NB On Ramp			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	0	2	0	0	0	0	0	0	0	0	0	0	2

Counts Unlimited, Inc.

PO Box 1178
Corona, CA 92878
Phone: (951) 268-6268
email: counts@countsunlimited.com

County of Riverside
Central Avenue
W/ Sycamore Canyon Boulevard
24 Hour Directional Volume Count

CRV003
Site Code: 051-19367

Start Time	27-May-19 Mon	Eastbound Morning	Eastbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Westbound Morning	Westbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		19	122			30	130				
12:15		16	154			10	136				
12:30		10	123			10	119				
12:45		6	142	51	541	8	130	58	515	109	1056
01:00		5	136			10	131				
01:15		5	129			7	159				
01:30		11	135			14	127				
01:45		6	135	27	535	9	138	40	555	67	1090
02:00		5	167			13	156				
02:15		2	167			4	133				
02:30		6	176			4	**209**				
02:45		14	156	27	666	6	**181**	27	679	54	1345
03:00		4	163			6	**152**				
03:15		10	218			5	**138**				
03:30		10	247			8	137				
03:45		13	248	37	876	12	152	31	579	68	1455
04:00		8	250			8	161				
04:15		14	255			14	184				
04:30		18	213			13	149				
04:45		24	284	64	1002	17	135	52	629	116	1631
05:00		18	242			35	160				
05:15		29	**284**			47	151				
05:30		45	**272**			60	162				
05:45		37	**261**	129	1059	70	162	212	635	341	1694
06:00		41	**281**			88	116				
06:15		56	213			104	105				
06:30		66	231			120	90				
06:45		93	186	256	911	116	85	428	396	684	1307
07:00		130	156			120	129				
07:15		**173**	126			142	79				
07:30		**209**	124			135	78				
07:45		**171**	82	683	488	115	59	512	345	1195	833
08:00		**164**	90			**140**	78				
08:15		140	125			**117**	77				
08:30		113	70			**141**	65				
08:45		110	86	527	371	**139**	73	537	293	1064	664
09:00		97	73			106	63				
09:15		105	75			144	62				
09:30		101	55			108	64				
09:45		91	50	394	253	144	40	502	229	896	482
10:00		101	56			112	47				
10:15		102	46			117	65				
10:30		113	41			106	47				
10:45		116	38	432	181	117	37	452	196	884	377
11:00		106	33			128	28				
11:15		91	28			129	24				
11:30		112	28			125	19				
11:45		132	19	441	108	97	20	479	91	920	199
Total		3068	6991	3068	6991	3330	5142	3330	5142	6398	12133
Combined Total		10059		10059		8472		8472		18531	
AM Peak	-	07:15	-	-	-	08:00	-	-	-	-	-
Vol.	-	717	-	-	-	537	-	-	-	-	-
P.H.F.		0.858				0.952					
PM Peak	-	-	05:15	-	-	-	02:30	-	-	-	-
Vol.	-	-	1098	-	-	-	680	-	-	-	-
P.H.F.			0.967				0.813				
Percentage		30.5%	69.5%			39.3%	60.7%				
ADT/AADT		ADT 18,531		AADT 18,531							

Counts Unlimited, Inc.

PO Box 1178
Corona, CA 92878
Phone: (951) 268-6268
email: counts@countsunlimited.com

County of Riverside
Sycamore Canyon Boulevard
N/ Central Avenue
24 Hour Directional Volume Count

CRV001
Site Code: 051-19367

Start Time	27-May-19 Mon	Northbound Morning	Northbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Southbound Morning	Southbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		4	71			3	21				
12:15		5	85			1	21				
12:30		4	68			1	23				
12:45		4	65	17	289	2	33	7	98	24	387
01:00		4	88			3	20				
01:15		2	74			3	37				
01:30		2	60			1	30				
01:45		5	**96**	13	318	2	27	9	114	22	432
02:00		3	**97**			1	27				
02:15		3	**78**			2	27				
02:30		3	**99**			4	28				
02:45		3	92	12	366	2	42	9	124	21	490
03:00		3	67			4	35				
03:15		1	73			1	51				
03:30		1	76			2	45				
03:45		0	81	5	297	1	63	8	194	13	491
04:00		0	77			1	47				
04:15		2	105			3	68				
04:30		4	99			2	78				
04:45		7	62	13	343	5	62	11	255	24	598
05:00		5	98			3	**85**				
05:15		13	88			12	**102**				
05:30		35	77			9	**115**				
05:45		41	61	94	324	4	**88**	28	390	122	714
06:00		51	43			6	72				
06:15		68	50			9	72				
06:30		**119**	42			9	50				
06:45		**102**	43	340	178	18	67	42	261	382	439
07:00		**94**	57			16	27				
07:15		**97**	24			23	28				
07:30		107	24			17	24				
07:45		112	26	410	131	22	16	78	95	488	226
08:00		88	36			19	15				
08:15		99	28			24	23				
08:30		82	29			15	11				
08:45		82	32	351	125	17	18	75	67	426	192
09:00		74	25			14	15				
09:15		66	30			20	13				
09:30		55	27			25	23				
09:45		70	18	265	100	9	9	68	60	333	160
10:00		45	30			8	18				
10:15		55	28			20	9				
10:30		53	19			20	8				
10:45		40	12	193	89	11	8	59	43	252	132
11:00		45	14			**33**	7				
11:15		41	6			**16**	11				
11:30		42	5			**17**	4				
11:45		44	8	172	33	**21**	5	87	27	259	60
Total		1885	2593	1885	2593	481	1728	481	1728	2366	4321
Combined Total		4478		4478		2209		2209		6687	
AM Peak	-	06:30	-	-	-	11:00	-	-	-	-	-
Vol.	-	412	-	-	-	87	-	-	-	-	-
P.H.F.		0.866				0.659					
PM Peak	-	-	01:45	-	-	-	05:00	-	-	-	-
Vol.	-	-	370	-	-	-	390	-	-	-	-
P.H.F.			0.934				0.848				
Percentage		42.1%	57.9%			21.8%	78.2%				
ADT/AADT		ADT 6,687		AADT 6,687							

Counts Unlimited, Inc.

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Corona, CA 92878
Phone: (951) 268-6268
email: counts@countsunlimited.com

County of Riverside
Sycamore Canyon Boulevard
S/ Central Avenue
24 Hour Directional Volume Count

CRV002
Site Code: 051-19367

Start Time	27-May-19 Mon	Northbound Morning	Northbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Southbound Morning	Southbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		12	201			14	75				
12:15		4	231			8	95				
12:30		7	204			6	83				
12:45		5	217	28	853	4	88	32	341	60	1194
01:00		2	233			8	76				
01:15		2	216			7	88				
01:30		4	184			1	87				
01:45		3	305	11	938	4	85	20	336	31	1274
02:00		8	**304**			4	93				
02:15		5	**269**			2	101				
02:30		2	**311**			7	110				
02:45		3	**310**	18	1194	4	120	17	424	35	1618
03:00		3	254			4	126				
03:15		8	271			1	135				
03:30		3	276			8	161				
03:45		9	261	23	1062	6	185	19	607	42	1669
04:00		9	217			4	165				
04:15		16	281			7	195				
04:30		33	235			10	218				
04:45		29	181	87	914	8	220	29	798	116	1712
05:00		38	243			7	214				
05:15		112	217			19	**271**				
05:30		217	156			24	**286**				
05:45		294	138	661	754	17	**251**	67	1022	728	1776
06:00		314	80			15	**234**				
06:15		**415**	96			13	190				
06:30		**414**	65			24	166				
06:45		**410**	68	1553	309	26	162	78	752	1631	1061
07:00		**417**	87			30	98				
07:15		405	54			45	92				
07:30		368	39			39	92				
07:45		397	43	1587	223	70	56	184	338	1771	561
08:00		409	59			67	75				
08:15		380	30			55	78				
08:30		418	44			38	52				
08:45		362	38	1569	171	49	61	209	266	1778	437
09:00		306	41			40	47				
09:15		317	39			51	55				
09:30		223	27			55	57				
09:45		273	17	1119	124	42	30	188	189	1307	313
10:00		225	34			43	37				
10:15		197	45			50	42				
10:30		186	25			69	27				
10:45		219	8	827	112	**66**	28	228	134	1055	246
11:00		176	19			**70**	21				
11:15		171	13			**61**	34				
11:30		166	6			**82**	13				
11:45		139	5	652	43	64	19	277	87	929	130
Total		8135	6697	8135	6697	1348	5294	1348	5294	9483	11991
Combined Total		14832		14832		6642		6642		21474	
AM Peak	-	06:15	-	-	-	10:45	-	-	-	-	-
Vol.	-	1656	-	-	-	279	-	-	-	-	-
P.H.F.		0.993				0.851					
PM Peak	-	-	02:00	-	-	-	05:15	-	-	-	-
Vol.	-	-	1194	-	-	-	1042	-	-	-	-
P.H.F.			0.960				0.911				
Percentage		54.8%	45.2%			20.3%	79.7%				
ADT/AADT		ADT 21,474		AADT 21,474							

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APPENDIX 3.2:

EXISTING (2019) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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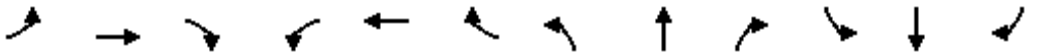
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	13	619	76	44	253	253	373	880	37	38	6
Future Volume (vph)	13	619	76	44	253	253	373	880	37	38	6
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases			4					2			6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	15.8	15.8	9.6	26.8	9.6	15.8	15.8	9.6	40.8	40.8
Total Split (s)	9.6	26.8	26.8	9.6	26.8	26.8	63.9	63.9	9.7	46.8	46.8
Total Split (%)	8.7%	24.4%	24.4%	8.7%	24.4%	24.4%	58.1%	58.1%	8.8%	42.5%	42.5%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	3.6	4.8	4.8	3.6	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	5.8	4.6	5.8	4.6	5.8	5.8	4.6	5.8	5.8
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min	Min

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 99.8
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Sycamore Canyon Bl. & Central Av.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	619	76	44	253	29	253	373	880	37	38	6
Future Volume (veh/h)	13	619	76	44	253	29	253	373	880	37	38	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1856	1796	1900	1870	1870	1856	1885	1841	1856	1856	1648
Adj Flow Rate, veh/h	14	666	80	47	272	28	272	401	851	40	41	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	3	7	0	2	2	3	1	4	3	3	17
Cap, veh/h	29	849	255	126	611	62	304	1056	873	59	1485	
Arrive On Green	0.02	0.17	0.17	0.04	0.19	0.19	0.17	0.56	0.56	0.03	0.42	0.00
Sat Flow, veh/h	1810	5066	1522	3510	3255	332	1767	1885	1560	1767	3526	1397
Grp Volume(v), veh/h	14	666	80	47	147	153	272	401	851	40	41	0
Grp Sat Flow(s),veh/h/ln	1810	1689	1522	1755	1777	1811	1767	1885	1560	1767	1763	1397
Q Serve(g_s), s	0.8	12.9	4.7	1.3	7.5	7.7	15.4	12.2	54.1	2.3	0.7	0.0
Cycle Q Clear(g_c), s	0.8	12.9	4.7	1.3	7.5	7.7	15.4	12.2	54.1	2.3	0.7	0.0
Prop In Lane	1.00		1.00	1.00		0.18	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	29	849	255	126	333	340	304	1056	873	59	1485	
V/C Ratio(X)	0.48	0.78	0.31	0.37	0.44	0.45	0.90	0.38	0.97	0.68	0.03	
Avail Cap(c_a), veh/h	88	1039	312	172	365	372	383	1070	886	88	1485	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	49.9	40.8	37.4	48.2	36.8	36.9	41.5	12.6	21.8	48.9	17.3	0.0
Incr Delay (d2), s/veh	4.5	3.3	0.7	0.7	0.9	0.9	17.3	0.2	23.9	5.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	5.4	1.7	0.6	3.2	3.3	7.9	4.6	22.5	1.1	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.5	44.1	38.1	48.9	37.7	37.8	58.8	12.8	45.7	54.0	17.3	0.0
LnGrp LOS	D	D	D	D	D	D	E	B	D	D	B	
Approach Vol, veh/h		760			347			1524			81	A
Approach Delay, s/veh		43.6			39.3			39.4			35.5	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	63.1	8.3	23.0	22.2	48.9	6.2	25.0
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	5.8	4.6	5.8
Max Green Setting (Gmax), s	5.1	58.1	5.0	21.0	22.2	41.0	5.0	21.0
Max Q Clear Time (g_c+I1), s	4.3	56.1	3.3	14.9	17.4	2.7	2.8	9.7
Green Ext Time (p_c), s	0.0	1.2	0.0	2.3	0.2	0.2	0.0	1.1

Intersection Summary	
HCM 6th Ctrl Delay	40.5
HCM 6th LOS	D

Notes

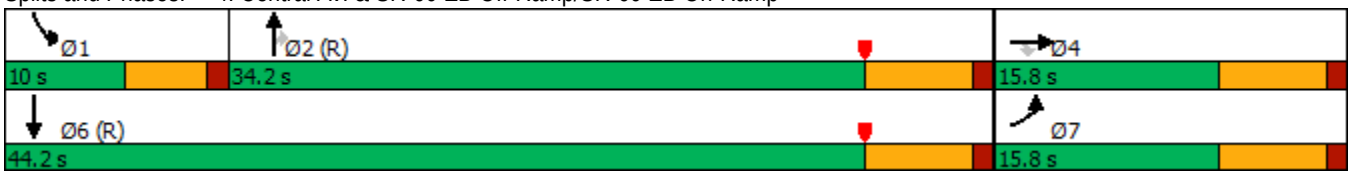
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	92	3	52	1332	204	174	274
Future Volume (vph)	92	3	52	1332	204	174	274
Turn Type	Prot	NA	Perm	NA	Perm	Prot	NA
Protected Phases	7	4		2		1	6
Permitted Phases			4		2		
Detector Phase	7	4	4	2	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	15.8	15.8	15.8	9.6	22.8
Total Split (s)	15.8	15.8	15.8	34.2	34.2	10.0	44.2
Total Split (%)	26.3%	26.3%	26.3%	57.0%	57.0%	16.7%	73.7%
Yellow Time (s)	4.8	4.8	4.8	4.8	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	4.6	5.8
Lead/Lag				Lag	Lag	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	None	C-Min

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 4: Central Av. & SR-60 EB Off-Ramp/SR-60 EB On-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	92	3	52	0	0	0	0	1332	204	174	274	0
Future Volume (veh/h)	92	3	52	0	0	0	0	1332	204	174	274	0
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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1841	1900	1811				0	1856	1841	1856	1900	0
Adj Flow Rate, veh/h	100	0	45				0	1448	144	189	298	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	4	0	6				0	3	4	3	0	0
Cap, veh/h	266	0	466				0	1750	775	280	2364	0
Arrive On Green	0.15	0.00	0.15				0.00	0.50	0.50	0.16	1.00	0.00
Sat Flow, veh/h	1753	0	3070				0	3618	1560	3428	3705	0
Grp Volume(v), veh/h	100	0	45				0	1448	144	189	298	0
Grp Sat Flow(s),veh/h/ln	1753	0	1535				0	1763	1560	1714	1805	0
Q Serve(g_s), s	3.1	0.0	0.8				0.0	21.1	3.1	3.1	0.0	0.0
Cycle Q Clear(g_c), s	3.1	0.0	0.8				0.0	21.1	3.1	3.1	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	266	0	466				0	1750	775	280	2364	0
V/C Ratio(X)	0.38	0.00	0.10				0.00	0.83	0.19	0.67	0.13	0.00
Avail Cap(c_a), veh/h	292	0	512				0	1750	775	309	2364	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.44	0.44	0.99	0.99	0.00
Uniform Delay (d), s/veh	22.9	0.0	21.9				0.0	12.9	8.4	24.3	0.0	0.0
Incr Delay (d2), s/veh	0.9	0.0	0.1				0.0	2.1	0.2	3.7	0.1	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	0.2				0.0	6.4	0.8	1.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.8	0.0	22.0				0.0	15.0	8.6	28.1	0.1	0.0
LnGrp LOS	C	A	C				A	B	A	C	A	A
Approach Vol, veh/h		145						1592			487	
Approach Delay, s/veh		23.2						14.4			11.0	
Approach LOS		C						B			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	9.5	35.6		14.9		45.1
Change Period (Y+Rc), s	4.6	5.8		5.8		5.8
Max Green Setting (Gmax), s	5.4	28.4		10.0		38.4
Max Q Clear Time (g_c+I1), s	5.1	23.1		5.1		2.0
Green Ext Time (p_c), s	0.0	4.0		0.2		1.8

Intersection Summary	
HCM 6th Ctrl Delay	14.2
HCM 6th LOS	B

Notes

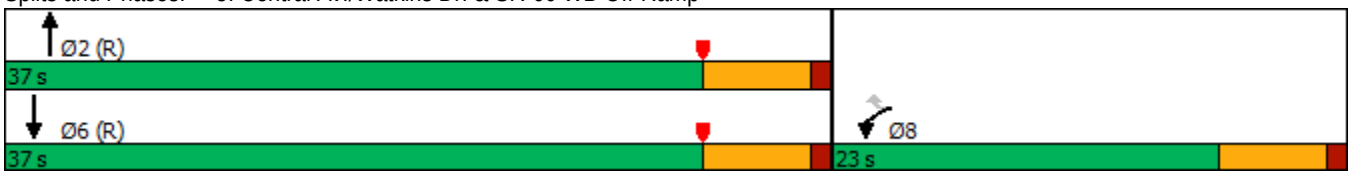
User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	117	394	1424	331
Future Volume (vph)	117	394	1424	331
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.8	15.8	15.8	22.8
Total Split (s)	23.0	23.0	37.0	37.0
Total Split (%)	38.3%	38.3%	61.7%	61.7%
Yellow Time (s)	4.8	4.8	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Min	C-Min

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 21.6 (36%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 5: Central Av./Watkins Dr. & SR-60 WB Off-Ramp



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	117	394	1424	0	0	331
Future Volume (veh/h)	117	394	1424	0	0	331
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1885	1885	1856	0	0	1870
Adj Flow Rate, veh/h	124	330	1515	0	0	352
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	3	0	0	2
Cap, veh/h	837	384	1997	0	0	2013
Arrive On Green	0.24	0.24	0.19	0.00	0.00	0.57
Sat Flow, veh/h	3483	1598	3711	0	0	3741
Grp Volume(v), veh/h	124	330	1515	0	0	352
Grp Sat Flow(s),veh/h/ln	1742	1598	1763	0	0	1777
Q Serve(g_s), s	1.7	11.9	24.4	0.0	0.0	2.9
Cycle Q Clear(g_c), s	1.7	11.9	24.4	0.0	0.0	2.9
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	837	384	1997	0	0	2013
V/C Ratio(X)	0.15	0.86	0.76	0.00	0.00	0.17
Avail Cap(c_a), veh/h	998	458	1997	0	0	2013
HCM Platoon Ratio	1.00	1.00	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.58	0.00	0.00	1.00
Uniform Delay (d), s/veh	18.0	21.8	20.5	0.0	0.0	6.3
Incr Delay (d2), s/veh	0.1	13.4	1.6	0.0	0.0	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	0.6	5.2	11.4	0.0	0.0	0.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	18.0	35.2	22.1	0.0	0.0	6.4
LnGrp LOS	B	D	C	A	A	A
Approach Vol, veh/h	454		1515			352
Approach Delay, s/veh	30.5		22.1			6.4
Approach LOS	C		C			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		39.8			39.8	20.2
Change Period (Y+Rc), s		5.8			5.8	5.8
Max Green Setting (Gmax), s		31.2			31.2	17.2
Max Q Clear Time (g_c+I1), s		26.4			4.9	13.9
Green Ext Time (p_c), s		3.6			2.1	0.6

Intersection Summary	
HCM 6th Ctrl Delay	21.4
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	766	1052	331	85
Future Vol, veh/h	0	0	766	1052	331	85
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	2	0
Mvmt Flow	0	0	842	1156	364	93

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2673	411	457	0	-	0
Stage 1	411	-	-	-	-	-
Stage 2	2262	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	18	645	1084	-	-	-
Stage 1	674	-	-	-	-	-
Stage 2	74	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	4	645	1084	-	-	-
Mov Cap-2 Maneuver	4	-	-	-	-	-
Stage 1	150	-	-	-	-	-
Stage 2	74	-	-	-	-	-

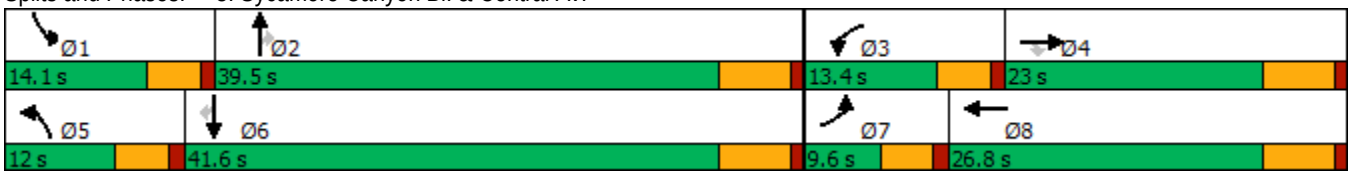
Approach	EB	NB	SB
HCM Control Delay, s	0	7.9	0
HCM LOS	A		

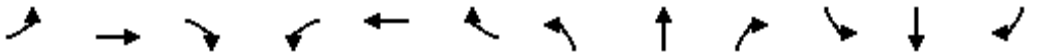
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1084	-	-	-	-
HCM Lane V/C Ratio	0.777	-	-	-	-
HCM Control Delay (s)	18.8	-	0	-	-
HCM Lane LOS	C	-	A	-	-
HCM 95th %tile Q(veh)	8.2	-	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	12	643	459	231	346	266	167	282	75	280	7
Future Volume (vph)	12	643	459	231	346	266	167	282	75	280	7
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases			4					2			6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	15.8	15.8	9.6	26.8	9.6	15.8	15.8	9.6	40.8	40.8
Total Split (s)	9.6	23.0	23.0	13.4	26.8	12.0	39.5	39.5	14.1	41.6	41.6
Total Split (%)	10.7%	25.6%	25.6%	14.9%	29.8%	13.3%	43.9%	43.9%	15.7%	46.2%	46.2%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	3.6	4.8	4.8	3.6	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	5.8	4.6	5.8	4.6	5.8	5.8	4.6	5.8	5.8
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min	Min

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 68.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Sycamore Canyon Bl. & Central Av.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	643	459	231	346	47	266	167	282	75	280	7
Future Volume (veh/h)	12	643	459	231	346	47	266	167	282	75	280	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1885	1870	1885	1885	1885	1870	1885	1856	1900	1885	1900
Adj Flow Rate, veh/h	13	684	347	246	368	35	283	178	205	80	298	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	8	1	2	1	1	1	2	1	3	0	1	0
Cap, veh/h	28	1359	419	355	1154	109	219	429	358	111	595	
Arrive On Green	0.02	0.26	0.26	0.10	0.35	0.35	0.12	0.23	0.23	0.06	0.17	0.00
Sat Flow, veh/h	1697	5147	1585	3483	3300	312	1781	1885	1572	1810	3582	1610
Grp Volume(v), veh/h	13	684	347	246	199	204	283	178	205	80	298	0
Grp Sat Flow(s),veh/h/ln	1697	1716	1585	1742	1791	1821	1781	1885	1572	1810	1791	1610
Q Serve(g_s), s	0.5	6.8	12.4	4.1	4.9	5.0	7.4	4.9	7.0	2.6	4.6	0.0
Cycle Q Clear(g_c), s	0.5	6.8	12.4	4.1	4.9	5.0	7.4	4.9	7.0	2.6	4.6	0.0
Prop In Lane	1.00		1.00	1.00		0.17	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	28	1359	419	355	626	637	219	429	358	111	595	
V/C Ratio(X)	0.47	0.50	0.83	0.69	0.32	0.32	1.29	0.41	0.57	0.72	0.50	
Avail Cap(c_a), veh/h	141	1469	453	509	626	637	219	1055	880	285	2129	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.4	18.8	20.9	26.1	14.3	14.3	26.4	19.8	20.7	27.8	22.9	0.0
Incr Delay (d2), s/veh	4.6	0.3	11.5	0.9	0.3	0.3	161.6	0.6	1.4	3.3	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.3	5.2	1.6	1.7	1.7	12.6	1.9	2.3	1.1	1.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.0	19.1	32.4	27.1	14.6	14.6	188.1	20.5	22.1	31.1	23.5	0.0
LnGrp LOS	C	B	C	C	B	B	F	C	C	C	C	
Approach Vol, veh/h		1044			649			666			378	A
Approach Delay, s/veh		23.7			19.3			92.2			25.1	
Approach LOS		C			B			F			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	19.5	10.7	21.7	12.0	15.8	5.6	26.9
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	5.8	4.6	5.8
Max Green Setting (Gmax), s	9.5	33.7	8.8	17.2	7.4	35.8	5.0	21.0
Max Q Clear Time (g_c+I1), s	4.6	9.0	6.1	14.4	9.4	6.6	2.5	7.0
Green Ext Time (p_c), s	0.0	1.5	0.1	1.5	0.0	1.8	0.0	1.8

Intersection Summary	
HCM 6th Ctrl Delay	39.5
HCM 6th LOS	D

Notes

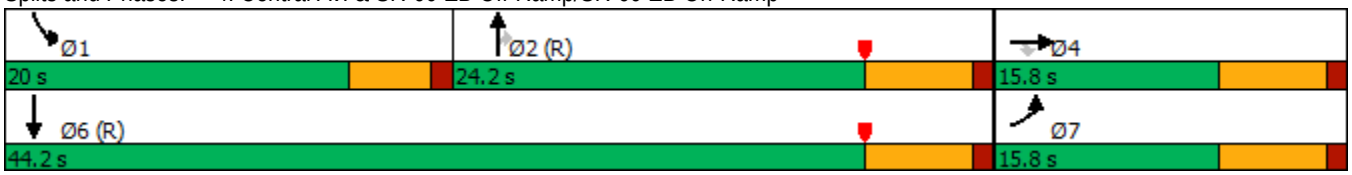
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

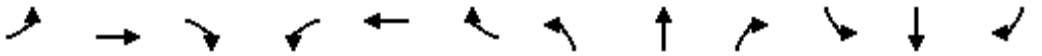
Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	9	3	52	415	585	670	572
Future Volume (vph)	9	3	52	415	585	670	572
Turn Type	Prot	NA	Perm	NA	Perm	Prot	NA
Protected Phases	7	4		2		1	6
Permitted Phases			4		2		
Detector Phase	7	4	4	2	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	15.8	15.8	15.8	9.6	22.8
Total Split (s)	15.8	15.8	15.8	24.2	24.2	20.0	44.2
Total Split (%)	26.3%	26.3%	26.3%	40.3%	40.3%	33.3%	73.7%
Yellow Time (s)	4.8	4.8	4.8	4.8	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	4.6	5.8
Lead/Lag				Lag	Lag	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	None	C-Min

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 4: Central Av. & SR-60 EB Off-Ramp/SR-60 EB On-Ramp





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	3	52	0	0	0	0	415	585	670	572	0
Future Volume (veh/h)	9	3	52	0	0	0	0	415	585	670	572	0
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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1841	1900	1811				0	1856	1841	1856	1900	0
Adj Flow Rate, veh/h	10	0	42				0	441	437	713	609	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	4	0	6				0	3	4	3	0	0
Cap, veh/h	169	0	297				0	1409	623	801	2563	0
Arrive On Green	0.10	0.00	0.10				0.00	0.40	0.40	0.39	1.00	0.00
Sat Flow, veh/h	1753	0	3070				0	3618	1560	3428	3705	0
Grp Volume(v), veh/h	10	0	42				0	441	437	713	609	0
Grp Sat Flow(s),veh/h/ln	1753	0	1535				0	1763	1560	1714	1805	0
Q Serve(g_s), s	0.3	0.0	0.8				0.0	5.1	14.0	11.7	0.0	0.0
Cycle Q Clear(g_c), s	0.3	0.0	0.8				0.0	5.1	14.0	11.7	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	169	0	297				0	1409	623	801	2563	0
V/C Ratio(X)	0.06	0.00	0.14				0.00	0.31	0.70	0.89	0.24	0.00
Avail Cap(c_a), veh/h	292	0	512				0	1409	623	880	2563	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.67	1.67	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.83	0.83	0.86	0.86	0.00
Uniform Delay (d), s/veh	24.6	0.0	24.8				0.0	12.4	15.0	17.6	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.2				0.0	0.5	5.4	8.7	0.2	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	0.1	0.0	0.3				0.0	1.7	4.8	4.1	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.8	0.0	25.0				0.0	12.8	20.4	26.2	0.2	0.0
LnGrp LOS	C	A	C				A	B	C	C	A	A
Approach Vol, veh/h		52						878			1322	
Approach Delay, s/veh		25.0						16.6			14.2	
Approach LOS		C						B			B	

Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	18.6	29.8		11.6		48.4						
Change Period (Y+Rc), s	4.6	5.8		5.8		5.8						
Max Green Setting (Gmax), s	15.4	18.4		10.0		38.4						
Max Q Clear Time (g_c+I1), s	13.7	16.0		2.8		2.0						
Green Ext Time (p_c), s	0.4	1.1		0.1		4.1						

Intersection Summary			
HCM 6th Ctrl Delay			15.4
HCM 6th LOS			B

Notes

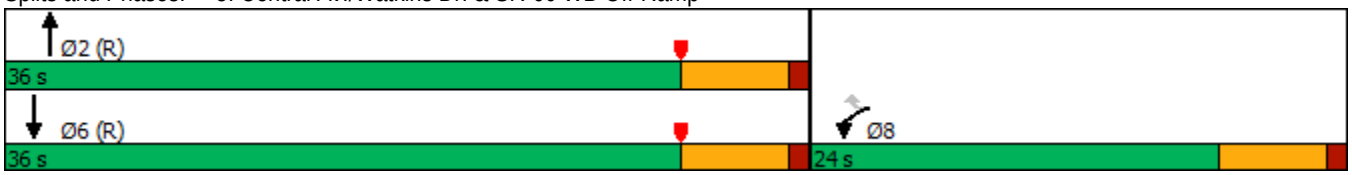
User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	270	331	422	972
Future Volume (vph)	270	331	422	972
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.8	15.8	15.8	22.8
Total Split (s)	24.0	24.0	36.0	36.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%
Yellow Time (s)	4.8	4.8	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Min	C-Min

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 21.6 (36%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 45
Control Type: Actuated-Coordinated

Splits and Phases: 5: Central Av./Watkins Dr. & SR-60 WB Off-Ramp



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	270	331	422	0	0	972
Future Volume (veh/h)	270	331	422	0	0	972
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1885	1870	1856	0	0	1885
Adj Flow Rate, veh/h	307	204	480	0	0	1105
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	1	2	3	0	0	1
Cap, veh/h	611	278	2225	0	0	2261
Arrive On Green	0.18	0.18	0.21	0.00	0.00	0.63
Sat Flow, veh/h	3483	1585	3711	0	0	3770
Grp Volume(v), veh/h	307	204	480	0	0	1105
Grp Sat Flow(s),veh/h/ln	1742	1585	1763	0	0	1791
Q Serve(g_s), s	4.8	7.3	6.8	0.0	0.0	9.9
Cycle Q Clear(g_c), s	4.8	7.3	6.8	0.0	0.0	9.9
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	611	278	2225	0	0	2261
V/C Ratio(X)	0.50	0.73	0.22	0.00	0.00	0.49
Avail Cap(c_a), veh/h	1057	481	2225	0	0	2261
HCM Platoon Ratio	1.00	1.00	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.97	0.00	0.00	1.00
Uniform Delay (d), s/veh	22.4	23.4	11.4	0.0	0.0	5.9
Incr Delay (d2), s/veh	0.6	3.7	0.2	0.0	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	2.7	2.0	0.0	0.0	2.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	23.0	27.1	11.7	0.0	0.0	6.7
LnGrp LOS	C	C	B	A	A	A
Approach Vol, veh/h	511		480			1105
Approach Delay, s/veh	24.7		11.7			6.7
Approach LOS	C		B			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		43.7			43.7	16.3
Change Period (Y+Rc), s		5.8			5.8	5.8
Max Green Setting (Gmax), s		30.2			30.2	18.2
Max Q Clear Time (g_c+I1), s		8.8			11.9	9.3
Green Ext Time (p_c), s		2.8			7.1	1.2

Intersection Summary	
HCM 6th Ctrl Delay	12.2
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	219	534	972	11
Future Vol, veh/h	0	0	219	534	972	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	1	9
Mvmt Flow	0	0	241	587	1068	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1850	1074	1080	0	-	0
Stage 1	1074	-	-	-	-	-
Stage 2	776	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	86	270	629	-	-	-
Stage 1	331	-	-	-	-	-
Stage 2	566	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	53	270	629	-	-	-
Mov Cap-2 Maneuver	53	-	-	-	-	-
Stage 1	204	-	-	-	-	-
Stage 2	566	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	4.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	629	-	-	-	-
HCM Lane V/C Ratio	0.383	-	-	-	-
HCM Control Delay (s)	14.2	-	0	-	-
HCM Lane LOS	B	-	A	-	-
HCM 95th %tile Q(veh)	1.8	-	-	-	-

APPENDIX 3.3:

EXISTING (2019) CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS

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Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	14	666	82	47	303	272	401	946	40	41	6
v/c Ratio	0.15	0.72	0.20	0.26	0.42	0.82	0.36	0.93	0.44	0.03	0.01
Control Delay	54.3	43.9	1.1	53.5	36.6	60.6	14.1	33.5	65.9	21.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.3	43.9	1.1	53.5	36.6	60.6	14.1	33.5	65.9	21.3	0.0
Queue Length 50th (ft)	10	161	0	17	85	182	160	~561	28	9	0
Queue Length 95th (ft)	31	206	0	37	141	#305	235	#869	#73	21	0
Internal Link Dist (ft)		1568			344		831			521	
Turn Bay Length (ft)	570		200	100		250		115	250		
Base Capacity (vph)	92	1076	452	178	809	396	1112	1016	91	1469	674
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.62	0.18	0.26	0.37	0.69	0.36	0.93	0.44	0.03	0.01

Intersection Summary

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

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

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	100	30	30	1448	222	189	298
v/c Ratio	0.35	0.11	0.08	0.79	0.24	0.62	0.12
Control Delay	26.0	11.3	0.5	17.5	2.3	36.2	3.2
Queue Delay	0.0	0.0	0.0	29.0	0.0	0.0	0.0
Total Delay	26.0	11.3	0.5	46.5	2.3	36.2	3.2
Queue Length 50th (ft)	32	1	0	231	0	36	13
Queue Length 95th (ft)	71	21	0	#373	29	#72	26
Internal Link Dist (ft)		1038		344			253
Turn Bay Length (ft)	400		115			150	
Base Capacity (vph)	289	269	353	1844	922	306	2570
Starvation Cap Reductn	0	0	0	54	0	0	0
Spillback Cap Reductn	2	0	0	469	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.11	0.08	1.05	0.24	0.62	0.12

Intersection Summary

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

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	124	419	1515	352
v/c Ratio	0.13	0.91	0.82	0.19
Control Delay	16.3	47.3	16.5	7.9
Queue Delay	0.0	0.0	42.1	0.0
Total Delay	16.3	47.3	58.7	7.9
Queue Length 50th (ft)	17	137	311	32
Queue Length 95th (ft)	34	#290	385	52
Internal Link Dist (ft)	1138		253	437
Turn Bay Length (ft)		300		
Base Capacity (vph)	993	473	1849	1867
Starvation Cap Reductn	0	0	455	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.12	0.89	1.09	0.19

Intersection Summary

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

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	766	1052	331	85
Future Vol, veh/h	0	0	766	1052	331	85
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	2	0
Mvmt Flow	0	0	842	1156	364	93

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2673	411	457	0	-	0
Stage 1	411	-	-	-	-	-
Stage 2	2262	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	18	645	1084	-	-	-
Stage 1	674	-	-	-	-	-
Stage 2	74	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	4	645	1084	-	-	-
Mov Cap-2 Maneuver	4	-	-	-	-	-
Stage 1	150	-	-	-	-	-
Stage 2	74	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	7.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1084	-	-	-	-
HCM Lane V/C Ratio	0.777	-	-	-	-
HCM Control Delay (s)	18.8	-	0	-	-
HCM Lane LOS	C	-	A	-	-
HCM 95th %tile Q(veh)	8.2	-	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	13	684	488	246	418	283	178	300	80	298	7
v/c Ratio	0.10	0.57	0.66	0.58	0.30	1.45	0.36	0.48	0.42	0.37	0.01
Control Delay	37.1	26.8	8.2	37.2	16.9	259.2	24.5	6.0	38.6	23.2	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	26.8	8.2	37.2	16.9	259.2	24.5	6.0	38.6	23.2	0.0
Queue Length 50th (ft)	5	85	2	48	48	~157	66	3	30	57	0
Queue Length 95th (ft)	26	173	94	#120	150	#402	117	55	87	86	0
Internal Link Dist (ft)		1568			344		831			521	
Turn Bay Length (ft)	570		200	100		250		115	250		
Base Capacity (vph)	124	1318	764	455	1414	195	945	933	255	1908	918
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.52	0.64	0.54	0.30	1.45	0.19	0.32	0.31	0.16	0.01

Intersection Summary

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

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

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	10	29	29	441	622	713	609
v/c Ratio	0.03	0.11	0.08	0.30	0.69	0.85	0.22
Control Delay	21.4	11.5	0.4	14.5	11.3	33.9	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.4	11.5	0.4	14.5	11.3	33.9	4.5
Queue Length 50th (ft)	3	1	0	65	53	150	28
Queue Length 95th (ft)	14	21	0	101	#232	#198	115
Internal Link Dist (ft)		1038		344			253
Turn Bay Length (ft)	400		115			150	
Base Capacity (vph)	289	268	353	1478	906	872	2830
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.11	0.08	0.30	0.69	0.82	0.22

Intersection Summary

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

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	307	376	480	1105
v/c Ratio	0.43	0.65	0.23	0.51
Control Delay	22.2	10.3	2.8	8.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	22.2	10.3	2.8	8.6
Queue Length 50th (ft)	52	19	2	95
Queue Length 95th (ft)	69	68	3	188
Internal Link Dist (ft)	1138		253	437
Turn Bay Length (ft)		300		
Base Capacity (vph)	1051	701	2110	2151
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.29	0.54	0.23	0.51

Intersection Summary

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	219	534	972	11
Future Vol, veh/h	0	0	219	534	972	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	1	9
Mvmt Flow	0	0	241	587	1068	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1850	1074	1080	0	-	0
Stage 1	1074	-	-	-	-	-
Stage 2	776	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	86	270	629	-	-	-
Stage 1	331	-	-	-	-	-
Stage 2	566	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	53	270	629	-	-	-
Mov Cap-2 Maneuver	53	-	-	-	-	-
Stage 1	204	-	-	-	-	-
Stage 2	566	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	4.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	629	-	-	-	-
HCM Lane V/C Ratio	0.383	-	-	-	-
HCM Control Delay (s)	14.2	-	0	-	-
HCM Lane LOS	B	-	A	-	-
HCM 95th %tile Q(veh)	1.8	-	-	-	-

APPENDIX 4.1:

POST PROCESSING WORKSHEETS

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Project:	Crestview Apartments	Job #:	12061
Scenario:	Horizon Year With Project	Analyst:	LCC
		Date:	6/18/19

LOCATION: Sycamore Canyon Boulevard / Central Avenue
FORECAST YEAR: 2040

INDIVIDUAL TURN VOLUME GROWTH REVIEW

		AM PEAK HOUR INPUT DATA				PM PEAK HOUR INPUT DATA			
APPROACH	TURNING MOVEMENT	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE
NORTH BOUND	Left	253	623	370	146%	266	412	146	55%
	Through	373	153	-220	-59%	167	79	-88	-53%
	Right	880	826	-54	-6%	282	280	-2	-1%
	NB Total	1,506	1,602	96	6%	715	771	56	8%
SOUTH BOUND	Left	37	26	-11	-30%	75	25	-50	-67%
	Through	38	39	1	3%	280	112	-168	-60%
	Right	6	11	5	83%	7	4	-3	-43%
	SB Total	81	76	-5	-6%	362	141	-221	-61%
EAST BOUND	Left	13	10	-3	-23%	12	7	-5	-42%
	Through	619	1,138	519	84%	643	748	105	16%
	Right	76	200	124	163%	459	645	186	41%
	EB Total	708	1,348	640	90%	1,114	1,400	286	26%
WEST BOUND	Left	44	31	-13	-30%	231	242	11	5%
	Through	253	325	72	28%	346	468	122	35%
	Right	29	6	-23	-79%	47	19	-28	-60%
	WB Total	326	362	36	11%	624	729	105	17%
TOTAL ENTERING VOLUME		2,621	3,388	767	29%	2,815	3,041	226	8%

FORECAST PEAK HOUR TO ADT COMPARISON

		VOLUMES		PERCENT OF ADT		
		AM	PM	AM	PM	ADT
North Leg	Inbound	76	141			
North Leg	Outbound	169	105			
North Leg	**TOTAL**	**245**	**246**	**18%**	**18%**	**1,382**
South Leg	Inbound	1,602	771			
South Leg	Outbound	270	999			
South Leg	**TOTAL**	**1,872**	**1,770**	**11%**	**11%**	**16,556**
East Leg	Inbound	362	729			
East Leg	Outbound	1,990	1,053			
East Leg	**TOTAL**	**2,352**	**1,782**	**7%**	**5%**	**33,780**
West Leg	Inbound	1,348	1,400			
West Leg	Outbound	959	884			
West Leg	**TOTAL**	**2,307**	**2,284**	**7%**	**7%**	**32,974**
OVERALL TOTAL		***6,776***	***6,082***	***8%***	***7%***	***84,692***

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Project:	Crestview Apartments	Job #:	12061
Scenario:	Horizon Year With Project	Analyst:	LCC
		Date:	6/18/19

LOCATION: Central Avenue / SR-60 EB Ramps
FORECAST YEAR: 2040

INDIVIDUAL TURN VOLUME GROWTH REVIEW

		AM PEAK HOUR INPUT DATA				PM PEAK HOUR INPUT DATA			
APPROACH	TURNING MOVEMENT	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE
NORTH BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	1,332	1,584	252	19%	415	551	136	33%
	Right	204	423	219	107%	585	450	-135	-23%
	NB Total	1,536	2,007	471	31%	1,000	1,001	1	0%
SOUTH BOUND	Left	174	192	18	10%	670	851	181	27%
	Through	274	270	-4	-1%	572	708	136	24%
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	SB Total	448	462	14	3%	1,242	1,559	317	26%
EAST BOUND	Left	92	88	-4	-4%	9	18	9	100%
	Through	3	5	2	67%	3	3	0	0%
	Right	52	77	25	48%	52	59	7	13%
	EB Total	147	170	23	16%	64	80	16	25%
WEST BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	WB Total	0	0	0	#DIV/0!	0	0	0	#DIV/0!
TOTAL ENTERING VOLUME		2,131	2,639	508	24%	2,306	2,640	334	14%

FORECAST PEAK HOUR TO ADT COMPARISON

		VOLUMES		PERCENT OF ADT		
		AM	PM	AM	PM	ADT
North Leg	Inbound	462	1,559			
North Leg	Outbound	1,672	569			
North Leg	**TOTAL**	**2,134**	**2,128**	**8%**	**8%**	**26,076**
South Leg	Inbound	2,007	1,001			
South Leg	Outbound	347	767			
South Leg	**TOTAL**	**2,354**	**1,768**	**7%**	**5%**	**33,926**
East Leg	Inbound	0	0			
East Leg	Outbound	620	1,304			
East Leg	**TOTAL**	**620**	**1,304**	**3%**	**6%**	**21,501**
West Leg	Inbound	170	80			
West Leg	Outbound	0	0			
West Leg	**TOTAL**	**170**	**80**	**9%**	**4%**	**1,801**
OVERALL TOTAL		***5,278***	***5,280***	***6%***	***6%***	***83,304***

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Project:	Crestview Apartments	Job #:	12061
Scenario:	Horizon Year With Project	Analyst:	LCC
		Date:	6/18/19

LOCATION: Central Avenue / SR-60 WB Off-Ramp
FORECAST YEAR: 2040

INDIVIDUAL TURN VOLUME GROWTH REVIEW

		AM PEAK HOUR INPUT DATA				PM PEAK HOUR INPUT DATA			
APPROACH	TURNING MOVEMENT	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE
NORTH BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	1,424	1,599	175	12%	422	554	132	31%
	Right	0	0	0	#DIV/0!	2	0	-2	-100%
	NB Total	1,424	1,599	175	12%	424	554	130	31%
SOUTH BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	331	390	59	18%	972	1,365	393	40%
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	SB Total	331	390	59	18%	972	1,365	393	40%
EAST BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	EB Total	0	0	0	#DIV/0!	0	0	0	#DIV/0!
WEST BOUND	Left	117	81	-36	-31%	270	240	-30	-11%
	Through	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Right	394	429	35	9%	331	362	31	9%
	WB Total	511	510	-1	0%	601	602	1	0%
TOTAL ENTERING VOLUME		2,266	2,499	233	10%	1,997	2,521	524	26%

FORECAST PEAK HOUR TO ADT COMPARISON

		VOLUMES		PERCENT OF ADT		
		AM	PM	AM	PM	ADT
North Leg	Inbound	390	1,365			
North Leg	Outbound	2,028	916			
North Leg	**TOTAL**	**2,418**	**2,281**	**12%**	**12%**	**19,529**
South Leg	Inbound	1,599	554			
South Leg	Outbound	471	1,605			
South Leg	**TOTAL**	**2,070**	**2,159**	**8%**	**8%**	**26,076**
East Leg	Inbound	510	602			
East Leg	Outbound	0	0			
East Leg	**TOTAL**	**510**	**602**	**4%**	**5%**	**12,057**
West Leg	Inbound	0	0			
West Leg	Outbound	0	0			
West Leg	**TOTAL**	**0**	**0**	**#DIV/0!**	**#DIV/0!**	**-**
OVERALL TOTAL		***4,998***	***5,042***	**9%**	***9%***	***57,662***

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Project:	Crestview Apartments	Job #:	12061
Scenario:	Horizon Year With Project	Analyst:	LCC
		Date:	6/18/19

LOCATION: Watkins Drive/Central Avenue / SR-60 EB On-Ramp
FORECAST YEAR: 2040

INDIVIDUAL TURN VOLUME GROWTH REVIEW

		AM PEAK HOUR INPUT DATA				PM PEAK HOUR INPUT DATA			
APPROACH	TURNING MOVEMENT	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE
NORTH BOUND	Left	766	784	18	2%	219	225	6	3%
	Through	1,052	1,195	143	14%	534	680	146	27%
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	NB Total	1,818	1,979	161	9%	753	905	152	20%
SOUTH BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	331	402	71	21%	972	1,370	398	41%
	Right	85	90	5	6%	11	15	4	36%
	SB Total	416	492	76	18%	983	1,385	402	41%
EAST BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	EB Total	0	0	0	#DIV/0!	0	0	0	#DIV/0!
WEST BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	WB Total	0	0	0	#DIV/0!	0	0	0	#DIV/0!
TOTAL ENTERING VOLUME		2,234	2,471	237	11%	1,736	2,290	554	32%

FORECAST PEAK HOUR TO ADT COMPARISON

		VOLUMES		PERCENT OF ADT		
		AM	PM	AM	PM	ADT
North Leg	Inbound	492	1,385			
North Leg	Outbound	1,195	680			
North Leg	**TOTAL**	**1,687**	**2,065**	**9%**	**11%**	**19,313**
South Leg	Inbound	1,979	905			
South Leg	Outbound	402	1,370			
South Leg	**TOTAL**	**2,381**	**2,275**	**12%**	**12%**	**19,529**
East Leg	Inbound	0	0			
East Leg	Outbound	0	0			
East Leg	**TOTAL**	**0**	**0**	**#DIV/0!**	**#DIV/0!**	**-**
West Leg	Inbound	0	0			
West Leg	Outbound	874	240			
West Leg	**TOTAL**	**874**	**240**	**161%**	**44%**	**542**
OVERALL TOTAL		***4,942***	***4,580***	**13%**	***12%***	***39,384***

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APPENDIX 5.1:

E+P CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	82	0	0	415	3	10
Future Vol, veh/h	82	0	0	415	3	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	89	0	0	451	3	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	540	89
Stage 1	-	-	-	-	89	-
Stage 2	-	-	-	-	451	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	-	0	0	-	503	969
Stage 1	-	0	0	-	934	-
Stage 2	-	0	0	-	642	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	503	969
Mov Cap-2 Maneuver	-	-	-	-	555	-
Stage 1	-	-	-	-	934	-
Stage 2	-	-	-	-	642	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	827	-	-
HCM Lane V/C Ratio	0.017	-	-
HCM Control Delay (s)	9.4	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	54	0	0	0	21	415	0	0	91	1
Future Vol, veh/h	0	0	54	0	0	0	21	415	0	0	91	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	59	0	0	0	23	451	0	0	99	1

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	597	597	50	100	0	-	-	-	0
Stage 1	100	100	-	-	-	-	-	-	-
Stage 2	497	497	-	-	-	-	-	-	-
Critical Hdwy	6.63	6.53	6.93	4.13	-	-	-	-	-
Critical Hdwy Stg 1	5.83	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.43	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	2.219	-	-	-	-	-
Pot Cap-1 Maneuver	450	416	1008	1492	-	0	0	-	-
Stage 1	913	812	-	-	-	0	0	-	-
Stage 2	610	544	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	443	0	1008	1492	-	-	-	-	-
Mov Cap-2 Maneuver	516	0	-	-	-	-	-	-	-
Stage 1	899	0	-	-	-	-	-	-	-
Stage 2	610	0	-	-	-	-	-	-	-

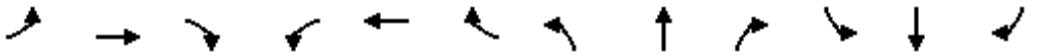
Approach	EB	NB	SB
HCM Control Delay, s	8.8	0.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1492	-	1008	-	-
HCM Lane V/C Ratio	0.015	-	0.058	-	-
HCM Control Delay (s)	7.5	-	8.8	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	17	619	76	44	253	253	376	880	78	48	20
Future Volume (vph)	17	619	76	44	253	253	376	880	78	48	20
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases			4					2			6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	15.8	15.8	9.6	26.8	9.6	15.8	15.8	9.6	40.8	40.8
Total Split (s)	9.6	26.8	26.8	9.6	26.8	29.0	63.9	63.9	9.7	44.6	44.6
Total Split (%)	8.7%	24.4%	24.4%	8.7%	24.4%	26.4%	58.1%	58.1%	8.8%	40.5%	40.5%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	3.6	4.8	4.8	3.6	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	5.8	4.6	5.8	4.6	5.8	5.8	4.6	5.8	5.8
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	5.0	18.9	18.9	5.0	22.6	19.9	58.4	58.4	5.1	43.5	43.5
Actuated g/C Ratio	0.05	0.18	0.18	0.05	0.21	0.19	0.55	0.55	0.05	0.41	0.41
v/c Ratio	0.21	0.74	0.20	0.28	0.42	0.83	0.39	1.00	1.00	0.04	0.03
Control Delay	56.6	47.2	1.1	55.2	36.8	62.4	16.0	51.4	151.1	22.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.6	47.2	1.1	55.2	36.8	62.4	16.0	51.4	151.1	22.6	0.1
LOS	E	D	A	E	D	E	B	D	F	C	A
Approach Delay		42.5			39.1		44.4			87.8	
Approach LOS		D			D		D			F	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 106.1	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 45.6	Intersection LOS: D
Intersection Capacity Utilization 84.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Sycamore Canyon Bl. & Central Av.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	619	76	44	253	42	253	376	880	78	48	20
Future Volume (veh/h)	17	619	76	44	253	42	253	376	880	78	48	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1856	1796	1900	1870	1870	1856	1885	1841	1856	1856	1648
Adj Flow Rate, veh/h	18	666	80	47	272	42	272	404	851	84	52	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	3	7	0	2	2	3	1	4	3	3	17
Cap, veh/h	35	840	252	125	562	86	303	1041	862	86	1513	
Arrive On Green	0.02	0.17	0.17	0.04	0.18	0.18	0.17	0.55	0.55	0.05	0.43	0.00
Sat Flow, veh/h	1810	5066	1522	3510	3091	472	1767	1885	1560	1767	3526	1397
Grp Volume(v), veh/h	18	666	80	47	155	159	272	404	851	84	52	0
Grp Sat Flow(s),veh/h/ln	1810	1689	1522	1755	1777	1785	1767	1885	1560	1767	1763	1397
Q Serve(g_s), s	1.0	13.3	4.9	1.4	8.2	8.4	15.8	12.8	56.5	5.0	0.9	0.0
Cycle Q Clear(g_c), s	1.0	13.3	4.9	1.4	8.2	8.4	15.8	12.8	56.5	5.0	0.9	0.0
Prop In Lane	1.00		1.00	1.00		0.26	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	35	840	252	125	323	325	303	1041	862	86	1513	
V/C Ratio(X)	0.51	0.79	0.32	0.38	0.48	0.49	0.90	0.39	0.99	0.98	0.03	
Avail Cap(c_a), veh/h	86	1012	304	167	355	357	410	1041	862	86	1513	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	51.1	42.1	38.6	49.6	38.6	38.6	42.6	13.4	23.2	50.0	17.4	0.0
Incr Delay (d2), s/veh	4.2	3.7	0.7	0.7	1.1	1.1	14.8	0.2	27.5	90.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	5.6	1.8	0.6	3.6	3.7	7.9	5.0	24.4	4.3	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.3	45.8	39.3	50.3	39.7	39.8	57.5	13.6	50.7	140.1	17.4	0.0
LnGrp LOS	E	D	D	D	D	D	E	B	D	F	B	
Approach Vol, veh/h		764			361			1527			136	A
Approach Delay, s/veh		45.4			41.1			42.1			93.2	
Approach LOS		D			D			D			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.7	63.9	8.3	23.2	22.7	50.9	6.6	24.9
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	5.8	4.6	5.8
Max Green Setting (Gmax), s	5.1	58.1	5.0	21.0	24.4	38.8	5.0	21.0
Max Q Clear Time (g_c+I1), s	7.0	58.5	3.4	15.3	17.8	2.9	3.0	10.4
Green Ext Time (p_c), s	0.0	0.0	0.0	2.2	0.2	0.2	0.0	1.1

Intersection Summary	
HCM 6th Ctrl Delay	45.3
HCM 6th LOS	D

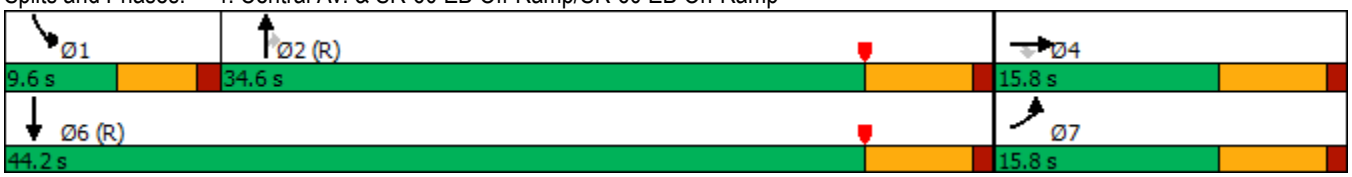
Notes

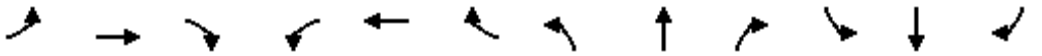
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	92	3	58	1356	221	174	282
Future Volume (vph)	92	3	58	1356	221	174	282
Turn Type	Prot	NA	Perm	NA	Perm	Prot	NA
Protected Phases	7	4		2		1	6
Permitted Phases			4		2		
Detector Phase	7	4	4	2	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	15.8	15.8	15.8	9.6	22.8
Total Split (s)	15.8	15.8	15.8	34.6	34.6	9.6	44.2
Total Split (%)	26.3%	26.3%	26.3%	57.7%	57.7%	16.0%	73.7%
Yellow Time (s)	4.8	4.8	4.8	4.8	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	4.6	5.8
Lead/Lag				Lag	Lag	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	10.0	10.0	10.0	31.9	31.9	5.1	42.7
Actuated g/C Ratio	0.17	0.17	0.17	0.53	0.53	0.08	0.71
v/c Ratio	0.35	0.12	0.09	0.79	0.26	0.65	0.12
Control Delay	26.0	11.1	0.5	17.4	2.3	39.1	3.2
Queue Delay	0.0	0.0	0.0	38.3	0.0	0.0	0.0
Total Delay	26.0	11.1	0.5	55.7	2.3	39.1	3.2
LOS	C	B	A	E	A	D	A
Approach Delay		18.0		48.2			16.9
Approach LOS		B		D			B

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 39.6	Intersection LOS: D
Intersection Capacity Utilization 74.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: Central Av. & SR-60 EB Off-Ramp/SR-60 EB On-Ramp





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	92	3	58	0	0	0	0	1356	221	174	282	0
Future Volume (veh/h)	92	3	58	0	0	0	0	1356	221	174	282	0
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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1841	1900	1811				0	1856	1841	1856	1900	0
Adj Flow Rate, veh/h	100	0	51				0	1474	162	189	307	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	4	0	6				0	3	4	3	0	0
Cap, veh/h	269	0	470				0	1746	773	280	2359	0
Arrive On Green	0.15	0.00	0.15				0.00	0.50	0.50	0.16	1.00	0.00
Sat Flow, veh/h	1753	0	3070				0	3618	1560	3428	3705	0
Grp Volume(v), veh/h	100	0	51				0	1474	162	189	307	0
Grp Sat Flow(s),veh/h/ln	1753	0	1535				0	1763	1560	1714	1805	0
Q Serve(g_s), s	3.1	0.0	0.9				0.0	21.8	3.5	3.1	0.0	0.0
Cycle Q Clear(g_c), s	3.1	0.0	0.9				0.0	21.8	3.5	3.1	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	269	0	470				0	1746	773	280	2359	0
V/C Ratio(X)	0.37	0.00	0.11				0.00	0.84	0.21	0.68	0.13	0.00
Avail Cap(c_a), veh/h	292	0	512				0	1746	773	286	2359	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.31	0.31	0.99	0.99	0.00
Uniform Delay (d), s/veh	22.8	0.0	21.9				0.0	13.1	8.5	24.4	0.0	0.0
Incr Delay (d2), s/veh	0.9	0.0	0.1				0.0	1.7	0.2	4.9	0.1	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	0.3				0.0	6.6	0.9	1.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.7	0.0	22.0				0.0	14.8	8.7	29.2	0.1	0.0
LnGrp LOS	C	A	C				A	B	A	C	A	A
Approach Vol, veh/h		151						1636			496	
Approach Delay, s/veh		23.1						14.2			11.2	
Approach LOS		C						B			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	9.5	35.5		15.0		45.0
Change Period (Y+Rc), s	4.6	5.8		5.8		5.8
Max Green Setting (Gmax), s	5.0	28.8		10.0		38.4
Max Q Clear Time (g_c+I1), s	5.1	23.8		5.1		2.0
Green Ext Time (p_c), s	0.0	3.8		0.2		1.9

Intersection Summary		
HCM 6th Ctrl Delay		14.2
HCM 6th LOS		B

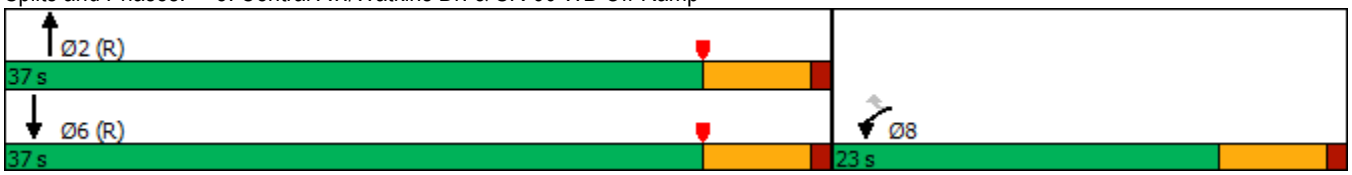
Notes

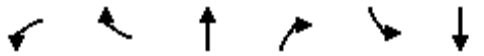
User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	123	394	1448	333
Future Volume (vph)	123	394	1448	333
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.8	15.8	15.8	22.8
Total Split (s)	23.0	23.0	37.0	37.0
Total Split (%)	38.3%	38.3%	61.7%	61.7%
Yellow Time (s)	4.8	4.8	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Min	C-Min
Act Effct Green (s)	16.8	16.8	31.6	31.6
Actuated g/C Ratio	0.28	0.28	0.53	0.53
v/c Ratio	0.14	0.91	0.83	0.19
Control Delay	16.4	47.8	17.0	7.9
Queue Delay	0.0	0.0	47.5	0.0
Total Delay	16.4	47.8	64.4	7.9
LOS	B	D	E	A
Approach Delay	40.3		64.4	7.9
Approach LOS	D		E	A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 21.6 (36%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 50.8	Intersection LOS: D
Intersection Capacity Utilization 74.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 5: Central Av./Watkins Dr. & SR-60 WB Off-Ramp





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	123	394	1448	0	0	333
Future Volume (veh/h)	123	394	1448	0	0	333
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1885	1885	1856	0	0	1870
Adj Flow Rate, veh/h	131	330	1540	0	0	354
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	3	0	0	2
Cap, veh/h	837	384	1997	0	0	2012
Arrive On Green	0.24	0.24	0.19	0.00	0.00	0.57
Sat Flow, veh/h	3483	1598	3711	0	0	3741
Grp Volume(v), veh/h	131	330	1540	0	0	354
Grp Sat Flow(s),veh/h/ln	1742	1598	1763	0	0	1777
Q Serve(g_s), s	1.8	11.9	24.9	0.0	0.0	2.9
Cycle Q Clear(g_c), s	1.8	11.9	24.9	0.0	0.0	2.9
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	837	384	1997	0	0	2012
V/C Ratio(X)	0.16	0.86	0.77	0.00	0.00	0.18
Avail Cap(c_a), veh/h	998	458	1997	0	0	2012
HCM Platoon Ratio	1.00	1.00	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.56	0.00	0.00	1.00
Uniform Delay (d), s/veh	18.0	21.8	20.7	0.0	0.0	6.3
Incr Delay (d2), s/veh	0.1	13.3	1.7	0.0	0.0	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	0.6	5.2	11.6	0.0	0.0	0.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	18.1	35.1	22.4	0.0	0.0	6.5
LnGrp LOS	B	D	C	A	A	A
Approach Vol, veh/h	461		1540			354
Approach Delay, s/veh	30.3		22.4			6.5
Approach LOS	C		C			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		39.8			39.8	20.2
Change Period (Y+Rc), s		5.8			5.8	5.8
Max Green Setting (Gmax), s		31.2			31.2	17.2
Max Q Clear Time (g_c+I1), s		26.9			4.9	13.9
Green Ext Time (p_c), s		3.3			2.1	0.6

Intersection Summary	
HCM 6th Ctrl Delay	21.5
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	783	1059	333	85
Future Vol, veh/h	0	0	783	1059	333	85
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	2	0
Mvmt Flow	0	0	860	1164	366	93

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2715	413	459	0	-	0
Stage 1	413	-	-	-	-	-
Stage 2	2302	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	17	643	1082	-	-	-
Stage 1	672	-	-	-	-	-
Stage 2	68	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	3	643	1082	-	-	-
Mov Cap-2 Maneuver	3	-	-	-	-	-
Stage 1	138	-	-	-	-	-
Stage 2	68	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	8.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1082	-	-	-	-
HCM Lane V/C Ratio	0.795	-	-	-	-
HCM Control Delay (s)	19.8	-	0	-	-
HCM Lane LOS	C	-	A	-	-
HCM 95th %tile Q(veh)	8.8	-	-	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	365	0	0	226	2	6
Future Vol, veh/h	365	0	0	226	2	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	397	0	0	246	2	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	643	397
Stage 1	-	-	-	-	397	-
Stage 2	-	-	-	-	246	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	-	0	0	-	438	652
Stage 1	-	0	0	-	679	-
Stage 2	-	0	0	-	795	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	438	652
Mov Cap-2 Maneuver	-	-	-	-	531	-
Stage 1	-	-	-	-	679	-
Stage 2	-	-	-	-	795	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	617	-	-
HCM Lane V/C Ratio	0.014	-	-
HCM Control Delay (s)	10.9	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	34	0	0	0	65	226	0	0	368	3
Future Vol, veh/h	0	0	34	0	0	0	65	226	0	0	368	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	37	0	0	0	71	246	0	0	400	3

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	790	790	202	403	0	-	-	-	0
Stage 1	402	402	-	-	-	-	-	-	-
Stage 2	388	388	-	-	-	-	-	-	-
Critical Hdwy	6.63	6.53	6.93	4.13	-	-	-	-	-
Critical Hdwy Stg 1	5.83	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.43	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	2.219	-	-	-	-	-
Pot Cap-1 Maneuver	343	322	806	1154	-	0	0	-	-
Stage 1	645	600	-	-	-	0	0	-	-
Stage 2	685	608	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	322	0	806	1154	-	-	-	-	-
Mov Cap-2 Maneuver	439	0	-	-	-	-	-	-	-
Stage 1	605	0	-	-	-	-	-	-	-
Stage 2	685	0	-	-	-	-	-	-	-

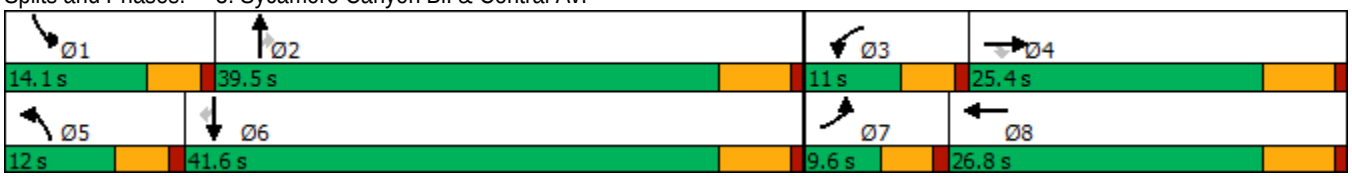
Approach	EB	NB	SB
HCM Control Delay, s	9.7	1.9	0
HCM LOS	A		

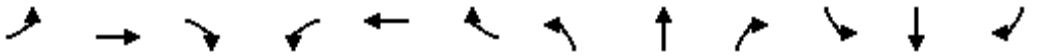
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1154	-	806	-	-
HCM Lane V/C Ratio	0.061	-	0.046	-	-
HCM Control Delay (s)	8.3	-	9.7	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.2	-	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	26	643	459	231	346	266	177	282	101	286	16
Future Volume (vph)	26	643	459	231	346	266	177	282	101	286	16
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases			4					2			6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	15.8	15.8	9.6	26.8	9.6	15.8	15.8	9.6	40.8	40.8
Total Split (s)	9.6	25.4	25.4	11.0	26.8	12.0	39.5	39.5	14.1	41.6	41.6
Total Split (%)	10.7%	28.2%	28.2%	12.2%	29.8%	13.3%	43.9%	43.9%	15.7%	46.2%	46.2%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	3.6	4.8	4.8	3.6	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	5.8	4.6	5.8	4.6	5.8	5.8	4.6	5.8	5.8
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	5.1	16.8	16.8	6.6	24.7	7.6	18.1	18.1	7.9	16.0	16.0
Actuated g/C Ratio	0.07	0.25	0.25	0.10	0.36	0.11	0.27	0.27	0.12	0.23	0.23
v/c Ratio	0.22	0.54	0.66	0.74	0.36	1.44	0.38	0.50	0.51	0.36	0.04
Control Delay	39.4	25.3	8.1	48.2	18.7	253.5	24.5	8.6	40.7	22.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.4	25.3	8.1	48.2	18.7	253.5	24.5	8.6	40.7	22.5	0.1
LOS	D	C	A	D	B	F	C	A	D	C	A
Approach Delay		18.6			29.0		102.4			26.1	
Approach LOS		B			C		F			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 68.3	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.44	
Intersection Signal Delay: 42.8	Intersection LOS: D
Intersection Capacity Utilization 59.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Sycamore Canyon Bl. & Central Av.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	643	459	231	346	88	266	177	282	101	286	16
Future Volume (veh/h)	26	643	459	231	346	88	266	177	282	101	286	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1885	1870	1885	1885	1885	1870	1885	1856	1900	1885	1900
Adj Flow Rate, veh/h	28	684	347	246	368	79	283	188	205	107	304	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	8	1	2	1	1	1	2	1	3	0	1	0
Cap, veh/h	52	1422	438	347	1010	214	215	392	327	138	585	
Arrive On Green	0.03	0.28	0.28	0.10	0.35	0.35	0.12	0.21	0.21	0.08	0.16	0.00
Sat Flow, veh/h	1697	5147	1585	3483	2927	621	1781	1885	1572	1810	3582	1610
Grp Volume(v), veh/h	28	684	347	246	223	224	283	188	205	107	304	0
Grp Sat Flow(s),veh/h/ln	1697	1716	1585	1742	1791	1757	1781	1885	1572	1810	1791	1610
Q Serve(g_s), s	1.0	6.8	12.4	4.2	5.7	5.8	7.4	5.4	7.3	3.6	4.7	0.0
Cycle Q Clear(g_c), s	1.0	6.8	12.4	4.2	5.7	5.8	7.4	5.4	7.3	3.6	4.7	0.0
Prop In Lane	1.00		1.00	1.00		0.35	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	52	1422	438	347	618	606	215	392	327	138	585	
V/C Ratio(X)	0.53	0.48	0.79	0.71	0.36	0.37	1.31	0.48	0.63	0.77	0.52	
Avail Cap(c_a), veh/h	139	1648	508	364	618	606	215	1038	866	281	2095	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.2	18.5	20.5	26.7	15.0	15.0	26.9	21.3	22.1	27.7	23.4	0.0
Incr Delay (d2), s/veh	3.1	0.3	7.3	4.9	0.4	0.4	170.4	0.9	2.0	3.4	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	2.3	4.8	1.8	2.0	2.0	13.0	2.2	2.5	1.5	1.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.3	18.7	27.9	31.6	15.4	15.4	197.3	22.3	24.1	31.2	24.1	0.0
LnGrp LOS	C	B	C	C	B	B	F	C	C	C	C	
Approach Vol, veh/h		1059			693			676			411	A
Approach Delay, s/veh		22.1			21.1			96.1			26.0	
Approach LOS		C			C			F			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.3	18.5	10.7	22.7	12.0	15.8	6.5	26.9
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	5.8	4.6	5.8
Max Green Setting (Gmax), s	9.5	33.7	6.4	19.6	7.4	35.8	5.0	21.0
Max Q Clear Time (g_c+I1), s	5.6	9.3	6.2	14.4	9.4	6.7	3.0	7.8
Green Ext Time (p_c), s	0.0	1.6	0.0	2.5	0.0	1.8	0.0	1.9

Intersection Summary	
HCM 6th Ctrl Delay	40.0
HCM 6th LOS	D

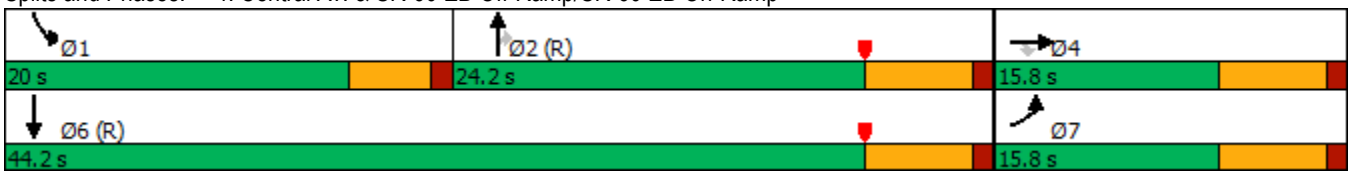
Notes

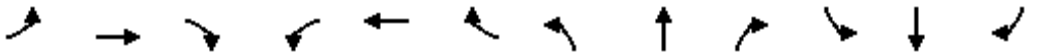
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	9	3	69	430	596	670	596
Future Volume (vph)	9	3	69	430	596	670	596
Turn Type	Prot	NA	Perm	NA	Perm	Prot	NA
Protected Phases	7	4		2		1	6
Permitted Phases			4		2		
Detector Phase	7	4	4	2	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	15.8	15.8	15.8	9.6	22.8
Total Split (s)	15.8	15.8	15.8	24.2	24.2	20.0	44.2
Total Split (%)	26.3%	26.3%	26.3%	40.3%	40.3%	33.3%	73.7%
Yellow Time (s)	4.8	4.8	4.8	4.8	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	4.6	5.8
Lead/Lag				Lag	Lag	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	10.0	10.0	10.0	25.3	25.3	14.8	47.0
Actuated g/C Ratio	0.17	0.17	0.17	0.42	0.42	0.25	0.78
v/c Ratio	0.03	0.14	0.11	0.31	0.70	0.85	0.22
Control Delay	21.4	10.7	0.6	14.6	11.9	33.7	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.4	10.7	0.6	14.6	11.9	33.7	4.5
LOS	C	B	A	B	B	C	A
Approach Delay		7.5		13.0			20.0
Approach LOS		A		B			B

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 16.5	Intersection LOS: B
Intersection Capacity Utilization 77.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: Central Av. & SR-60 EB Off-Ramp/SR-60 EB On-Ramp





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	3	69	0	0	0	0	430	596	670	596	0
Future Volume (veh/h)	9	3	69	0	0	0	0	430	596	670	596	0
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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1841	1900	1811				0	1856	1841	1856	1900	0
Adj Flow Rate, veh/h	10	0	60				0	457	449	713	634	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	4	0	6				0	3	4	3	0	0
Cap, veh/h	201	0	352				0	1345	595	801	2498	0
Arrive On Green	0.11	0.00	0.11				0.00	0.38	0.38	0.39	1.00	0.00
Sat Flow, veh/h	1753	0	3070				0	3618	1560	3428	3705	0
Grp Volume(v), veh/h	10	0	60				0	457	449	713	634	0
Grp Sat Flow(s),veh/h/ln	1753	0	1535				0	1763	1560	1714	1805	0
Q Serve(g_s), s	0.3	0.0	1.1				0.0	5.5	15.0	11.7	0.0	0.0
Cycle Q Clear(g_c), s	0.3	0.0	1.1				0.0	5.5	15.0	11.7	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	201	0	352				0	1345	595	801	2498	0
V/C Ratio(X)	0.05	0.00	0.17				0.00	0.34	0.75	0.89	0.25	0.00
Avail Cap(c_a), veh/h	292	0	512				0	1345	595	880	2498	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.67	1.67	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.82	0.82	0.85	0.85	0.00
Uniform Delay (d), s/veh	23.6	0.0	24.0				0.0	13.2	16.1	17.6	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.2				0.0	0.6	7.2	8.6	0.2	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	0.1	0.0	0.4				0.0	1.9	5.4	4.1	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.7	0.0	24.2				0.0	13.7	23.3	26.1	0.2	0.0
LnGrp LOS	C	A	C				A	B	C	C	A	A
Approach Vol, veh/h		70						906			1347	
Approach Delay, s/veh		24.1						18.5			13.9	
Approach LOS		C						B			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	18.6	28.7		12.7		47.3
Change Period (Y+Rc), s	4.6	5.8		5.8		5.8
Max Green Setting (Gmax), s	15.4	18.4		10.0		38.4
Max Q Clear Time (g_c+I1), s	13.7	17.0		3.1		2.0
Green Ext Time (p_c), s	0.4	0.7		0.1		4.3

Intersection Summary			
HCM 6th Ctrl Delay			16.0
HCM 6th LOS			B

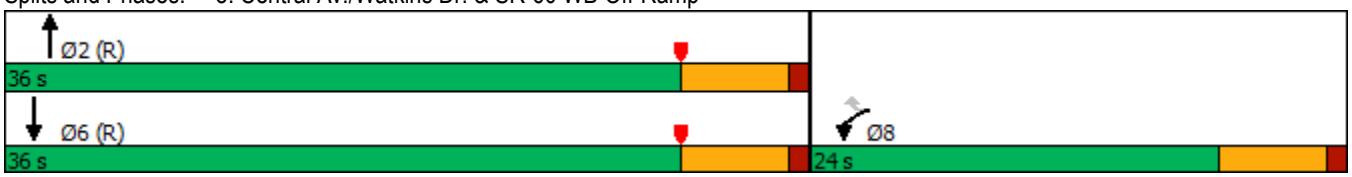
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	287	331	437	979
Future Volume (vph)	287	331	437	979
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.8	15.8	15.8	22.8
Total Split (s)	24.0	24.0	36.0	36.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%
Yellow Time (s)	4.8	4.8	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Min	C-Min
Act Effct Green (s)	12.5	12.5	35.9	35.9
Actuated g/C Ratio	0.21	0.21	0.60	0.60
v/c Ratio	0.45	0.66	0.24	0.52
Control Delay	22.3	11.1	2.8	8.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	22.3	11.1	2.8	8.8
LOS	C	B	A	A
Approach Delay	16.3		2.8	8.8
Approach LOS	B		A	A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 21.6 (36%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 45	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.66	
Intersection Signal Delay: 9.8	Intersection LOS: A
Intersection Capacity Utilization 45.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 5: Central Av./Watkins Dr. & SR-60 WB Off-Ramp



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	287	331	437	2	0	979
Future Volume (veh/h)	287	331	437	2	0	979
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1885	1870	1856	1856	0	1885
Adj Flow Rate, veh/h	326	204	497	2	0	1112
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	1	2	3	3	0	1
Cap, veh/h	614	279	2270	9	0	2258
Arrive On Green	0.18	0.18	0.21	0.21	0.00	0.63
Sat Flow, veh/h	3483	1585	3694	14	0	3770
Grp Volume(v), veh/h	326	204	243	256	0	1112
Grp Sat Flow(s),veh/h/ln	1742	1585	1763	1853	0	1791
Q Serve(g_s), s	5.1	7.3	6.9	6.9	0.0	10.0
Cycle Q Clear(g_c), s	5.1	7.3	6.9	6.9	0.0	10.0
Prop In Lane	1.00	1.00		0.01	0.00	
Lane Grp Cap(c), veh/h	614	279	1111	1168	0	2258
V/C Ratio(X)	0.53	0.73	0.22	0.22	0.00	0.49
Avail Cap(c_a), veh/h	1057	481	1111	1168	0	2258
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.96	0.96	0.00	1.00
Uniform Delay (d), s/veh	22.5	23.4	11.5	11.5	0.0	5.9
Incr Delay (d2), s/veh	0.7	3.7	0.4	0.4	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	2.7	2.1	2.2	0.0	2.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	23.2	27.0	11.9	11.9	0.0	6.7
LnGrp LOS	C	C	B	B	A	A
Approach Vol, veh/h	530		499			1112
Approach Delay, s/veh	24.6		11.9			6.7
Approach LOS	C		B			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		43.6			43.6	16.4
Change Period (Y+Rc), s		5.8			5.8	5.8
Max Green Setting (Gmax), s		30.2			30.2	18.2
Max Q Clear Time (g_c+I1), s		8.9			12.0	9.3
Green Ext Time (p_c), s		2.6			7.1	1.3

Intersection Summary		
HCM 6th Ctrl Delay	12.4	
HCM 6th LOS	B	

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	230	538	979	11
Future Vol, veh/h	0	0	230	538	979	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	1	9
Mvmt Flow	0	0	253	591	1076	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1884	1082	1088	0	-	0
Stage 1	1082	-	-	-	-	-
Stage 2	802	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	81	267	625	-	-	-
Stage 1	328	-	-	-	-	-
Stage 2	546	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	48	267	625	-	-	-
Mov Cap-2 Maneuver	48	-	-	-	-	-
Stage 1	195	-	-	-	-	-
Stage 2	546	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	625	-	-	-	-
HCM Lane V/C Ratio	0.404	-	-	-	-
HCM Control Delay (s)	14.6	-	0	-	-
HCM Lane LOS	B	-	A	-	-
HCM 95th %tile Q(veh)	2	-	-	-	-

APPENDIX 5.2:

E+P CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS		E+P
				CALC	LC	DATE 06/13/19
Jurisdiction:	City of Riverside			CHK	CH	DATE 06/13/19
Major Street:	Sycamore Canyon Boulevard			Critical Approach Speed (Major)		45 mph
Minor Street:	Driveway 1			Critical Approach Speed (Minor)		25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes **1** lane

Major Street Future ADT = **6,705** vpd Minor Street Future ADT = **70** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ..... [√]

or

In built up area of isolated community of < 10,000 population ..... [ ]

RURAL (R)

(Based on Estimated Average Daily Traffic - See Note)

URBAN / RURAL: XX

CONDITION A - Minimum Vehicular Volume

Satisfied / Not Satisfied: XX

Number of lanes for moving traffic on each approach

Major Street	Minor Street	Minimum Requirements EADT: Vehicles Per Day on Major Street (Total of Both Approaches) Urban	Rural	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) Urban	Rural
1 **6,705**	1 **70**	8,000	5,600 *	2,400	1,680
2 +	1	9,600	6,720	2,400	1,680
2 +	2 +	9,600	6,720	3,200	2,240
1	2 +	8,000	5,600	3,200	2,240

CONDITION B - Interruption of Continuous Traffic

Satisfied / Not Satisfied: XX

Number of lanes for moving traffic on each approach

Major Street	Minor Street	Vehicles Per Day on Major Street (Total of Both Approaches) Urban	Rural	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) Urban	Rural
1 **6,705**	1 **70**	12,000	8,400	1,200	850
2 +	1	14,400	10,080	1,200	850
2 +	2 +	14,400	10,080	1,600	1,120
1	2 +	12,000	8,400	1,600	1,120

Combination of CONDITIONS A + B

Satisfied / Not Satisfied: XX

No one condition satisfied, but following conditions fulfilled 80% of more ..... A: 4% B: 8%

2 CONDITIONS 80%

2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS	E+P
				CALC LC	DATE 06/13/19
Jurisdiction: City of Riverside				CHK CH	DATE 06/13/19
Major Street: Sycamore Canyon Boulevard				Critical Approach Speed (Major)	45 mph
Minor Street: Driveway 2				Critical Approach Speed (Minor)	25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes **1** lane

Major Street Future ADT = **7,086** vpd Minor Street Future ADT = **277** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ..... [√]

or

In built up area of isolated community of < 10,000 population ..... [ ]

RURAL (R)

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
	XX				
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **7,086**	*1* **277**	8,000	5,600 *	2,400	1,680
2 +	*1*	9,600	6,720	2,400	1,680
2 +	*2* +	9,600	6,720	3,200	2,240
1	*2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **7,086**	*1* **277**	12,000	8,400	1,200	850
2 +	*1*	14,400	10,080	1,200	850
2 +	*2* +	14,400	10,080	1,600	1,120
1	*2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B					
Satisfied	Not Satisfied				
	XX	2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more	**A** 16% **B** 33%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

APPENDIX 5.3:

E+P CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS

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Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	82	0	0	415	3	10
Future Vol, veh/h	82	0	0	415	3	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	89	0	0	451	3	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	540	89
Stage 1	-	-	-	-	89	-
Stage 2	-	-	-	-	451	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	-	0	0	-	503	969
Stage 1	-	0	0	-	934	-
Stage 2	-	0	0	-	642	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	503	969
Mov Cap-2 Maneuver	-	-	-	-	555	-
Stage 1	-	-	-	-	934	-
Stage 2	-	-	-	-	642	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	827	-	-
HCM Lane V/C Ratio	0.017	-	-
HCM Control Delay (s)	9.4	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	54	0	0	0	21	415	0	0	91	1
Future Vol, veh/h	0	0	54	0	0	0	21	415	0	0	91	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	59	0	0	0	23	451	0	0	99	1

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	597	597	50	100	0	-	-	-	0
Stage 1	100	100	-	-	-	-	-	-	-
Stage 2	497	497	-	-	-	-	-	-	-
Critical Hdwy	6.63	6.53	6.93	4.13	-	-	-	-	-
Critical Hdwy Stg 1	5.83	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.43	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	2.219	-	-	-	-	-
Pot Cap-1 Maneuver	450	416	1008	1492	-	0	0	-	-
Stage 1	913	812	-	-	-	0	0	-	-
Stage 2	610	544	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	443	0	1008	1492	-	-	-	-	-
Mov Cap-2 Maneuver	516	0	-	-	-	-	-	-	-
Stage 1	899	0	-	-	-	-	-	-	-
Stage 2	610	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.8	0.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1492	-	1008	-	-
HCM Lane V/C Ratio	0.015	-	0.058	-	-
HCM Control Delay (s)	7.5	-	8.8	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	18	666	82	47	317	272	404	946	84	52	22
v/c Ratio	0.21	0.74	0.20	0.28	0.42	0.85	0.39	1.00	1.00	0.04	0.03
Control Delay	56.6	47.2	1.1	55.2	36.8	66.4	16.0	51.4	151.1	21.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.6	47.2	1.1	55.2	36.8	66.4	16.0	51.4	151.1	21.7	0.1
Queue Length 50th (ft)	12	161	0	17	88	182	162	~645	~63	12	0
Queue Length 95th (ft)	37	206	0	37	146	#305	238	#900	#166	25	0
Internal Link Dist (ft)		1568			344		831			521	
Turn Bay Length (ft)	570		200	100		250		115	250		
Base Capacity (vph)	85	1001	432	165	801	368	1034	942	84	1456	669
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.67	0.19	0.28	0.40	0.74	0.39	1.00	1.00	0.04	0.03

Intersection Summary

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

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

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	100	33	33	1474	240	189	307
v/c Ratio	0.35	0.12	0.09	0.79	0.26	0.65	0.12
Control Delay	26.0	11.1	0.5	17.4	2.3	39.1	3.2
Queue Delay	0.0	0.0	0.0	38.3	0.0	0.0	0.0
Total Delay	26.0	11.1	0.5	55.7	2.3	39.1	3.2
Queue Length 50th (ft)	32	1	0	234	0	36	13
Queue Length 95th (ft)	71	22	0	#379	30	#76	26
Internal Link Dist (ft)		1038		344			253
Turn Bay Length (ft)	400		115			150	
Base Capacity (vph)	289	271	353	1861	937	289	2570
Starvation Cap Reductn	0	0	0	66	0	0	0
Spillback Cap Reductn	2	0	0	492	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.12	0.09	1.08	0.26	0.65	0.12

Intersection Summary

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

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	131	419	1540	354
v/c Ratio	0.14	0.91	0.83	0.19
Control Delay	16.4	47.8	17.0	7.9
Queue Delay	0.0	0.0	47.5	0.0
Total Delay	16.4	47.8	64.4	7.9
Queue Length 50th (ft)	18	138	316	32
Queue Length 95th (ft)	35	#291	#404	52
Internal Link Dist (ft)	1138		253	437
Turn Bay Length (ft)		300		
Base Capacity (vph)	993	471	1847	1865
Starvation Cap Reductn	0	0	455	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.13	0.89	1.11	0.19

Intersection Summary

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

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	783	1059	333	85
Future Vol, veh/h	0	0	783	1059	333	85
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	2	0
Mvmt Flow	0	0	860	1164	366	93

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2715	413	459	0	-	0
Stage 1	413	-	-	-	-	-
Stage 2	2302	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	17	643	1082	-	-	-
Stage 1	672	-	-	-	-	-
Stage 2	68	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	3	643	1082	-	-	-
Mov Cap-2 Maneuver	3	-	-	-	-	-
Stage 1	138	-	-	-	-	-
Stage 2	68	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	8.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1082	-	-	-	-
HCM Lane V/C Ratio	0.795	-	-	-	-
HCM Control Delay (s)	19.8	-	0	-	-
HCM Lane LOS	C	-	A	-	-
HCM 95th %tile Q(veh)	8.8	-	-	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	365	0	0	226	2	6
Future Vol, veh/h	365	0	0	226	2	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	397	0	0	246	2	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	643	397
Stage 1	-	-	-	-	397	-
Stage 2	-	-	-	-	246	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	-	0	0	-	438	652
Stage 1	-	0	0	-	679	-
Stage 2	-	0	0	-	795	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	438	652
Mov Cap-2 Maneuver	-	-	-	-	531	-
Stage 1	-	-	-	-	679	-
Stage 2	-	-	-	-	795	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	617	-	-
HCM Lane V/C Ratio	0.014	-	-
HCM Control Delay (s)	10.9	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	34	0	0	0	65	226	0	0	368	3
Future Vol, veh/h	0	0	34	0	0	0	65	226	0	0	368	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	37	0	0	0	71	246	0	0	400	3

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	790	790	202	403	0	-	-	-	0
Stage 1	402	402	-	-	-	-	-	-	-
Stage 2	388	388	-	-	-	-	-	-	-
Critical Hdwy	6.63	6.53	6.93	4.13	-	-	-	-	-
Critical Hdwy Stg 1	5.83	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.43	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	2.219	-	-	-	-	-
Pot Cap-1 Maneuver	343	322	806	1154	-	0	0	-	-
Stage 1	645	600	-	-	-	0	0	-	-
Stage 2	685	608	-	-	-	0	0	-	-
Platoon blocked, %					-			-	-
Mov Cap-1 Maneuver	322	0	806	1154	-	-	-	-	-
Mov Cap-2 Maneuver	439	0	-	-	-	-	-	-	-
Stage 1	605	0	-	-	-	-	-	-	-
Stage 2	685	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.7	1.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1154	-	806	-	-
HCM Lane V/C Ratio	0.061	-	0.046	-	-
HCM Control Delay (s)	8.3	-	9.7	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.2	-	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	28	684	488	246	462	283	188	300	107	304	17
v/c Ratio	0.22	0.54	0.66	0.74	0.36	1.44	0.38	0.50	0.51	0.36	0.04
Control Delay	39.4	25.3	8.1	48.2	18.7	253.5	24.5	8.6	40.7	22.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.4	25.3	8.1	48.2	18.7	253.5	24.5	8.6	40.7	22.5	0.1
Queue Length 50th (ft)	11	83	4	49	54	~154	68	18	40	55	0
Queue Length 95th (ft)	43	167	97	#149	161	#402	124	76	#113	87	0
Internal Link Dist (ft)		1568			344		831			521	
Turn Bay Length (ft)	570		200	100		250		115	250		
Base Capacity (vph)	125	1512	799	333	1271	196	952	916	257	1923	924
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.45	0.61	0.74	0.36	1.44	0.20	0.33	0.42	0.16	0.02

Intersection Summary

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

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

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	10	38	38	457	634	713	634
v/c Ratio	0.03	0.14	0.11	0.31	0.70	0.85	0.22
Control Delay	21.4	10.7	0.6	14.6	11.9	33.7	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.4	10.7	0.6	14.6	11.9	33.7	4.5
Queue Length 50th (ft)	3	1	0	68	56	150	30
Queue Length 95th (ft)	14	23	0	104	#243	#200	120
Internal Link Dist (ft)		1038		344			253
Turn Bay Length (ft)	400		115			150	
Base Capacity (vph)	289	274	353	1478	906	872	2830
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.14	0.11	0.31	0.70	0.82	0.22

Intersection Summary

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

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	326	376	499	1113
v/c Ratio	0.45	0.66	0.24	0.52
Control Delay	22.3	11.1	2.8	8.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	22.3	11.1	2.8	8.8
Queue Length 50th (ft)	55	23	2	97
Queue Length 95th (ft)	72	74	3	189
Internal Link Dist (ft)	1138		253	437
Turn Bay Length (ft)		300		
Base Capacity (vph)	1051	691	2098	2140
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.31	0.54	0.24	0.52

Intersection Summary

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	230	538	979	11
Future Vol, veh/h	0	0	230	538	979	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	1	9
Mvmt Flow	0	0	253	591	1076	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1884	1082	1088	0	-	0
Stage 1	1082	-	-	-	-	-
Stage 2	802	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	81	267	625	-	-	-
Stage 1	328	-	-	-	-	-
Stage 2	546	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	48	267	625	-	-	-
Mov Cap-2 Maneuver	48	-	-	-	-	-
Stage 1	195	-	-	-	-	-
Stage 2	546	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	625	-	-	-	-
HCM Lane V/C Ratio	0.404	-	-	-	-
HCM Control Delay (s)	14.6	-	0	-	-
HCM Lane LOS	B	-	A	-	-
HCM 95th %tile Q(veh)	2	-	-	-	-

APPENDIX 6.1:

OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	142	0	18	0	458	74	37	86	0
Future Vol, veh/h	0	0	0	142	0	18	0	458	74	37	86	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	154	0	20	0	498	80	40	93	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	665	711	538	-	0	0	578	0	0
Stage 1	538	538	-	-	-	-	-	-	-
Stage 2	127	173	-	-	-	-	-	-	-
Critical Hdwy	6.63	6.53	6.23	-	-	-	4.13	-	-
Critical Hdwy Stg 1	5.43	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.83	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	-	-	-	2.219	-	-
Pot Cap-1 Maneuver	409	357	542	0	-	-	994	-	0
Stage 1	584	521	-	0	-	-	-	-	0
Stage 2	886	755	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	392	0	542	-	-	-	994	-	-
Mov Cap-2 Maneuver	481	0	-	-	-	-	-	-	-
Stage 1	584	0	-	-	-	-	-	-	-
Stage 2	849	0	-	-	-	-	-	-	-

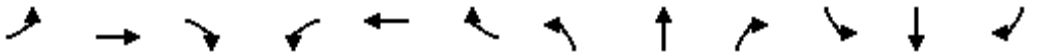
Approach	WB	NB	SB
HCM Control Delay, s	16.4	0	2.7
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	487	994	-
HCM Lane V/C Ratio	-	-	0.357	0.04	-
HCM Control Delay (s)	-	-	16.4	8.8	0.1
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.6	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	49	657	81	47	268	268	410	934	99	53	39
Future Volume (vph)	49	657	81	47	268	268	410	934	99	53	39
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases			4					2			6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	15.8	15.8	9.6	26.8	9.6	15.8	15.8	9.6	40.8	40.8
Total Split (s)	9.6	26.8	26.8	9.6	26.8	26.8	63.9	63.9	9.7	46.8	46.8
Total Split (%)	8.7%	24.4%	24.4%	8.7%	24.4%	24.4%	58.1%	58.1%	8.8%	42.5%	42.5%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	3.6	4.8	4.8	3.6	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	5.8	4.6	5.8	4.6	5.8	5.8	4.6	5.8	5.8
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	5.0	19.3	19.3	5.0	19.3	20.0	58.3	58.3	5.1	43.5	43.5
Actuated g/C Ratio	0.05	0.18	0.18	0.05	0.18	0.19	0.55	0.55	0.05	0.41	0.41
v/c Ratio	0.62	0.77	0.21	0.31	0.60	0.88	0.43	1.07	1.26	0.04	0.06
Control Delay	82.7	48.1	1.2	55.9	40.4	69.5	16.7	73.3	228.3	21.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.7	48.1	1.2	55.9	40.4	69.5	16.7	73.3	228.3	21.9	0.2
LOS	F	D	A	E	D	E	B	E	F	C	A
Approach Delay		45.5			42.2		58.3			124.2	
Approach LOS		D			D		E			F	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 106.5	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.26	
Intersection Signal Delay: 56.9	Intersection LOS: E
Intersection Capacity Utilization 89.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Sycamore Canyon Bl. & Central Av.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	657	81	47	268	94	268	410	934	99	53	39
Future Volume (veh/h)	49	657	81	47	268	94	268	410	934	99	53	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1856	1796	1900	1870	1870	1856	1885	1841	1856	1856	1648
Adj Flow Rate, veh/h	53	706	85	51	288	98	288	441	909	106	57	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	3	7	0	2	2	3	1	4	3	3	17
Cap, veh/h	68	870	261	129	446	149	318	1032	854	85	1466	
Arrive On Green	0.04	0.17	0.17	0.04	0.17	0.17	0.18	0.55	0.55	0.05	0.42	0.00
Sat Flow, veh/h	1810	5066	1522	3510	2618	872	1767	1885	1560	1767	3526	1397
Grp Volume(v), veh/h	53	706	85	51	194	192	288	441	909	106	57	0
Grp Sat Flow(s),veh/h/ln	1810	1689	1522	1755	1777	1713	1767	1885	1560	1767	1763	1397
Q Serve(g_s), s	3.1	14.2	5.2	1.5	10.8	11.1	16.9	14.7	58.1	5.1	1.0	0.0
Cycle Q Clear(g_c), s	3.1	14.2	5.2	1.5	10.8	11.1	16.9	14.7	58.1	5.1	1.0	0.0
Prop In Lane	1.00		1.00	1.00		0.51	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	68	870	261	129	303	292	318	1032	854	85	1466	
V/C Ratio(X)	0.77	0.81	0.33	0.40	0.64	0.66	0.91	0.43	1.06	1.25	0.04	
Avail Cap(c_a), veh/h	85	1003	301	165	352	339	370	1032	854	85	1466	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	50.6	42.3	38.6	50.0	41.0	41.1	42.6	14.2	24.0	50.5	18.4	0.0
Incr Delay (d2), s/veh	22.4	4.5	0.7	0.7	3.0	3.7	21.5	0.3	49.3	178.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	6.1	1.9	0.7	4.8	4.8	9.0	5.7	30.2	6.4	0.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.0	46.8	39.3	50.7	44.0	44.9	64.1	14.5	73.3	228.8	18.4	0.0
LnGrp LOS	E	D	D	D	D	D	E	B	F	F	B	
Approach Vol, veh/h		844			437			1638			163	A
Approach Delay, s/veh		47.7			45.2			55.9			155.2	
Approach LOS		D			D			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.7	63.9	8.5	24.0	23.7	49.9	8.6	23.9
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	5.8	4.6	5.8
Max Green Setting (Gmax), s	5.1	58.1	5.0	21.0	22.2	41.0	5.0	21.0
Max Q Clear Time (g_c+I1), s	7.1	60.1	3.5	16.2	18.9	3.0	5.1	13.1
Green Ext Time (p_c), s	0.0	0.0	0.0	2.0	0.1	0.3	0.0	1.2

Intersection Summary	
HCM 6th Ctrl Delay	57.4
HCM 6th LOS	E

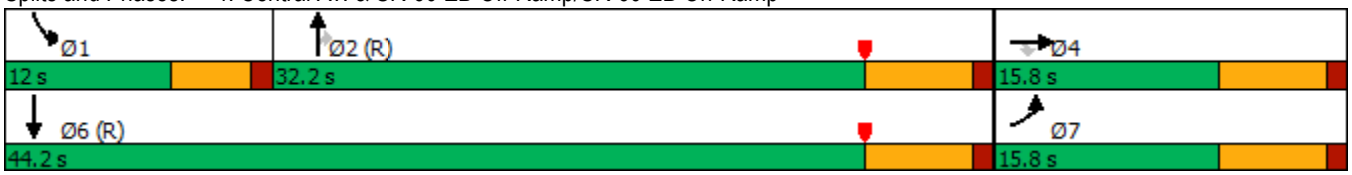
Notes

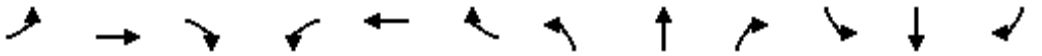
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	98	3	83	1447	243	185	326
Future Volume (vph)	98	3	83	1447	243	185	326
Turn Type	Prot	NA	Perm	NA	Perm	Prot	NA
Protected Phases	7	4		2		1	6
Permitted Phases			4		2		
Detector Phase	7	4	4	2	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	15.8	15.8	15.8	9.6	22.8
Total Split (s)	15.8	15.8	15.8	32.2	32.2	12.0	44.2
Total Split (%)	26.3%	26.3%	26.3%	53.7%	53.7%	20.0%	73.7%
Yellow Time (s)	4.8	4.8	4.8	4.8	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	4.6	5.8
Lead/Lag				Lag	Lag	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	10.0	10.0	10.0	30.0	30.0	6.9	42.7
Actuated g/C Ratio	0.17	0.17	0.17	0.50	0.50	0.12	0.71
v/c Ratio	0.37	0.17	0.13	0.90	0.29	0.51	0.14
Control Delay	26.5	10.2	0.8	25.7	2.6	32.2	3.2
Queue Delay	0.0	0.0	0.0	46.6	0.0	0.0	0.0
Total Delay	26.5	10.2	0.8	72.2	2.6	32.2	3.2
LOS	C	B	A	E	A	C	A
Approach Delay		16.7		62.2			13.7
Approach LOS		B		E			B

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 48.3	Intersection LOS: D
Intersection Capacity Utilization 78.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: Central Av. & SR-60 EB Off-Ramp/SR-60 EB On-Ramp





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	98	3	83	0	0	0	0	1447	243	185	326	0
Future Volume (veh/h)	98	3	83	0	0	0	0	1447	243	185	326	0
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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1841	1900	1811				0	1856	1841	1856	1900	0
Adj Flow Rate, veh/h	107	0	78				0	1573	186	201	354	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	4	0	6				0	3	4	3	0	0
Cap, veh/h	279	0	488				0	1708	756	296	2338	0
Arrive On Green	0.16	0.00	0.16				0.00	0.48	0.48	0.17	1.00	0.00
Sat Flow, veh/h	1753	0	3070				0	3618	1560	3428	3705	0
Grp Volume(v), veh/h	107	0	78				0	1573	186	201	354	0
Grp Sat Flow(s),veh/h/ln	1753	0	1535				0	1763	1560	1714	1805	0
Q Serve(g_s), s	3.3	0.0	1.3				0.0	24.9	4.2	3.3	0.0	0.0
Cycle Q Clear(g_c), s	3.3	0.0	1.3				0.0	24.9	4.2	3.3	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	279	0	488				0	1708	756	296	2338	0
V/C Ratio(X)	0.38	0.00	0.16				0.00	0.92	0.25	0.68	0.15	0.00
Avail Cap(c_a), veh/h	292	0	512				0	1708	756	423	2338	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.17	0.17	0.99	0.99	0.00
Uniform Delay (d), s/veh	22.6	0.0	21.8				0.0	14.4	9.0	24.0	0.0	0.0
Incr Delay (d2), s/veh	0.9	0.0	0.2				0.0	2.0	0.1	1.0	0.1	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	1.3	0.0	0.4				0.0	7.6	1.1	1.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.5	0.0	21.9				0.0	16.4	9.2	25.1	0.1	0.0
LnGrp LOS	C	A	C				A	B	A	C	A	A
Approach Vol, veh/h		185						1759			555	
Approach Delay, s/veh		22.8						15.6			9.2	
Approach LOS		C						B			A	

Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	9.8	34.9		15.3		44.7						
Change Period (Y+Rc), s	4.6	5.8		5.8		5.8						
Max Green Setting (Gmax), s	7.4	26.4		10.0		38.4						
Max Q Clear Time (g_c+I1), s	5.3	26.9		5.3		2.0						
Green Ext Time (p_c), s	0.1	0.0		0.2		2.2						

Intersection Summary												
HCM 6th Ctrl Delay			14.7									
HCM 6th LOS			B									

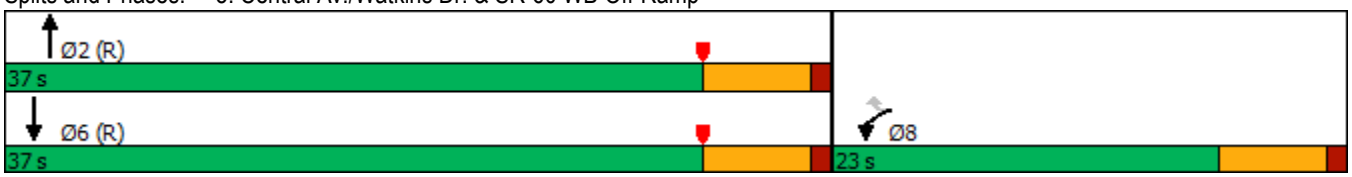
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	152	418	1544	358
Future Volume (vph)	152	418	1544	358
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.8	15.8	15.8	22.8
Total Split (s)	23.0	23.0	37.0	37.0
Total Split (%)	38.3%	38.3%	61.7%	61.7%
Yellow Time (s)	4.8	4.8	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Min	C-Min
Act Effct Green (s)	17.3	17.3	31.1	31.1
Actuated g/C Ratio	0.29	0.29	0.52	0.52
v/c Ratio	0.16	0.94	0.91	0.21
Control Delay	16.6	53.9	18.7	8.1
Queue Delay	0.0	0.0	46.4	0.0
Total Delay	16.6	53.9	65.1	8.1
LOS	B	D	E	A
Approach Delay	43.9		65.1	8.1
Approach LOS	D		E	A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 21.6 (36%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 52.0	Intersection LOS: D
Intersection Capacity Utilization 78.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 5: Central Av./Watkins Dr. & SR-60 WB Off-Ramp



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	152	418	1544	0	0	358
Future Volume (veh/h)	152	418	1544	0	0	358
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1885	1885	1856	0	0	1870
Adj Flow Rate, veh/h	162	356	1643	0	0	381
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	3	0	0	2
Cap, veh/h	888	408	1945	0	0	1960
Arrive On Green	0.26	0.26	0.18	0.00	0.00	0.55
Sat Flow, veh/h	3483	1598	3711	0	0	3741
Grp Volume(v), veh/h	162	356	1643	0	0	381
Grp Sat Flow(s),veh/h/ln	1742	1598	1763	0	0	1777
Q Serve(g_s), s	2.2	12.8	27.0	0.0	0.0	3.2
Cycle Q Clear(g_c), s	2.2	12.8	27.0	0.0	0.0	3.2
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	888	408	1945	0	0	1960
V/C Ratio(X)	0.18	0.87	0.84	0.00	0.00	0.19
Avail Cap(c_a), veh/h	998	458	1945	0	0	1960
HCM Platoon Ratio	1.00	1.00	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.39	0.00	0.00	1.00
Uniform Delay (d), s/veh	17.5	21.4	22.1	0.0	0.0	6.8
Incr Delay (d2), s/veh	0.1	15.6	1.9	0.0	0.0	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	0.8	5.8	12.6	0.0	0.0	0.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.6	37.0	24.0	0.0	0.0	7.0
LnGrp LOS	B	D	C	A	A	A
Approach Vol, veh/h	518		1643			381
Approach Delay, s/veh	30.9		24.0			7.0
Approach LOS	C		C			A

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	38.9			38.9	21.1
Change Period (Y+Rc), s	5.8			5.8	5.8
Max Green Setting (Gmax), s	31.2			31.2	17.2
Max Q Clear Time (g_c+I1), s	29.0			5.2	14.8
Green Ext Time (p_c), s	1.8			2.3	0.5

Intersection Summary	
HCM 6th Ctrl Delay	22.8
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	9.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	840	1123	358	90
Future Vol, veh/h	0	0	840	1123	358	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	2	0
Mvmt Flow	0	0	923	1234	393	99

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2906	443	492	0	-	0
Stage 1	443	-	-	-	-	-
Stage 2	2463	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	10	619	1051	-	-	-
Stage 1	651	-	-	-	-	-
Stage 2	48	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	1	619	1051	-	-	-
Mov Cap-2 Maneuver	1	-	-	-	-	-
Stage 1	79	-	-	-	-	-
Stage 2	48	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	11.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1051	-	-	-	-
HCM Lane V/C Ratio	0.878	-	-	-	-
HCM Control Delay (s)	26.9	-	0	-	-
HCM Lane LOS	D	-	A	-	-
HCM 95th %tile Q(veh)	12.3	-	-	-	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	134	0	17	0	257	72	36	384	0
Future Vol, veh/h	0	0	0	134	0	17	0	257	72	36	384	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	146	0	18	0	279	78	39	417	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	605	813	318	-	0	0	357	0	0
Stage 1	318	318	-	-	-	-	-	-	-
Stage 2	287	495	-	-	-	-	-	-	-
Critical Hdwy	6.63	6.53	6.23	-	-	-	4.13	-	-
Critical Hdwy Stg 1	5.43	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.83	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	-	-	-	2.219	-	-
Pot Cap-1 Maneuver	445	312	722	0	-	-	1200	-	0
Stage 1	737	653	-	0	-	-	-	-	0
Stage 2	737	545	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	426	0	722	-	-	-	1200	-	-
Mov Cap-2 Maneuver	523	0	-	-	-	-	-	-	-
Stage 1	737	0	-	-	-	-	-	-	-
Stage 2	706	0	-	-	-	-	-	-	-

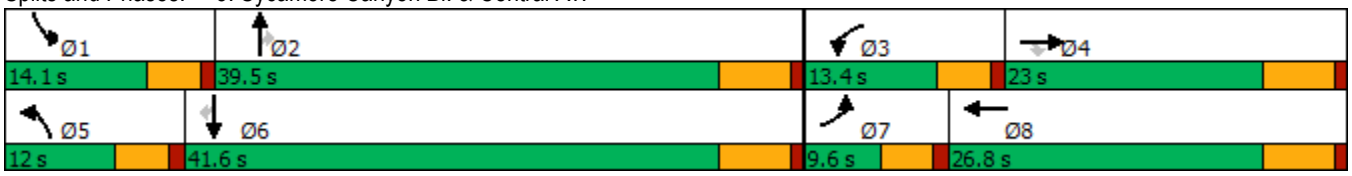
Approach	WB	NB	SB
HCM Control Delay, s	14.6	0	0.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	540	1200	-
HCM Lane V/C Ratio	-	-	0.304	0.033	-
HCM Control Delay (s)	-	-	14.6	8.1	0.1
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.3	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	47	682	487	245	367	282	190	299	137	310	39
Future Volume (vph)	47	682	487	245	367	282	190	299	137	310	39
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases			4					2			6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	15.8	15.8	9.6	26.8	9.6	15.8	15.8	9.6	40.8	40.8
Total Split (s)	9.6	23.0	23.0	13.4	26.8	12.0	39.5	39.5	14.1	41.6	41.6
Total Split (%)	10.7%	25.6%	25.6%	14.9%	29.8%	13.3%	43.9%	43.9%	15.7%	46.2%	46.2%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	3.6	4.8	4.8	3.6	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	5.8	4.6	5.8	4.6	5.8	5.8	4.6	5.8	5.8
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	5.1	16.4	16.4	8.5	24.2	7.5	15.7	15.7	9.0	17.1	17.1
Actuated g/C Ratio	0.07	0.23	0.23	0.12	0.34	0.11	0.22	0.22	0.13	0.24	0.24
v/c Ratio	0.42	0.61	0.73	0.63	0.42	1.60	0.49	0.60	0.64	0.38	0.08
Control Delay	47.1	28.1	12.2	39.5	20.5	319.0	27.9	12.3	46.6	23.1	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.1	28.1	12.2	39.5	20.5	319.0	27.9	12.3	46.6	23.1	0.3
LOS	D	C	B	D	C	F	C	B	D	C	A
Approach Delay		22.5			27.0		128.3			27.9	
Approach LOS		C			C		F			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 70.8	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.60	
Intersection Signal Delay: 49.9	Intersection LOS: D
Intersection Capacity Utilization 61.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Sycamore Canyon Bl. & Central Av.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	47	682	487	245	367	110	282	190	299	137	310	39
Future Volume (veh/h)	47	682	487	245	367	110	282	190	299	137	310	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1885	1870	1885	1885	1885	1870	1885	1856	1900	1885	1900
Adj Flow Rate, veh/h	50	726	377	261	390	102	300	202	223	146	330	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	8	1	2	1	1	1	2	1	3	0	1	0
Cap, veh/h	79	1382	426	366	917	237	210	363	303	186	636	
Arrive On Green	0.05	0.27	0.27	0.11	0.33	0.33	0.12	0.19	0.19	0.10	0.18	0.00
Sat Flow, veh/h	1697	5147	1585	3483	2802	724	1781	1885	1572	1810	3582	1610
Grp Volume(v), veh/h	50	726	377	261	247	245	300	202	223	146	330	0
Grp Sat Flow(s),veh/h/ln	1697	1716	1585	1742	1791	1735	1781	1885	1572	1810	1791	1610
Q Serve(g_s), s	1.8	7.5	14.3	4.6	6.8	6.9	7.4	6.1	8.4	4.9	5.2	0.0
Cycle Q Clear(g_c), s	1.8	7.5	14.3	4.6	6.8	6.9	7.4	6.1	8.4	4.9	5.2	0.0
Prop In Lane	1.00		1.00	1.00		0.42	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	79	1382	426	366	586	568	210	363	303	186	636	
V/C Ratio(X)	0.64	0.53	0.89	0.71	0.42	0.43	1.43	0.56	0.74	0.79	0.52	
Avail Cap(c_a), veh/h	135	1409	434	488	599	580	210	1011	844	274	2041	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.4	19.6	22.0	27.2	16.5	16.5	27.7	22.9	23.9	27.5	23.4	0.0
Incr Delay (d2), s/veh	3.2	0.3	19.0	1.7	0.5	0.5	218.5	1.3	3.5	4.8	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	2.6	6.8	1.8	2.4	2.4	15.6	2.5	3.0	2.2	2.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.6	19.9	41.0	28.9	17.0	17.1	246.2	24.3	27.3	32.3	24.1	0.0
LnGrp LOS	C	B	D	C	B	B	F	C	C	C	C	
Approach Vol, veh/h		1153			753			725			476	A
Approach Delay, s/veh		27.4			21.1			117.1			26.6	
Approach LOS		C			C			F			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	17.9	11.2	22.7	12.0	16.9	7.5	26.4
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	5.8	4.6	5.8
Max Green Setting (Gmax), s	9.5	33.7	8.8	17.2	7.4	35.8	5.0	21.0
Max Q Clear Time (g_c+I1), s	6.9	10.4	6.6	16.3	9.4	7.2	3.8	8.9
Green Ext Time (p_c), s	0.0	1.7	0.1	0.5	0.0	2.0	0.0	2.1

Intersection Summary	
HCM 6th Ctrl Delay	46.7
HCM 6th LOS	D

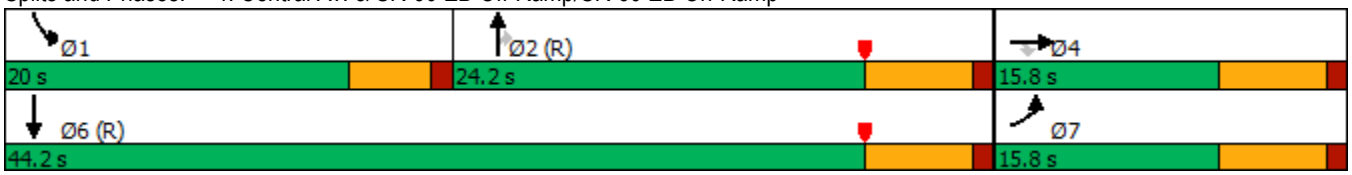
Notes

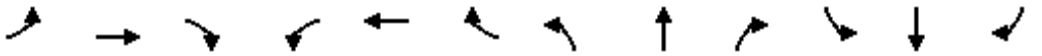
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	10	3	82	472	646	711	641
Future Volume (vph)	10	3	82	472	646	711	641
Turn Type	Prot	NA	Perm	NA	Perm	Prot	NA
Protected Phases	7	4		2		1	6
Permitted Phases			4		2		
Detector Phase	7	4	4	2	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	15.8	15.8	15.8	9.6	22.8
Total Split (s)	15.8	15.8	15.8	24.2	24.2	20.0	44.2
Total Split (%)	26.3%	26.3%	26.3%	40.3%	40.3%	33.3%	73.7%
Yellow Time (s)	4.8	4.8	4.8	4.8	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	4.6	5.8
Lead/Lag				Lag	Lag	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	10.0	10.0	10.0	24.9	24.9	15.2	47.0
Actuated g/C Ratio	0.17	0.17	0.17	0.42	0.42	0.25	0.78
v/c Ratio	0.04	0.16	0.12	0.35	0.77	0.88	0.24
Control Delay	21.5	10.2	0.7	15.0	15.4	34.8	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.5	10.2	0.7	15.0	15.4	34.8	5.4
LOS	C	B	A	B	B	C	A
Approach Delay		7.3		15.2			20.9
Approach LOS		A		B			C

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 17.9	Intersection LOS: B
Intersection Capacity Utilization 82.1%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 4: Central Av. & SR-60 EB Off-Ramp/SR-60 EB On-Ramp





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	3	82	0	0	0	0	472	646	711	641	0
Future Volume (veh/h)	10	3	82	0	0	0	0	472	646	711	641	0
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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1841	1900	1811				0	1856	1841	1856	1900	0
Adj Flow Rate, veh/h	11	0	74				0	502	502	756	682	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	4	0	6				0	3	4	3	0	0
Cap, veh/h	221	0	388				0	1268	561	837	2456	0
Arrive On Green	0.13	0.00	0.13				0.00	0.36	0.36	0.41	1.00	0.00
Sat Flow, veh/h	1753	0	3070				0	3618	1560	3428	3705	0
Grp Volume(v), veh/h	11	0	74				0	502	502	756	682	0
Grp Sat Flow(s),veh/h/ln	1753	0	1535				0	1763	1560	1714	1805	0
Q Serve(g_s), s	0.3	0.0	1.3				0.0	6.4	18.2	12.4	0.0	0.0
Cycle Q Clear(g_c), s	0.3	0.0	1.3				0.0	6.4	18.2	12.4	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	221	0	388				0	1268	561	837	2456	0
V/C Ratio(X)	0.05	0.00	0.19				0.00	0.40	0.89	0.90	0.28	0.00
Avail Cap(c_a), veh/h	292	0	512				0	1268	561	880	2456	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.67	1.67	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.76	0.76	0.82	0.82	0.00
Uniform Delay (d), s/veh	23.0	0.0	23.5				0.0	14.3	18.1	17.1	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.2				0.0	0.7	15.6	9.9	0.2	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	0.1	0.0	0.4				0.0	2.2	7.7	4.4	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.1	0.0	23.7				0.0	15.0	33.7	27.1	0.2	0.0
LnGrp LOS	C	A	C				A	B	C	C	A	A
Approach Vol, veh/h		85						1004			1438	
Approach Delay, s/veh		23.6						24.4			14.3	
Approach LOS		C						C			B	

Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	19.2	27.4		13.4		46.6						
Change Period (Y+Rc), s	4.6	5.8		5.8		5.8						
Max Green Setting (Gmax), s	15.4	18.4		10.0		38.4						
Max Q Clear Time (g_c+I1), s	14.4	20.2		3.3		2.0						
Green Ext Time (p_c), s	0.2	0.0		0.1		4.7						

Intersection Summary			
HCM 6th Ctrl Delay			18.6
HCM 6th LOS			B

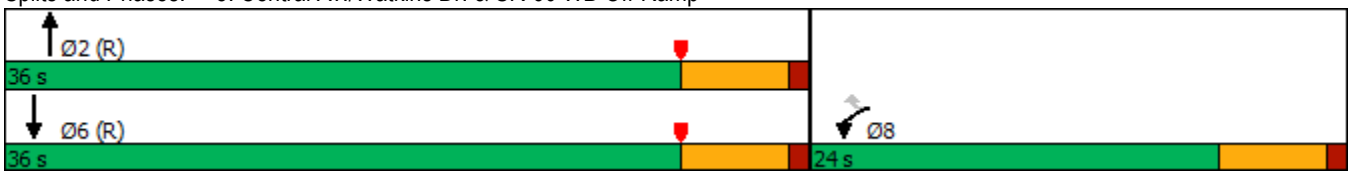
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	314	351	480	1038
Future Volume (vph)	314	351	480	1038
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.8	15.8	15.8	22.8
Total Split (s)	24.0	24.0	36.0	36.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%
Yellow Time (s)	4.8	4.8	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Min	C-Min
Act Effct Green (s)	13.3	13.3	35.1	35.1
Actuated g/C Ratio	0.22	0.22	0.58	0.58
v/c Ratio	0.47	0.72	0.27	0.56
Control Delay	21.7	15.0	2.6	9.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.7	15.0	2.6	9.7
LOS	C	B	A	A
Approach Delay	18.2		2.6	9.7
Approach LOS	B		A	A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 21.6 (36%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 45	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 10.7	Intersection LOS: B
Intersection Capacity Utilization 47.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 5: Central Av./Watkins Dr. & SR-60 WB Off-Ramp



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	314	351	480	2	0	1038
Future Volume (veh/h)	314	351	480	2	0	1038
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1885	1870	1856	1856	0	1885
Adj Flow Rate, veh/h	357	227	545	2	0	1180
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	1	2	3	3	0	1
Cap, veh/h	666	303	2217	8	0	2205
Arrive On Green	0.19	0.19	0.20	0.20	0.00	0.62
Sat Flow, veh/h	3483	1585	3695	13	0	3770
Grp Volume(v), veh/h	357	227	267	280	0	1180
Grp Sat Flow(s),veh/h/ln	1742	1585	1763	1853	0	1791
Q Serve(g_s), s	5.5	8.1	7.6	7.6	0.0	11.3
Cycle Q Clear(g_c), s	5.5	8.1	7.6	7.6	0.0	11.3
Prop In Lane	1.00	1.00		0.01	0.00	
Lane Grp Cap(c), veh/h	666	303	1085	1141	0	2205
V/C Ratio(X)	0.54	0.75	0.25	0.25	0.00	0.54
Avail Cap(c_a), veh/h	1057	481	1085	1141	0	2205
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.95	0.95	0.00	1.00
Uniform Delay (d), s/veh	21.9	22.9	12.2	12.2	0.0	6.6
Incr Delay (d2), s/veh	0.7	3.7	0.5	0.5	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	2.9	2.5	2.6	0.0	2.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.5	26.6	12.7	12.7	0.0	7.6
LnGrp LOS	C	C	B	B	A	A
Approach Vol, veh/h	584		547			1180
Approach Delay, s/veh	24.1		12.7			7.6
Approach LOS	C		B			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		42.7			42.7	17.3
Change Period (Y+Rc), s		5.8			5.8	5.8
Max Green Setting (Gmax), s		30.2			30.2	18.2
Max Q Clear Time (g_c+I1), s		9.6			13.3	10.1
Green Ext Time (p_c), s		2.8			7.3	1.4

Intersection Summary	
HCM 6th Ctrl Delay	13.0
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	257	573	1038	12
Future Vol, veh/h	0	0	257	573	1038	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	1	9
Mvmt Flow	0	0	282	630	1141	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2027	1148	1154	0	-	0
Stage 1	1148	-	-	-	-	-
Stage 2	879	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	66	244	589	-	-	-
Stage 1	305	-	-	-	-	-
Stage 2	550	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	34	244	589	-	-	-
Mov Cap-2 Maneuver	34	-	-	-	-	-
Stage 1	159	-	-	-	-	-
Stage 2	550	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	5.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	589	-	-	-	-
HCM Lane V/C Ratio	0.479	-	-	-	-
HCM Control Delay (s)	16.6	-	0	-	-
HCM Lane LOS	C	-	A	-	-
HCM 95th %tile Q(veh)	2.6	-	-	-	-

APPENDIX 6.2:

OPENING YEAR CUMULATIVE (2022) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	115	0	0	467	3	10
Future Vol, veh/h	115	0	0	467	3	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	0	0	508	3	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	633	125
Stage 1	-	-	-	-	125	-
Stage 2	-	-	-	-	508	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	-	0	0	-	444	926
Stage 1	-	0	0	-	901	-
Stage 2	-	0	0	-	604	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	444	926
Mov Cap-2 Maneuver	-	-	-	-	513	-
Stage 1	-	-	-	-	901	-
Stage 2	-	-	-	-	604	-

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

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	781	-	-
HCM Lane V/C Ratio	0.018	-	-
HCM Control Delay (s)	9.7	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	54	142	0	18	21	458	74	37	96	1
Future Vol, veh/h	0	0	54	142	0	18	21	458	74	37	96	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	59	154	0	20	23	498	80	40	104	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	779	809	53	716	769	538	105	0	0	578	0	0
Stage 1	185	185	-	584	584	-	-	-	-	-	-	-
Stage 2	594	624	-	132	185	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.53	6.93	7.33	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.53	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.53	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	3.519	4.019	3.319	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	299	314	1004	331	331	542	1485	-	-	994	-	-
Stage 1	800	746	-	497	497	-	-	-	-	-	-	-
Stage 2	490	477	-	858	746	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	275	296	1004	298	312	542	1485	-	-	994	-	-
Mov Cap-2 Maneuver	357	363	-	395	395	-	-	-	-	-	-	-
Stage 1	788	714	-	490	490	-	-	-	-	-	-	-
Stage 2	465	470	-	773	714	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.8	20.3	0.3	2.4
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1485	-	-	1004	407	994	-	-
HCM Lane V/C Ratio	0.015	-	-	0.058	0.427	0.04	-	-
HCM Control Delay (s)	7.5	-	-	8.8	20.3	8.8	-	-
HCM Lane LOS	A	-	-	A	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	2.1	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	53	657	81	47	268	268	413	934	140	63	53
Future Volume (vph)	53	657	81	47	268	268	413	934	140	63	53
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases			4					2			6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	15.8	15.8	9.6	26.8	9.6	15.8	15.8	9.6	40.8	40.8
Total Split (s)	9.6	26.8	26.8	9.6	26.8	26.8	63.9	63.9	9.7	46.8	46.8
Total Split (%)	8.7%	24.4%	24.4%	8.7%	24.4%	24.4%	58.1%	58.1%	8.8%	42.5%	42.5%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	3.6	4.8	4.8	3.6	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	5.8	4.6	5.8	4.6	5.8	5.8	4.6	5.8	5.8
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	5.0	19.3	19.3	5.0	19.3	20.0	58.3	58.3	5.1	43.5	43.5
Actuated g/C Ratio	0.05	0.18	0.18	0.05	0.18	0.19	0.55	0.55	0.05	0.41	0.41
v/c Ratio	0.67	0.77	0.21	0.31	0.62	0.88	0.43	1.08	1.80	0.05	0.09
Control Delay	88.0	48.1	1.2	55.9	40.0	69.5	16.8	74.4	434.7	21.9	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	88.0	48.1	1.2	55.9	40.0	69.5	16.8	74.4	434.7	21.9	0.3
LOS	F	D	A	E	D	E	B	E	F	C	A
Approach Delay		46.0			41.8		58.8			243.3	
Approach LOS		D			D		E			F	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 106.5	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.80	
Intersection Signal Delay: 68.6	Intersection LOS: E
Intersection Capacity Utilization 91.8%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 3: Sycamore Canyon Bl. & Central Av.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	657	81	47	268	107	268	413	934	140	63	53
Future Volume (veh/h)	53	657	81	47	268	107	268	413	934	140	63	53
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1856	1796	1900	1870	1870	1856	1885	1841	1856	1856	1648
Adj Flow Rate, veh/h	57	706	85	51	288	112	288	444	909	151	68	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	3	7	0	2	2	3	1	4	3	3	17
Cap, veh/h	74	870	261	129	422	160	318	1032	854	85	1466	
Arrive On Green	0.04	0.17	0.17	0.04	0.17	0.17	0.18	0.55	0.55	0.05	0.42	0.00
Sat Flow, veh/h	1810	5066	1522	3510	2518	957	1767	1885	1560	1767	3526	1397
Grp Volume(v), veh/h	57	706	85	51	201	199	288	444	909	151	68	0
Grp Sat Flow(s),veh/h/ln	1810	1689	1522	1755	1777	1698	1767	1885	1560	1767	1763	1397
Q Serve(g_s), s	3.3	14.2	5.2	1.5	11.3	11.7	16.9	14.8	58.1	5.1	1.2	0.0
Cycle Q Clear(g_c), s	3.3	14.2	5.2	1.5	11.3	11.7	16.9	14.8	58.1	5.1	1.2	0.0
Prop In Lane	1.00		1.00	1.00		0.56	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	74	870	261	129	298	285	318	1032	854	85	1466	
V/C Ratio(X)	0.77	0.81	0.33	0.40	0.68	0.70	0.91	0.43	1.06	1.78	0.05	
Avail Cap(c_a), veh/h	85	1003	301	165	352	336	370	1032	854	85	1466	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	50.4	42.3	38.6	50.0	41.5	41.6	42.6	14.2	24.0	50.5	18.5	0.0
Incr Delay (d2), s/veh	25.9	4.5	0.7	0.7	4.0	5.1	21.5	0.3	49.3	393.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	6.1	1.9	0.7	5.1	5.1	9.0	5.8	30.2	11.5	0.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	76.4	46.8	39.3	50.7	45.5	46.7	64.1	14.5	73.3	443.6	18.5	0.0
LnGrp LOS	E	D	D	D	D	D	E	B	F	F	B	
Approach Vol, veh/h		848			451			1641			219	A
Approach Delay, s/veh		48.1			46.6			55.8			311.6	
Approach LOS		D			D			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.7	63.9	8.5	24.0	23.7	49.9	8.9	23.6
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	5.8	4.6	5.8
Max Green Setting (Gmax), s	5.1	58.1	5.0	21.0	22.2	41.0	5.0	21.0
Max Q Clear Time (g_c+I1), s	7.1	60.1	3.5	16.2	18.9	3.2	5.3	13.7
Green Ext Time (p_c), s	0.0	0.0	0.0	2.0	0.1	0.3	0.0	1.2

Intersection Summary	
HCM 6th Ctrl Delay	70.1
HCM 6th LOS	E

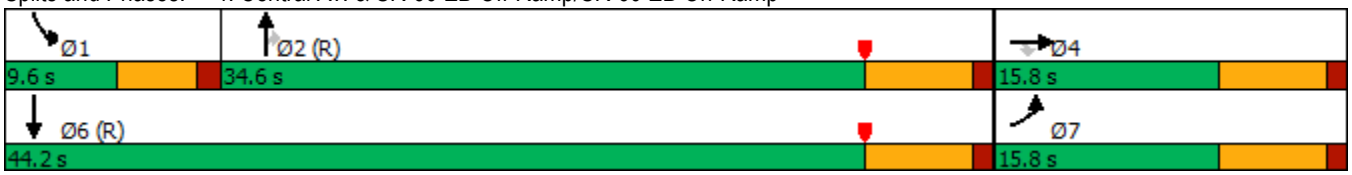
Notes

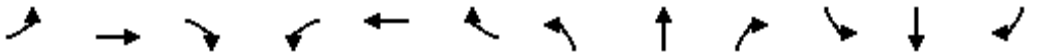
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	98	3	89	1471	260	185	334
Future Volume (vph)	98	3	89	1471	260	185	334
Turn Type	Prot	NA	Perm	NA	Perm	Prot	NA
Protected Phases	7	4		2		1	6
Permitted Phases			4		2		
Detector Phase	7	4	4	2	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	15.8	15.8	15.8	9.6	22.8
Total Split (s)	15.8	15.8	15.8	34.6	34.6	9.6	44.2
Total Split (%)	26.3%	26.3%	26.3%	57.7%	57.7%	16.0%	73.7%
Yellow Time (s)	4.8	4.8	4.8	4.8	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	4.6	5.8
Lead/Lag				Lag	Lag	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	10.0	10.0	10.0	31.8	31.8	5.1	42.7
Actuated g/C Ratio	0.17	0.17	0.17	0.53	0.53	0.08	0.71
v/c Ratio	0.37	0.18	0.14	0.86	0.30	0.69	0.14
Control Delay	26.5	10.0	0.8	20.9	2.3	41.9	3.3
Queue Delay	0.0	0.0	0.0	47.3	0.0	0.0	0.0
Total Delay	26.5	10.0	0.8	68.3	2.3	41.9	3.3
LOS	C	A	A	E	A	D	A
Approach Delay		16.3		58.3			17.0
Approach LOS		B		E			B

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 46.3	Intersection LOS: D
Intersection Capacity Utilization 78.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: Central Av. & SR-60 EB Off-Ramp/SR-60 EB On-Ramp





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	98	3	89	0	0	0	0	1471	260	185	334	0
Future Volume (veh/h)	98	3	89	0	0	0	0	1471	260	185	334	0
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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1841	1900	1811				0	1856	1841	1856	1900	0
Adj Flow Rate, veh/h	107	0	85				0	1599	205	201	363	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	4	0	6				0	3	4	3	0	0
Cap, veh/h	280	0	491				0	1716	759	286	2335	0
Arrive On Green	0.16	0.00	0.16				0.00	0.49	0.49	0.17	1.00	0.00
Sat Flow, veh/h	1753	0	3070				0	3618	1560	3428	3705	0
Grp Volume(v), veh/h	107	0	85				0	1599	205	201	363	0
Grp Sat Flow(s),veh/h/ln	1753	0	1535				0	1763	1560	1714	1805	0
Q Serve(g_s), s	3.3	0.0	1.4				0.0	25.6	4.7	3.3	0.0	0.0
Cycle Q Clear(g_c), s	3.3	0.0	1.4				0.0	25.6	4.7	3.3	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	280	0	491				0	1716	759	286	2335	0
V/C Ratio(X)	0.38	0.00	0.17				0.00	0.93	0.27	0.70	0.16	0.00
Avail Cap(c_a), veh/h	292	0	512				0	1716	759	286	2335	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.09	0.09	0.99	0.99	0.00
Uniform Delay (d), s/veh	22.6	0.0	21.8				0.0	14.5	9.1	24.3	0.0	0.0
Incr Delay (d2), s/veh	0.9	0.0	0.2				0.0	1.2	0.1	6.4	0.1	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	1.3	0.0	0.5				0.0	7.6	1.2	1.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.4	0.0	21.9				0.0	15.7	9.2	30.7	0.1	0.0
LnGrp LOS	C	A	C				A	B	A	C	A	A
Approach Vol, veh/h		192						1804			564	
Approach Delay, s/veh		22.8						15.0			11.0	
Approach LOS		C						B			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	9.6	35.0		15.4		44.6
Change Period (Y+Rc), s	4.6	5.8		5.8		5.8
Max Green Setting (Gmax), s	5.0	28.8		10.0		38.4
Max Q Clear Time (g_c+I1), s	5.3	27.6		5.3		2.0
Green Ext Time (p_c), s	0.0	1.1		0.2		2.3

Intersection Summary		
HCM 6th Ctrl Delay		14.7
HCM 6th LOS		B

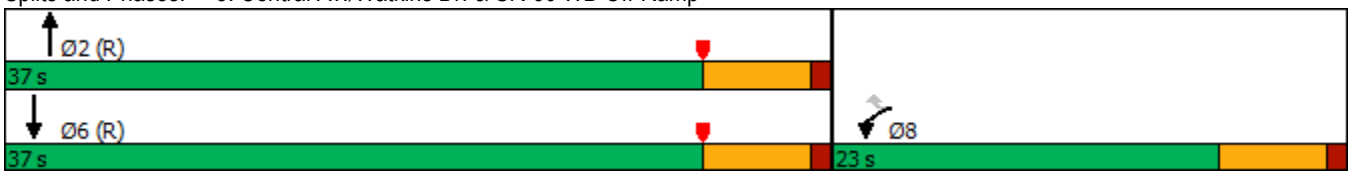
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	158	418	1568	360
Future Volume (vph)	158	418	1568	360
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.8	15.8	15.8	22.8
Total Split (s)	23.0	23.0	37.0	37.0
Total Split (%)	38.3%	38.3%	61.7%	61.7%
Yellow Time (s)	4.8	4.8	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Min	C-Min
Act Effct Green (s)	17.3	17.3	31.1	31.1
Actuated g/C Ratio	0.29	0.29	0.52	0.52
v/c Ratio	0.17	0.95	0.92	0.21
Control Delay	16.6	55.1	20.5	8.1
Queue Delay	0.0	0.0	46.0	0.0
Total Delay	16.6	55.1	66.5	8.1
LOS	B	E	E	A
Approach Delay	44.5		66.5	8.1
Approach LOS	D		E	A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 21.6 (36%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 53.0	Intersection LOS: D
Intersection Capacity Utilization 78.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 5: Central Av./Watkins Dr. & SR-60 WB Off-Ramp



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	158	418	1568	0	0	360
Future Volume (veh/h)	158	418	1568	0	0	360
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1885	1885	1856	0	0	1870
Adj Flow Rate, veh/h	168	356	1668	0	0	383
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	3	0	0	2
Cap, veh/h	889	408	1944	0	0	1960
Arrive On Green	0.26	0.26	0.18	0.00	0.00	0.55
Sat Flow, veh/h	3483	1598	3711	0	0	3741
Grp Volume(v), veh/h	168	356	1668	0	0	383
Grp Sat Flow(s),veh/h/ln	1742	1598	1763	0	0	1777
Q Serve(g_s), s	2.3	12.8	27.5	0.0	0.0	3.3
Cycle Q Clear(g_c), s	2.3	12.8	27.5	0.0	0.0	3.3
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	889	408	1944	0	0	1960
V/C Ratio(X)	0.19	0.87	0.86	0.00	0.00	0.20
Avail Cap(c_a), veh/h	998	458	1944	0	0	1960
HCM Platoon Ratio	1.00	1.00	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.45	0.00	0.00	1.00
Uniform Delay (d), s/veh	17.5	21.4	22.3	0.0	0.0	6.8
Incr Delay (d2), s/veh	0.1	15.6	2.4	0.0	0.0	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	0.8	5.8	13.0	0.0	0.0	0.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.6	37.0	24.7	0.0	0.0	7.0
LnGrp LOS	B	D	C	A	A	A
Approach Vol, veh/h	524		1668			383
Approach Delay, s/veh	30.8		24.7			7.0
Approach LOS	C		C			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		38.9			38.9	21.1
Change Period (Y+Rc), s		5.8			5.8	5.8
Max Green Setting (Gmax), s		31.2			31.2	17.2
Max Q Clear Time (g_c+I1), s		29.5			5.3	14.8
Green Ext Time (p_c), s		1.4			2.3	0.5

Intersection Summary	
HCM 6th Ctrl Delay	23.3
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	10.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	857	1130	360	90
Future Vol, veh/h	0	0	857	1130	360	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	2	0
Mvmt Flow	0	0	942	1242	396	99

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2951	446	495	0	-	0
Stage 1	446	-	-	-	-	-
Stage 2	2505	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	9	617	1049	-	-	-
Stage 1	649	-	-	-	-	-
Stage 2	45	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	1	617	1049	-	-	-
Mov Cap-2 Maneuver	1	-	-	-	-	-
Stage 1	66	-	-	-	-	-
Stage 2	45	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	12.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1049	-	-	-	-
HCM Lane V/C Ratio	0.898	-	-	-	-
HCM Control Delay (s)	29.2	-	0	-	-
HCM Lane LOS	D	-	A	-	-
HCM 95th %tile Q(veh)	13.2	-	-	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↱	
Traffic Vol, veh/h	414	0	0	265	2	6
Future Vol, veh/h	414	0	0	265	2	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	450	0	0	288	2	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	738	450
Stage 1	-	-	-	-	450	-
Stage 2	-	-	-	-	288	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	-	0	0	-	385	609
Stage 1	-	0	0	-	642	-
Stage 2	-	0	0	-	761	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	385	609
Mov Cap-2 Maneuver	-	-	-	-	491	-
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	761	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	574	-	-
HCM Lane V/C Ratio	0.015	-	-
HCM Control Delay (s)	11.4	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0	-	-

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↰	↱			↑↱	
Traffic Vol, veh/h	0	0	34	134	0	17	65	257	72	36	390	3
Future Vol, veh/h	0	0	34	134	0	17	65	257	72	36	390	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	37	146	0	18	71	279	78	39	424	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	973	1003	214	750	965	318	427	0	0	357	0	0
Stage 1	504	504	-	460	460	-	-	-	-	-	-	-
Stage 2	469	499	-	290	505	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.53	6.93	7.33	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.53	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.53	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	3.519	4.019	3.319	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	219	241	792	313	254	722	1131	-	-	1200	-	-
Stage 1	519	540	-	580	565	-	-	-	-	-	-	-
Stage 2	574	543	-	694	539	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	197	216	792	275	228	722	1131	-	-	1200	-	-
Mov Cap-2 Maneuver	311	323	-	378	323	-	-	-	-	-	-	-
Stage 1	486	517	-	543	529	-	-	-	-	-	-	-
Stage 2	524	509	-	633	516	-	-	-	-	-	-	-

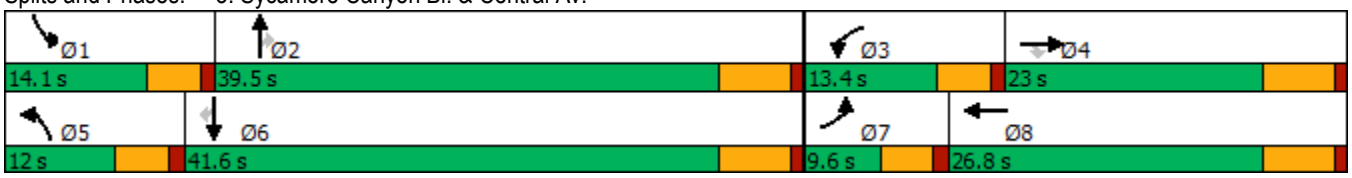
Approach	EB	WB	NB	SB
HCM Control Delay, s	9.8	20.2	1.4	0.7
HCM LOS	A	C		

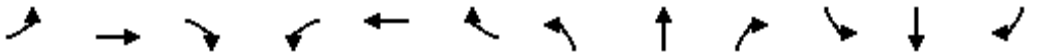
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1131	-	-	792	399	1200	-	-
HCM Lane V/C Ratio	0.062	-	-	0.047	0.411	0.033	-	-
HCM Control Delay (s)	8.4	-	-	9.8	20.2	8.1	-	-
HCM Lane LOS	A	-	-	A	C	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	2	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	61	682	487	245	367	282	200	299	163	316	48
Future Volume (vph)	61	682	487	245	367	282	200	299	163	316	48
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases			4					2			6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	15.8	15.8	9.6	26.8	9.6	15.8	15.8	9.6	40.8	40.8
Total Split (s)	9.6	23.0	23.0	13.4	26.8	12.0	39.5	39.5	14.1	41.6	41.6
Total Split (%)	10.7%	25.6%	25.6%	14.9%	29.8%	13.3%	43.9%	43.9%	15.7%	46.2%	46.2%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	3.6	4.8	4.8	3.6	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	5.8	4.6	5.8	4.6	5.8	5.8	4.6	5.8	5.8
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	5.1	16.4	16.4	8.5	22.2	7.5	15.9	15.9	9.6	17.9	17.9
Actuated g/C Ratio	0.07	0.23	0.23	0.12	0.31	0.10	0.22	0.22	0.13	0.25	0.25
v/c Ratio	0.55	0.62	0.73	0.63	0.50	1.61	0.51	0.61	0.72	0.38	0.10
Control Delay	55.1	28.5	12.7	40.0	21.7	327.9	28.5	13.5	51.1	22.9	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.1	28.5	12.7	40.0	21.7	327.9	28.5	13.5	51.1	22.9	0.4
LOS	E	C	B	D	C	F	C	B	D	C	A
Approach Delay		23.6			27.6		130.8			29.6	
Approach LOS		C			C		F			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 71.6	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.61	
Intersection Signal Delay: 50.8	Intersection LOS: D
Intersection Capacity Utilization 61.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Sycamore Canyon Bl. & Central Av.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	61	682	487	245	367	151	282	200	299	163	316	48
Future Volume (veh/h)	61	682	487	245	367	151	282	200	299	163	316	48
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1885	1870	1885	1885	1885	1870	1885	1856	1900	1885	1900
Adj Flow Rate, veh/h	65	726	377	261	390	146	300	213	223	173	336	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	8	1	2	1	1	1	2	1	3	0	1	0
Cap, veh/h	90	1357	418	363	800	295	204	362	302	215	704	
Arrive On Green	0.05	0.26	0.26	0.10	0.31	0.31	0.11	0.19	0.19	0.12	0.20	0.00
Sat Flow, veh/h	1697	5147	1585	3483	2544	938	1781	1885	1572	1810	3582	1610
Grp Volume(v), veh/h	65	726	377	261	273	263	300	213	223	173	336	0
Grp Sat Flow(s),veh/h/ln	1697	1716	1585	1742	1791	1691	1781	1885	1572	1810	1791	1610
Q Serve(g_s), s	2.4	7.8	14.9	4.7	8.0	8.2	7.4	6.7	8.6	6.0	5.4	0.0
Cycle Q Clear(g_c), s	2.4	7.8	14.9	4.7	8.0	8.2	7.4	6.7	8.6	6.0	5.4	0.0
Prop In Lane	1.00		1.00	1.00		0.55	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	90	1357	418	363	564	532	204	362	302	215	704	
V/C Ratio(X)	0.72	0.53	0.90	0.72	0.48	0.49	1.47	0.59	0.74	0.80	0.48	
Avail Cap(c_a), veh/h	131	1367	421	473	581	548	204	981	818	265	1980	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.2	20.4	23.0	28.1	17.9	18.0	28.7	23.8	24.6	27.8	23.1	0.0
Incr Delay (d2), s/veh	4.0	0.4	22.1	2.2	0.6	0.7	237.9	1.5	3.5	10.9	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	2.8	7.3	1.9	2.9	2.8	16.3	2.8	3.1	3.0	2.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.2	20.8	45.1	30.3	18.6	18.7	266.6	25.4	28.2	38.7	23.6	0.0
LnGrp LOS	C	C	D	C	B	B	F	C	C	D	C	
Approach Vol, veh/h		1168			797			736			509	A
Approach Delay, s/veh		29.4			22.5			124.6			28.7	
Approach LOS		C			C			F			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.3	18.2	11.3	22.9	12.0	18.5	8.0	26.2
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	5.8	4.6	5.8
Max Green Setting (Gmax), s	9.5	33.7	8.8	17.2	7.4	35.8	5.0	21.0
Max Q Clear Time (g_c+I1), s	8.0	10.6	6.7	16.9	9.4	7.4	4.4	10.2
Green Ext Time (p_c), s	0.0	1.8	0.1	0.2	0.0	2.0	0.0	2.2

Intersection Summary	
HCM 6th Ctrl Delay	49.4
HCM 6th LOS	D

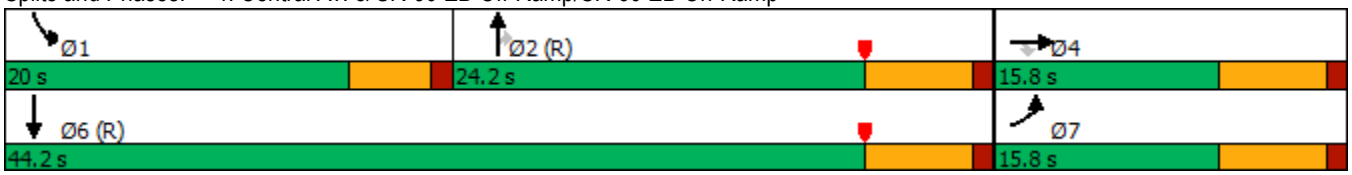
Notes

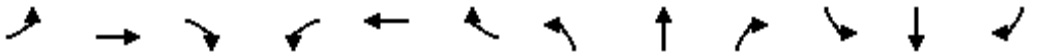
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	10	3	99	487	657	711	665
Future Volume (vph)	10	3	99	487	657	711	665
Turn Type	Prot	NA	Perm	NA	Perm	Prot	NA
Protected Phases	7	4		2		1	6
Permitted Phases			4		2		
Detector Phase	7	4	4	2	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	15.8	15.8	15.8	9.6	22.8
Total Split (s)	15.8	15.8	15.8	24.2	24.2	20.0	44.2
Total Split (%)	26.3%	26.3%	26.3%	40.3%	40.3%	33.3%	73.7%
Yellow Time (s)	4.8	4.8	4.8	4.8	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	4.6	5.8
Lead/Lag				Lag	Lag	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	10.0	10.0	10.0	24.9	24.9	15.2	47.0
Actuated g/C Ratio	0.17	0.17	0.17	0.42	0.42	0.25	0.78
v/c Ratio	0.04	0.19	0.15	0.36	0.78	0.88	0.25
Control Delay	21.5	9.9	0.9	15.1	16.3	34.6	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.5	9.9	0.9	15.1	16.3	34.6	5.5
LOS	C	A	A	B	B	C	A
Approach Delay		6.9		15.8			20.5
Approach LOS		A		B			C

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 17.9	Intersection LOS: B
Intersection Capacity Utilization 82.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 4: Central Av. & SR-60 EB Off-Ramp/SR-60 EB On-Ramp





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	3	99	0	0	0	0	487	657	711	665	0
Future Volume (veh/h)	10	3	99	0	0	0	0	487	657	711	665	0
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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1841	1900	1811				0	1856	1841	1856	1900	0
Adj Flow Rate, veh/h	11	0	92				0	518	514	756	707	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	4	0	6				0	3	4	3	0	0
Cap, veh/h	240	0	420				0	1231	545	837	2418	0
Arrive On Green	0.14	0.00	0.14				0.00	0.35	0.35	0.41	1.00	0.00
Sat Flow, veh/h	1753	0	3070				0	3618	1560	3428	3705	0
Grp Volume(v), veh/h	11	0	92				0	518	514	756	707	0
Grp Sat Flow(s),veh/h/ln	1753	0	1535				0	1763	1560	1714	1805	0
Q Serve(g_s), s	0.3	0.0	1.6				0.0	6.7	19.2	12.4	0.0	0.0
Cycle Q Clear(g_c), s	0.3	0.0	1.6				0.0	6.7	19.2	12.4	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	240	0	420				0	1231	545	837	2418	0
V/C Ratio(X)	0.05	0.00	0.22				0.00	0.42	0.94	0.90	0.29	0.00
Avail Cap(c_a), veh/h	292	0	512				0	1231	545	880	2418	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.67	1.67	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.74	0.74	0.82	0.82	0.00
Uniform Delay (d), s/veh	22.5	0.0	23.0				0.0	14.9	19.0	17.1	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.3				0.0	0.8	21.9	9.9	0.3	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	0.1	0.0	0.5				0.0	2.3	8.9	4.4	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.6	0.0	23.3				0.0	15.7	40.9	27.1	0.3	0.0
LnGrp LOS	C	A	C				A	B	D	C	A	A
Approach Vol, veh/h		103						1032			1463	
Approach Delay, s/veh		23.2						28.2			14.1	
Approach LOS		C						C			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	19.2	26.8		14.0		46.0
Change Period (Y+Rc), s	4.6	5.8		5.8		5.8
Max Green Setting (Gmax), s	15.4	18.4		10.0		38.4
Max Q Clear Time (g_c+I1), s	14.4	21.2		3.6		2.0
Green Ext Time (p_c), s	0.2	0.0		0.1		4.9

Intersection Summary		
HCM 6th Ctrl Delay		20.1
HCM 6th LOS		C

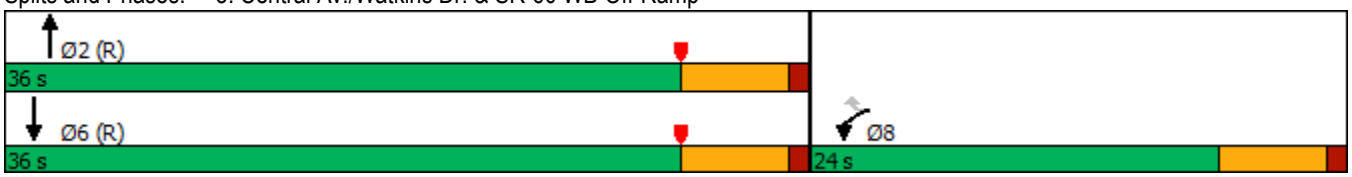
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	331	351	495	1045
Future Volume (vph)	331	351	495	1045
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.8	15.8	15.8	22.8
Total Split (s)	24.0	24.0	36.0	36.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%
Yellow Time (s)	4.8	4.8	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Min	C-Min
Act Effct Green (s)	13.5	13.5	34.9	34.9
Actuated g/C Ratio	0.22	0.22	0.58	0.58
v/c Ratio	0.48	0.72	0.28	0.57
Control Delay	21.8	15.8	2.8	9.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.8	15.8	2.8	9.9
LOS	C	B	A	A
Approach Delay	18.7		2.8	9.9
Approach LOS	B		A	A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 21.6 (36%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 45	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 11.0	Intersection LOS: B
Intersection Capacity Utilization 48.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 5: Central Av./Watkins Dr. & SR-60 WB Off-Ramp



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	331	351	495	2	0	1045
Future Volume (veh/h)	331	351	495	2	0	1045
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1885	1870	1856	1856	0	1885
Adj Flow Rate, veh/h	376	227	562	2	0	1188
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	1	2	3	3	0	1
Cap, veh/h	669	304	2215	8	0	2202
Arrive On Green	0.19	0.19	0.20	0.20	0.00	0.61
Sat Flow, veh/h	3483	1585	3696	13	0	3770
Grp Volume(v), veh/h	376	227	275	289	0	1188
Grp Sat Flow(s),veh/h/ln	1742	1585	1763	1853	0	1791
Q Serve(g_s), s	5.9	8.1	7.9	7.9	0.0	11.5
Cycle Q Clear(g_c), s	5.9	8.1	7.9	7.9	0.0	11.5
Prop In Lane	1.00	1.00		0.01	0.00	
Lane Grp Cap(c), veh/h	669	304	1084	1139	0	2202
V/C Ratio(X)	0.56	0.75	0.25	0.25	0.00	0.54
Avail Cap(c_a), veh/h	1057	481	1084	1139	0	2202
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.95	0.95	0.00	1.00
Uniform Delay (d), s/veh	22.0	22.9	12.3	12.3	0.0	6.7
Incr Delay (d2), s/veh	0.7	3.6	0.5	0.5	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	2.9	2.6	2.7	0.0	2.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.7	26.5	12.9	12.9	0.0	7.6
LnGrp LOS	C	C	B	B	A	A
Approach Vol, veh/h	603		564			1188
Approach Delay, s/veh	24.1		12.9			7.6
Approach LOS	C		B			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		42.7			42.7	17.3
Change Period (Y+Rc), s		5.8			5.8	5.8
Max Green Setting (Gmax), s		30.2			30.2	18.2
Max Q Clear Time (g_c+I1), s		9.9			13.5	10.1
Green Ext Time (p_c), s		2.9			7.3	1.4

Intersection Summary		
HCM 6th Ctrl Delay		13.1
HCM 6th LOS		B

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	268	577	1045	12
Future Vol, veh/h	0	0	268	577	1045	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	1	9
Mvmt Flow	0	0	295	634	1148	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2062	1155	1161	0	-	0
Stage 1	1155	-	-	-	-	-
Stage 2	907	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	62	242	586	-	-	-
Stage 1	303	-	-	-	-	-
Stage 2	529	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	31	242	586	-	-	-
Mov Cap-2 Maneuver	31	-	-	-	-	-
Stage 1	151	-	-	-	-	-
Stage 2	529	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	5.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	586	-	-	-	-
HCM Lane V/C Ratio	0.503	-	-	-	-
HCM Control Delay (s)	17.2	-	0	-	-
HCM Lane LOS	C	-	A	-	-
HCM 95th %tile Q(veh)	2.8	-	-	-	-

APPENDIX 6.3:

OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM		TRAFFIC CONDITIONS		2022 NP
				CALC	CS	DATE	06/26/19
Jurisdiction:	City of Riverside			CHK	CS	DATE	06/26/19
Major Street:	Sycamore Canyon Boulevard				Critical Approach Speed (Major)		45 mph
Minor Street:	Driveway 2				Critical Approach Speed (Minor)		25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **8,937** vpd Minor Street Future ADT = **1,625** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. √

or

In built up area of isolated community of < 10,000 population ……..

RURAL (R)

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
	XX				
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **8,937**	*1* **1,625**	8,000	5,600 *	2,400	1,680
2 +	*1*	9,600	6,720	2,400	1,680
2 +	*2* +	9,600	6,720	3,200	2,240
1	*2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
XX					
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **8,937**	*1* **1,625**	12,000	8,400 *	1,200	850 *
2 +	*1*	14,400	10,080	1,200	850
2 +	*2* +	14,400	10,080	1,600	1,120
1	*2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B					
Satisfied	Not Satisfied				
XX		2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more …..	A / B				
	A: 97% / B: 100%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

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APPENDIX 6.4:

OPENING YEAR CUMULATIVE (2022) WITH PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS		2022 WP
				CALC LC	DATE	06/13/19
Jurisdiction: City of Riverside				CHK CS	DATE	06/13/19
Major Street: Sycamore Canyon Boulevard				Critical Approach Speed (Major)		45 mph
Minor Street: Driveway 1				Critical Approach Speed (Minor)		25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **7,764** vpd Minor Street Future ADT = **70** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. √

or

In built up area of isolated community of < 10,000 population ……

RURAL (R)

(Based on Estimated Average Daily Traffic - See Note)

URBAN / RURAL	Number of lanes for moving traffic on each approach		Minimum Requirements EADT			
			Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
	Major Street	Minor Street	Urban	Rural	Urban	Rural
CONDITION A - Minimum Vehicular Volume						
Satisfied / Not Satisfied: XX / XX						
	1 **7,764**	1 **70**	8,000	5,600 *	2,400	1,680
	2 +	1	9,600	6,720	2,400	1,680
	2 +	2 +	9,600	6,720	3,200	2,240
	1	2 +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic						
Satisfied / Not Satisfied: XX						
	1 **7,764**	1 **70**	12,000	8,400	1,200	850
	2 +	1	14,400	10,080	1,200	850
	2 +	2 +	14,400	10,080	1,600	1,120
	1	2 +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B						
Satisfied / Not Satisfied: XX						
No one condition satisfied, but following conditions fulfilled 80% of more …..	**A** 4%	**B** 8%	2 CONDITIONS 80%		2 CONDITIONS 80%	

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

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APPENDIX 6.5:

OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS

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Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	142	0	18	0	458	74	37	86	0
Future Vol, veh/h	0	0	0	142	0	18	0	458	74	37	86	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	154	0	20	0	498	80	40	93	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	665	711	538	-	0	0	578	0	0
Stage 1	538	538	-	-	-	-	-	-	-
Stage 2	127	173	-	-	-	-	-	-	-
Critical Hdwy	6.63	6.53	6.23	-	-	-	4.13	-	-
Critical Hdwy Stg 1	5.43	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.83	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	-	-	-	2.219	-	-
Pot Cap-1 Maneuver	409	357	542	0	-	-	994	-	0
Stage 1	584	521	-	0	-	-	-	-	0
Stage 2	886	755	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	392	0	542	-	-	-	994	-	-
Mov Cap-2 Maneuver	481	0	-	-	-	-	-	-	-
Stage 1	584	0	-	-	-	-	-	-	-
Stage 2	849	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.4	0	2.7
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	487	994	-
HCM Lane V/C Ratio	-	-	0.357	0.04	-
HCM Control Delay (s)	-	-	16.4	8.8	0.1
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.6	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	53	706	87	51	389	288	441	1004	106	57	42
v/c Ratio	0.62	0.77	0.21	0.31	0.60	0.88	0.43	1.07	1.26	0.04	0.06
Control Delay	82.7	48.1	1.2	55.9	40.4	69.5	16.7	73.3	228.3	21.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.7	48.1	1.2	55.9	40.4	69.5	16.7	73.3	228.3	21.9	0.2
Queue Length 50th (ft)	38	173	0	18	118	196	184	~744	~96	13	0
Queue Length 95th (ft)	#102	219	0	38	170	#333	264	#996	#210	27	0
Internal Link Dist (ft)		1568			344		831			521	
Turn Bay Length (ft)	570		200	100		250		115	250		
Base Capacity (vph)	85	996	430	165	702	366	1030	935	84	1430	660
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.71	0.20	0.31	0.55	0.79	0.43	1.07	1.26	0.04	0.06

Intersection Summary

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

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

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	107	47	46	1573	264	201	354
v/c Ratio	0.37	0.17	0.13	0.90	0.29	0.51	0.14
Control Delay	26.5	10.2	0.8	25.7	2.6	32.2	3.2
Queue Delay	0.0	0.0	0.0	46.6	0.0	0.0	0.0
Total Delay	26.5	10.2	0.8	72.2	2.6	32.2	3.2
Queue Length 50th (ft)	35	1	0	~298	0	39	15
Queue Length 95th (ft)	75	26	0	#450	34	69	31
Internal Link Dist (ft)		1038		344			253
Turn Bay Length (ft)	400		115			150	
Base Capacity (vph)	289	281	353	1755	909	419	2570
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	2	0	0	422	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.17	0.13	1.18	0.29	0.48	0.14

Intersection Summary

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

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

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	162	445	1643	381
v/c Ratio	0.16	0.94	0.91	0.21
Control Delay	16.6	53.9	18.7	8.1
Queue Delay	0.0	0.0	46.4	0.0
Total Delay	16.6	53.9	65.1	8.1
Queue Length 50th (ft)	22	152	337	35
Queue Length 95th (ft)	42	#319	m#406	56
Internal Link Dist (ft)	1138		253	437
Turn Bay Length (ft)		300		
Base Capacity (vph)	1000	471	1822	1840
Starvation Cap Reductn	0	0	443	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.16	0.94	1.19	0.21

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.

Intersection	
Int Delay, s/veh	9.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	840	1123	358	90
Future Vol, veh/h	0	0	840	1123	358	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	2	0
Mvmt Flow	0	0	923	1234	393	99

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2906	443	492	0	-	0
Stage 1	443	-	-	-	-	-
Stage 2	2463	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	10	619	1051	-	-	-
Stage 1	651	-	-	-	-	-
Stage 2	48	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	1	619	1051	-	-	-
Mov Cap-2 Maneuver	1	-	-	-	-	-
Stage 1	79	-	-	-	-	-
Stage 2	48	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	11.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1051	-	-	-	-
HCM Lane V/C Ratio	0.878	-	-	-	-
HCM Control Delay (s)	26.9	-	0	-	-
HCM Lane LOS	D	-	A	-	-
HCM 95th %tile Q(veh)	12.3	-	-	-	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	134	0	17	0	257	72	36	384	0
Future Vol, veh/h	0	0	0	134	0	17	0	257	72	36	384	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	146	0	18	0	279	78	39	417	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	605	813	318	-	0	0	357	0	0
Stage 1	318	318	-	-	-	-	-	-	-
Stage 2	287	495	-	-	-	-	-	-	-
Critical Hdwy	6.63	6.53	6.23	-	-	-	4.13	-	-
Critical Hdwy Stg 1	5.43	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.83	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	-	-	-	2.219	-	-
Pot Cap-1 Maneuver	445	312	722	0	-	-	1200	-	0
Stage 1	737	653	-	0	-	-	-	-	0
Stage 2	737	545	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	426	0	722	-	-	-	1200	-	-
Mov Cap-2 Maneuver	523	0	-	-	-	-	-	-	-
Stage 1	737	0	-	-	-	-	-	-	-
Stage 2	706	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.6	0	0.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	540	1200	-
HCM Lane V/C Ratio	-	-	0.304	0.033	-
HCM Control Delay (s)	-	-	14.6	8.1	0.1
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	1.3	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	50	726	518	261	507	300	202	318	146	330	41
v/c Ratio	0.42	0.61	0.73	0.63	0.42	1.60	0.49	0.60	0.64	0.38	0.08
Control Delay	47.1	28.1	12.2	39.5	20.5	319.0	27.9	12.3	46.6	23.1	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.1	28.1	12.2	39.5	20.5	319.0	27.9	12.3	46.6	23.1	0.3
Queue Length 50th (ft)	21	97	22	54	82	~185	79	32	59	64	0
Queue Length 95th (ft)	#77	184	#163	#131	175	#426	133	96	#176	94	0
Internal Link Dist (ft)		1568			344		831			521	
Turn Bay Length (ft)	570		200	100		250		115	250		
Base Capacity (vph)	120	1273	731	439	1203	188	913	880	247	1843	892
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.57	0.71	0.59	0.42	1.60	0.22	0.36	0.59	0.18	0.05

Intersection Summary

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

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

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	11	46	44	502	687	756	682
v/c Ratio	0.04	0.16	0.12	0.35	0.77	0.88	0.24
Control Delay	21.5	10.2	0.7	15.0	15.4	34.8	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.5	10.2	0.7	15.0	15.4	34.8	5.4
Queue Length 50th (ft)	3	1	0	76	81	144	35
Queue Length 95th (ft)	15	26	0	115	#293	#219	129
Internal Link Dist (ft)		1038		344			253
Turn Bay Length (ft)	400		115			150	
Base Capacity (vph)	289	280	353	1454	897	882	2830
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.16	0.12	0.35	0.77	0.86	0.24

Intersection Summary

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

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	357	399	547	1180
v/c Ratio	0.47	0.72	0.27	0.56
Control Delay	21.7	15.0	2.6	9.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.7	15.0	2.6	9.7
Queue Length 50th (ft)	59	42	2	115
Queue Length 95th (ft)	79	104	4	206
Internal Link Dist (ft)	1138		253	437
Turn Bay Length (ft)		300		
Base Capacity (vph)	1051	665	2051	2093
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.34	0.60	0.27	0.56

Intersection Summary

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	257	573	1038	12
Future Vol, veh/h	0	0	257	573	1038	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	1	9
Mvmt Flow	0	0	282	630	1141	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2027	1148	1154	0	-	0
Stage 1	1148	-	-	-	-	-
Stage 2	879	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	66	244	589	-	-	-
Stage 1	305	-	-	-	-	-
Stage 2	550	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	34	244	589	-	-	-
Mov Cap-2 Maneuver	34	-	-	-	-	-
Stage 1	159	-	-	-	-	-
Stage 2	550	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	5.1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	589	-	-	-	-
HCM Lane V/C Ratio	0.479	-	-	-	-
HCM Control Delay (s)	16.6	-	0	-	-
HCM Lane LOS	C	-	A	-	-
HCM 95th %tile Q(veh)	2.6	-	-	-	-

APPENDIX 6.6:

OPENING YEAR CUMULATIVE (2022) WITH PROJECT CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS

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Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↱	
Traffic Vol, veh/h	115	0	0	467	3	10
Future Vol, veh/h	115	0	0	467	3	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	0	0	508	3	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	633	125
Stage 1	-	-	-	-	125	-
Stage 2	-	-	-	-	508	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	-	0	0	-	444	926
Stage 1	-	0	0	-	901	-
Stage 2	-	0	0	-	604	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	444	926
Mov Cap-2 Maneuver	-	-	-	-	513	-
Stage 1	-	-	-	-	901	-
Stage 2	-	-	-	-	604	-

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

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	781	-	-
HCM Lane V/C Ratio	0.018	-	-
HCM Control Delay (s)	9.7	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	54	142	0	18	21	458	74	37	96	1
Future Vol, veh/h	0	0	54	142	0	18	21	458	74	37	96	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	59	154	0	20	23	498	80	40	104	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	779	809	53	716	769	538	105	0	0	578	0	0
Stage 1	185	185	-	584	584	-	-	-	-	-	-	-
Stage 2	594	624	-	132	185	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.53	6.93	7.33	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.53	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.53	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	3.519	4.019	3.319	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	299	314	1004	331	331	542	1485	-	-	994	-	-
Stage 1	800	746	-	497	497	-	-	-	-	-	-	-
Stage 2	490	477	-	858	746	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	275	296	1004	298	312	542	1485	-	-	994	-	-
Mov Cap-2 Maneuver	357	363	-	395	395	-	-	-	-	-	-	-
Stage 1	788	714	-	490	490	-	-	-	-	-	-	-
Stage 2	465	470	-	773	714	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.8	20.3	0.3	2.4
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1485	-	-	1004	407	994	-	-
HCM Lane V/C Ratio	0.015	-	-	0.058	0.427	0.04	-	-
HCM Control Delay (s)	7.5	-	-	8.8	20.3	8.8	-	-
HCM Lane LOS	A	-	-	A	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	2.1	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	57	706	87	51	403	288	444	1004	151	68	57
v/c Ratio	0.67	0.77	0.21	0.31	0.62	0.88	0.43	1.08	1.80	0.05	0.09
Control Delay	88.0	48.1	1.2	55.9	40.0	69.5	16.8	74.4	434.7	21.9	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	88.0	48.1	1.2	55.9	40.0	69.5	16.8	74.4	434.7	21.9	0.3
Queue Length 50th (ft)	40	173	0	18	121	196	185	~749	~163	15	0
Queue Length 95th (ft)	#109	219	0	38	173	#333	266	#1001	#294	31	0
Internal Link Dist (ft)		1568			344		831			521	
Turn Bay Length (ft)	570		200	100		250		115	250		
Base Capacity (vph)	85	996	430	165	707	366	1030	932	84	1430	660
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.71	0.20	0.31	0.57	0.79	0.43	1.08	1.80	0.05	0.09

Intersection Summary

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

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

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	107	51	49	1599	283	201	363
v/c Ratio	0.37	0.18	0.14	0.86	0.30	0.69	0.14
Control Delay	26.5	10.0	0.8	20.9	2.3	41.9	3.3
Queue Delay	0.0	0.0	0.0	47.3	0.0	0.0	0.0
Total Delay	26.5	10.0	0.8	68.3	2.3	41.9	3.3
Queue Length 50th (ft)	35	1	0	271	0	39	15
Queue Length 95th (ft)	75	27	0	#433	32	#83	32
Internal Link Dist (ft)		1038		344			253
Turn Bay Length (ft)	400		115			150	
Base Capacity (vph)	289	284	353	1858	956	291	2570
Starvation Cap Reductn	0	0	0	62	0	0	0
Spillback Cap Reductn	2	0	0	519	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.18	0.14	1.19	0.30	0.69	0.14

Intersection Summary

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

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	168	445	1668	383
v/c Ratio	0.17	0.95	0.92	0.21
Control Delay	16.6	55.1	20.5	8.1
Queue Delay	0.0	0.0	46.0	0.0
Total Delay	16.6	55.1	66.5	8.1
Queue Length 50th (ft)	23	152	347	35
Queue Length 95th (ft)	43	#320	m#450	56
Internal Link Dist (ft)	1138		253	437
Turn Bay Length (ft)		300		
Base Capacity (vph)	997	469	1822	1840
Starvation Cap Reductn	0	0	443	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.17	0.95	1.21	0.21

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.

Intersection	
Int Delay, s/veh	10.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	857	1130	360	90
Future Vol, veh/h	0	0	857	1130	360	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	2	0
Mvmt Flow	0	0	942	1242	396	99

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2951	446	495	0	-	0
Stage 1	446	-	-	-	-	-
Stage 2	2505	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	9	617	1049	-	-	-
Stage 1	649	-	-	-	-	-
Stage 2	45	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	1	617	1049	-	-	-
Mov Cap-2 Maneuver	1	-	-	-	-	-
Stage 1	66	-	-	-	-	-
Stage 2	45	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	12.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1049	-	-	-	-
HCM Lane V/C Ratio	0.898	-	-	-	-
HCM Control Delay (s)	29.2	-	0	-	-
HCM Lane LOS	D	-	A	-	-
HCM 95th %tile Q(veh)	13.2	-	-	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↱	
Traffic Vol, veh/h	414	0	0	265	2	6
Future Vol, veh/h	414	0	0	265	2	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	450	0	0	288	2	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	738	450
Stage 1	-	-	-	-	450	-
Stage 2	-	-	-	-	288	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	-	0	0	-	385	609
Stage 1	-	0	0	-	642	-
Stage 2	-	0	0	-	761	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	385	609
Mov Cap-2 Maneuver	-	-	-	-	491	-
Stage 1	-	-	-	-	642	-
Stage 2	-	-	-	-	761	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	574	-	-
HCM Lane V/C Ratio	0.015	-	-
HCM Control Delay (s)	11.4	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0	-	-

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↰	↱			↑↱	
Traffic Vol, veh/h	0	0	34	134	0	17	65	257	72	36	390	3
Future Vol, veh/h	0	0	34	134	0	17	65	257	72	36	390	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	37	146	0	18	71	279	78	39	424	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	973	1003	214	750	965	318	427	0	0	357	0	0
Stage 1	504	504	-	460	460	-	-	-	-	-	-	-
Stage 2	469	499	-	290	505	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.53	6.93	7.33	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.53	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.53	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	3.519	4.019	3.319	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	219	241	792	313	254	722	1131	-	-	1200	-	-
Stage 1	519	540	-	580	565	-	-	-	-	-	-	-
Stage 2	574	543	-	694	539	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	197	216	792	275	228	722	1131	-	-	1200	-	-
Mov Cap-2 Maneuver	311	323	-	378	323	-	-	-	-	-	-	-
Stage 1	486	517	-	543	529	-	-	-	-	-	-	-
Stage 2	524	509	-	633	516	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.8	20.2	1.4	0.7
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1131	-	-	792	399	1200	-	-
HCM Lane V/C Ratio	0.062	-	-	0.047	0.411	0.033	-	-
HCM Control Delay (s)	8.4	-	-	9.8	20.2	8.1	-	-
HCM Lane LOS	A	-	-	A	C	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	2	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	65	726	518	261	551	300	213	318	173	336	51
v/c Ratio	0.55	0.62	0.73	0.63	0.50	1.61	0.51	0.61	0.72	0.38	0.10
Control Delay	55.1	28.5	12.7	40.0	21.7	327.9	28.5	13.5	51.1	22.9	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.1	28.5	12.7	40.0	21.7	327.9	28.5	13.5	51.1	22.9	0.4
Queue Length 50th (ft)	27	99	24	55	87	~187	84	37	72	65	0
Queue Length 95th (ft)	#103	184	#172	#131	185	#426	139	103	#217	96	0
Internal Link Dist (ft)		1568			344		831			521	
Turn Bay Length (ft)	570		200	100		250		115	250		
Base Capacity (vph)	118	1255	723	433	1102	186	900	865	243	1818	882
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.58	0.72	0.60	0.50	1.61	0.24	0.37	0.71	0.18	0.06

Intersection Summary

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

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

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	11	54	54	518	699	756	707
v/c Ratio	0.04	0.19	0.15	0.36	0.78	0.88	0.25
Control Delay	21.5	9.9	0.9	15.1	16.3	34.6	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.5	9.9	0.9	15.1	16.3	34.6	5.5
Queue Length 50th (ft)	3	1	0	79	88	137	36
Queue Length 95th (ft)	15	28	0	119	#303	#219	132
Internal Link Dist (ft)		1038		344			253
Turn Bay Length (ft)	400		115			150	
Base Capacity (vph)	289	286	353	1454	897	882	2830
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.19	0.15	0.36	0.78	0.86	0.25

Intersection Summary

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

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	376	399	565	1188
v/c Ratio	0.48	0.72	0.28	0.57
Control Delay	21.8	15.8	2.8	9.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.8	15.8	2.8	9.9
Queue Length 50th (ft)	62	46	2	118
Queue Length 95th (ft)	83	109	4	207
Internal Link Dist (ft)	1138		253	437
Turn Bay Length (ft)		300		
Base Capacity (vph)	1051	657	2039	2081
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.36	0.61	0.28	0.57

Intersection Summary

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	268	577	1045	12
Future Vol, veh/h	0	0	268	577	1045	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	1	9
Mvmt Flow	0	0	295	634	1148	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2062	1155	1161	0	-	0
Stage 1	1155	-	-	-	-	-
Stage 2	907	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	62	242	586	-	-	-
Stage 1	303	-	-	-	-	-
Stage 2	529	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	31	242	586	-	-	-
Mov Cap-2 Maneuver	31	-	-	-	-	-
Stage 1	151	-	-	-	-	-
Stage 2	529	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	5.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	586	-	-	-	-
HCM Lane V/C Ratio	0.503	-	-	-	-
HCM Control Delay (s)	17.2	-	0	-	-
HCM Lane LOS	C	-	A	-	-
HCM 95th %tile Q(veh)	2.8	-	-	-	-

APPENDIX 6.7:

OPENING YEAR CUMULATIVE (2022) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS WITH IMPROVEMENTS

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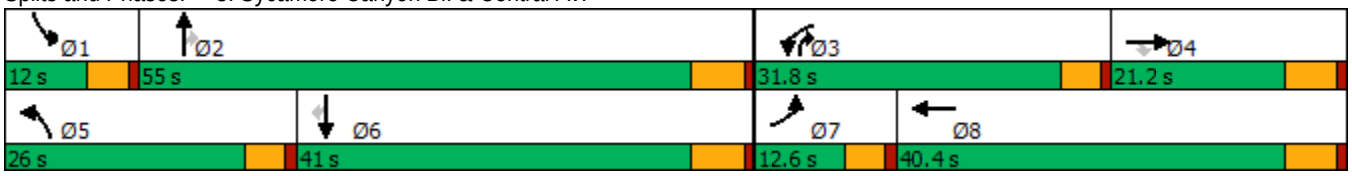
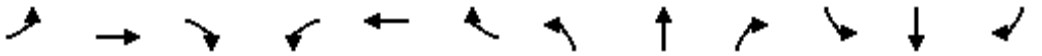
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	53	657	81	47	268	268	413	934	140	63	53
Future Volume (vph)	53	657	81	47	268	268	413	934	140	63	53
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2	3	1	6	
Permitted Phases			4					2			6
Detector Phase	7	4	4	3	8	5	2	3	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	5.0	10.0	10.0
Minimum Split (s)	9.6	15.8	15.8	9.6	26.8	9.6	15.8	9.6	9.6	40.8	40.8
Total Split (s)	12.6	21.2	21.2	31.8	40.4	26.0	55.0	31.8	12.0	41.0	41.0
Total Split (%)	10.5%	17.7%	17.7%	26.5%	33.7%	21.7%	45.8%	26.5%	10.0%	34.2%	34.2%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	3.6	4.8	3.6	3.6	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	5.8	4.6	5.8	4.6	5.8	4.6	4.6	5.8	5.8
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	None	Min	Min

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 101.4
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Sycamore Canyon Bl. & Central Av.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	657	81	47	268	107	268	413	934	140	63	53
Future Volume (veh/h)	53	657	81	47	268	107	268	413	934	140	63	53
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1856	1796	1900	1870	1870	1856	1885	1841	1856	1856	1648
Adj Flow Rate, veh/h	57	706	85	51	288	112	288	444	909	151	68	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	3	7	0	2	2	3	1	4	3	3	17
Cap, veh/h	74	803	241	136	394	150	321	962	856	136	1429	
Arrive On Green	0.04	0.16	0.16	0.04	0.16	0.16	0.18	0.51	0.51	0.08	0.41	0.00
Sat Flow, veh/h	1810	5066	1522	3510	2518	957	1767	1885	1560	1767	3526	1397
Grp Volume(v), veh/h	57	706	85	51	201	199	288	444	909	151	68	0
Grp Sat Flow(s),veh/h/ln	1810	1689	1522	1755	1777	1698	1767	1885	1560	1767	1763	1397
Q Serve(g_s), s	3.0	13.1	4.8	1.4	10.4	10.8	15.4	14.5	49.2	7.4	1.1	0.0
Cycle Q Clear(g_c), s	3.0	13.1	4.8	1.4	10.4	10.8	15.4	14.5	49.2	7.4	1.1	0.0
Prop In Lane	1.00		1.00	1.00		0.56	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	74	803	241	136	278	265	321	962	856	136	1429	
V/C Ratio(X)	0.77	0.88	0.35	0.38	0.72	0.75	0.90	0.46	1.06	1.11	0.05	
Avail Cap(c_a), veh/h	150	809	243	991	638	610	392	962	856	136	1429	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	45.8	39.7	36.2	45.2	38.7	38.9	38.6	15.1	21.7	44.5	17.4	0.0
Incr Delay (d2), s/veh	6.3	10.9	0.9	0.6	3.6	4.2	17.9	0.3	48.4	110.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	6.0	1.8	0.6	4.6	4.6	7.9	5.6	27.7	7.3	0.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.1	50.6	37.0	45.8	42.3	43.1	56.5	15.5	70.1	155.3	17.4	0.0
LnGrp LOS	D	D	D	D	D	D	E	B	F	F	B	
Approach Vol, veh/h		848			451			1641			219	A
Approach Delay, s/veh		49.3			43.0			52.9			112.5	
Approach LOS		D			D			D			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	55.0	8.3	21.1	22.1	44.9	8.5	20.9
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	5.8	4.6	5.8
Max Green Setting (Gmax), s	7.4	49.2	27.2	15.4	21.4	35.2	8.0	34.6
Max Q Clear Time (g_c+I1), s	9.4	51.2	3.4	15.1	17.4	3.1	5.0	12.8
Green Ext Time (p_c), s	0.0	0.0	0.1	0.1	0.2	0.3	0.0	2.1

Intersection Summary	
HCM 6th Ctrl Delay	54.7
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	57	706	87	51	403	288	444	1004	151	68	57
v/c Ratio	0.47	0.91	0.22	0.05	0.31	0.83	0.80	1.01	1.17	0.11	0.15
Control Delay	61.0	61.0	1.3	31.1	22.8	60.5	44.0	49.9	176.4	34.8	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.0	61.0	1.3	31.1	22.8	60.5	44.0	49.9	176.4	34.8	0.8
Queue Length 50th (ft)	35	161	0	12	83	171	262	~616	~113	20	0
Queue Length 95th (ft)	89	#310	0	33	162	#387	369	#980	#293	38	0
Internal Link Dist (ft)		1568			344		831			521	
Turn Bay Length (ft)	570		200	100		250		115	250		
Base Capacity (vph)	143	772	394	948	1306	373	921	993	129	1228	608
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.91	0.22	0.05	0.31	0.77	0.48	1.01	1.17	0.06	0.09

Intersection Summary

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

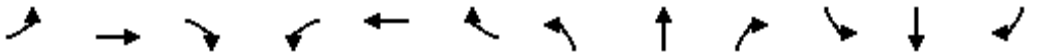
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	61	682	487	245	367	282	200	299	163	316	48
Future Volume (vph)	61	682	487	245	367	282	200	299	163	316	48
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2	3	1	6	
Permitted Phases			4					2			6
Detector Phase	7	4	4	3	8	5	2	3	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	5.0	5.0	10.0	10.0
Minimum Split (s)	9.6	15.8	15.8	9.6	26.8	9.6	15.8	9.6	9.6	40.8	40.8
Total Split (s)	9.6	23.3	23.3	13.2	26.9	22.4	41.3	13.2	22.2	41.1	41.1
Total Split (%)	9.6%	23.3%	23.3%	13.2%	26.9%	22.4%	41.3%	13.2%	22.2%	41.1%	41.1%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	3.6	4.8	3.6	3.6	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	5.8	4.6	5.8	4.6	5.8	4.6	4.6	5.8	5.8
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	None	Min	Min

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 80
Natural Cycle: 90
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Sycamore Canyon Bl. & Central Av.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	61	682	487	245	367	151	282	200	299	163	316	48
Future Volume (veh/h)	61	682	487	245	367	151	282	200	299	163	316	48
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1885	1870	1885	1885	1885	1870	1885	1856	1900	1885	1900
Adj Flow Rate, veh/h	65	726	377	261	390	146	300	213	223	173	336	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	8	1	2	1	1	1	2	1	3	0	1	0
Cap, veh/h	88	1309	403	356	776	286	346	417	509	216	524	
Arrive On Green	0.05	0.25	0.25	0.10	0.31	0.31	0.19	0.22	0.22	0.12	0.15	0.00
Sat Flow, veh/h	1697	5147	1585	3483	2544	938	1781	1885	1572	1810	3582	1610
Grp Volume(v), veh/h	65	726	377	261	273	263	300	213	223	173	336	0
Grp Sat Flow(s),veh/h/ln	1697	1716	1585	1742	1791	1691	1781	1885	1572	1810	1791	1610
Q Serve(g_s), s	2.6	8.4	16.0	5.0	8.6	8.8	11.2	6.8	7.7	6.4	6.1	0.0
Cycle Q Clear(g_c), s	2.6	8.4	16.0	5.0	8.6	8.8	11.2	6.8	7.7	6.4	6.1	0.0
Prop In Lane	1.00		1.00	1.00		0.55	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	88	1309	403	356	546	516	346	417	509	216	524	
V/C Ratio(X)	0.74	0.55	0.93	0.73	0.50	0.51	0.87	0.51	0.44	0.80	0.64	
Avail Cap(c_a), veh/h	123	1309	403	436	549	519	461	973	973	463	1838	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.2	22.3	25.1	30.0	19.6	19.7	26.8	23.5	18.3	29.5	27.7	0.0
Incr Delay (d2), s/veh	7.2	0.5	28.9	3.5	0.7	0.8	10.3	1.0	0.6	2.6	1.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	3.1	8.5	2.1	3.2	3.1	5.3	2.8	2.5	2.7	2.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.3	22.8	54.0	33.5	20.3	20.5	37.1	24.5	18.9	32.1	29.0	0.0
LnGrp LOS	D	C	D	C	C	C	D	C	B	C	C	
Approach Vol, veh/h		1168			797			736			509	A
Approach Delay, s/veh		33.8			24.7			27.9			30.0	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.8	21.0	11.6	23.3	18.0	15.9	8.2	26.8
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	5.8	4.6	5.8
Max Green Setting (Gmax), s	17.6	35.5	8.6	17.5	17.8	35.3	5.0	21.1
Max Q Clear Time (g_c+I1), s	8.4	9.7	7.0	18.0	13.2	8.1	4.6	10.8
Green Ext Time (p_c), s	0.1	1.8	0.1	0.0	0.2	2.0	0.0	2.2

Intersection Summary	
HCM 6th Ctrl Delay	29.6
HCM 6th LOS	C

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	65	726	518	261	551	300	213	318	173	336	51
v/c Ratio	0.61	0.66	0.70	0.70	0.54	0.78	0.42	0.40	0.66	0.48	0.12
Control Delay	65.9	33.5	8.9	47.5	26.2	46.9	27.4	9.2	45.8	30.3	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.9	33.5	8.9	47.5	26.2	46.9	27.4	9.2	45.8	30.3	0.6
Queue Length 50th (ft)	31	115	0	62	106	134	88	48	79	79	0
Queue Length 95th (ft)	#119	209	101	#157	215	#354	157	116	170	114	0
Internal Link Dist (ft)		1568			344		831			521	
Turn Bay Length (ft)	570		200	100		250		115	250		
Base Capacity (vph)	106	1141	754	378	1013	400	847	791	403	1602	786
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.64	0.69	0.69	0.54	0.75	0.25	0.40	0.43	0.21	0.06

Intersection Summary

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

APPENDIX 7.1:

HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	142	0	18	0	536	74	37	69	0
Future Vol, veh/h	0	0	0	142	0	18	0	536	74	37	69	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	154	0	20	0	583	80	40	75	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	741	778	623	-	0	0	663	0	0
Stage 1	623	623	-	-	-	-	-	-	-
Stage 2	118	155	-	-	-	-	-	-	-
Critical Hdwy	6.63	6.53	6.23	-	-	-	4.13	-	-
Critical Hdwy Stg 1	5.43	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.83	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	-	-	-	2.219	-	-
Pot Cap-1 Maneuver	367	327	485	0	-	-	924	-	0
Stage 1	534	477	-	0	-	-	-	-	0
Stage 2	895	769	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	350	0	485	-	-	-	924	-	-
Mov Cap-2 Maneuver	443	0	-	-	-	-	-	-	-
Stage 1	534	0	-	-	-	-	-	-	-
Stage 2	855	0	-	-	-	-	-	-	-

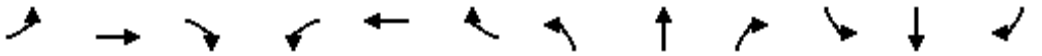
Approach	WB	NB	SB
HCM Control Delay, s	18.1	0	3.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	447	924	-
HCM Lane V/C Ratio	-	-	0.389	0.044	-
HCM Control Delay (s)	-	-	18.1	9.1	0.1
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.8	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	54	1138	200	51	325	323	453	1027	109	59	43
Future Volume (vph)	54	1138	200	51	325	323	453	1027	109	59	43
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases			4					2			6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	15.8	15.8	9.6	26.8	9.6	15.8	15.8	9.6	40.8	40.8
Total Split (s)	9.6	26.8	26.8	9.6	26.8	26.8	63.9	63.9	9.7	46.8	46.8
Total Split (%)	8.7%	24.4%	24.4%	8.7%	24.4%	24.4%	58.1%	58.1%	8.8%	42.5%	42.5%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	3.6	4.8	4.8	3.6	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	5.8	4.6	5.8	4.6	5.8	5.8	4.6	5.8	5.8
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min	Min

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 108.1
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Sycamore Canyon Bl. & Central Av.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	1138	200	51	325	103	323	453	1027	109	59	43
Future Volume (veh/h)	54	1138	200	51	325	103	323	453	1027	109	59	43
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1856	1796	1900	1870	1870	1856	1885	1841	1856	1856	1648
Adj Flow Rate, veh/h	58	1224	213	55	349	108	347	487	1009	117	63	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	3	7	0	2	2	3	1	4	3	3	17
Cap, veh/h	75	975	293	131	505	154	360	1004	831	83	1325	
Arrive On Green	0.04	0.19	0.19	0.04	0.19	0.19	0.20	0.53	0.53	0.05	0.38	0.00
Sat Flow, veh/h	1810	5066	1522	3510	2682	818	1767	1885	1560	1767	3526	1397
Grp Volume(v), veh/h	58	1224	213	55	229	228	347	487	1009	117	63	0
Grp Sat Flow(s),veh/h/ln	1810	1689	1522	1755	1777	1723	1767	1885	1560	1767	1763	1397
Q Serve(g_s), s	3.5	21.0	14.3	1.7	13.1	13.5	21.2	17.7	58.1	5.1	1.2	0.0
Cycle Q Clear(g_c), s	3.5	21.0	14.3	1.7	13.1	13.5	21.2	17.7	58.1	5.1	1.2	0.0
Prop In Lane	1.00		1.00	1.00		0.47	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	75	975	293	131	335	324	360	1004	831	83	1325	
V/C Ratio(X)	0.77	1.25	0.73	0.42	0.69	0.70	0.96	0.48	1.21	1.42	0.05	
Avail Cap(c_a), veh/h	83	975	293	161	342	332	360	1004	831	83	1325	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	51.8	44.0	41.3	51.4	41.3	41.4	43.0	16.1	25.5	52.0	21.6	0.0
Incr Delay (d2), s/veh	28.6	123.1	8.7	0.8	5.5	6.3	37.8	0.4	107.4	244.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	19.5	5.9	0.7	6.0	6.1	12.7	7.1	43.6	7.8	0.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	80.3	167.2	50.0	52.2	46.7	47.7	80.8	16.4	132.8	295.9	21.6	0.0
LnGrp LOS	F	F	D	D	D	D	F	B	F	F	C	
Approach Vol, veh/h		1495			512			1843			180	A
Approach Delay, s/veh		147.1			47.7			92.3			199.9	
Approach LOS		F			D			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.7	63.9	8.7	26.8	26.8	46.8	9.1	26.3
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	5.8	4.6	5.8
Max Green Setting (Gmax), s	5.1	58.1	5.0	21.0	22.2	41.0	5.0	21.0
Max Q Clear Time (g_c+I1), s	7.1	60.1	3.7	23.0	23.2	3.2	5.5	15.5
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.3	0.0	1.2

Intersection Summary	
HCM 6th Ctrl Delay	111.8
HCM 6th LOS	F

Notes

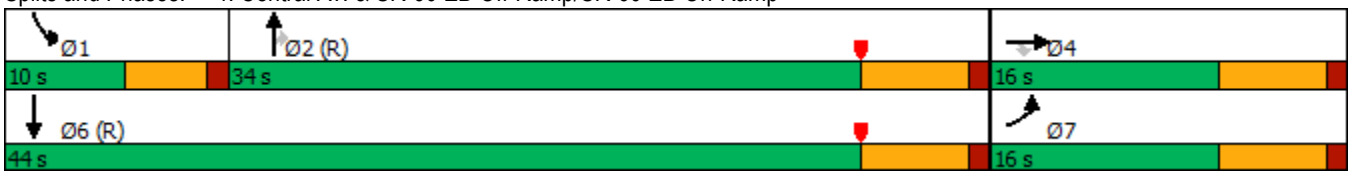
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

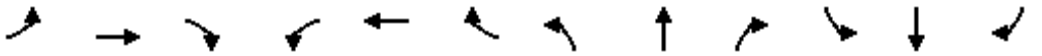
Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	107	5	110	1795	479	199	370
Future Volume (vph)	107	5	110	1795	479	199	370
Turn Type	Prot	NA	Perm	NA	Perm	Prot	NA
Protected Phases	7	4		2		1	6
Permitted Phases			4		2		
Detector Phase	7	4	4	2	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	15.8	15.8	15.8	9.6	22.8
Total Split (s)	16.0	16.0	16.0	34.0	34.0	10.0	44.0
Total Split (%)	26.7%	26.7%	26.7%	56.7%	56.7%	16.7%	73.3%
Yellow Time (s)	4.8	4.8	4.8	4.8	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	4.6	5.8
Lead/Lag				Lag	Lag	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	None	C-Min

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 4: Central Av. & SR-60 EB Off-Ramp/SR-60 EB On-Ramp





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	107	5	110	0	0	0	0	1795	479	199	370	0
Future Volume (veh/h)	107	5	110	0	0	0	0	1795	479	199	370	0
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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1841	1900	1811				0	1856	1841	1856	1900	0
Adj Flow Rate, veh/h	116	0	109				0	1951	443	216	402	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	4	0	6				0	3	4	3	0	0
Cap, veh/h	285	0	500				0	1683	745	308	2325	0
Arrive On Green	0.16	0.00	0.16				0.00	0.48	0.48	0.18	1.00	0.00
Sat Flow, veh/h	1753	0	3070				0	3618	1560	3428	3705	0
Grp Volume(v), veh/h	116	0	109				0	1951	443	216	402	0
Grp Sat Flow(s),veh/h/ln	1753	0	1535				0	1763	1560	1714	1805	0
Q Serve(g_s), s	3.6	0.0	1.8				0.0	28.6	12.4	3.5	0.0	0.0
Cycle Q Clear(g_c), s	3.6	0.0	1.8				0.0	28.6	12.4	3.5	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	285	0	500				0	1683	745	308	2325	0
V/C Ratio(X)	0.41	0.00	0.22				0.00	1.16	0.59	0.70	0.17	0.00
Avail Cap(c_a), veh/h	298	0	522				0	1683	745	309	2325	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.09	0.09	0.98	0.98	0.00
Uniform Delay (d), s/veh	22.5	0.0	21.8				0.0	15.7	11.4	23.8	0.0	0.0
Incr Delay (d2), s/veh	0.9	0.0	0.2				0.0	72.4	0.3	5.8	0.2	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	1.4	0.0	0.6				0.0	25.2	3.3	1.4	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.5	0.0	22.0				0.0	88.1	11.8	29.6	0.2	0.0
LnGrp LOS	C	A	C				A	F	B	C	A	A
Approach Vol, veh/h		225						2394			618	
Approach Delay, s/veh		22.8						74.0			10.4	
Approach LOS		C						E			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	10.0	34.4		15.6		44.4
Change Period (Y+Rc), s	4.6	5.8		5.8		5.8
Max Green Setting (Gmax), s	5.4	28.2		10.2		38.2
Max Q Clear Time (g_c+I1), s	5.5	30.6		5.6		2.0
Green Ext Time (p_c), s	0.0	0.0		0.3		2.5

Intersection Summary	
HCM 6th Ctrl Delay	58.3
HCM 6th LOS	E

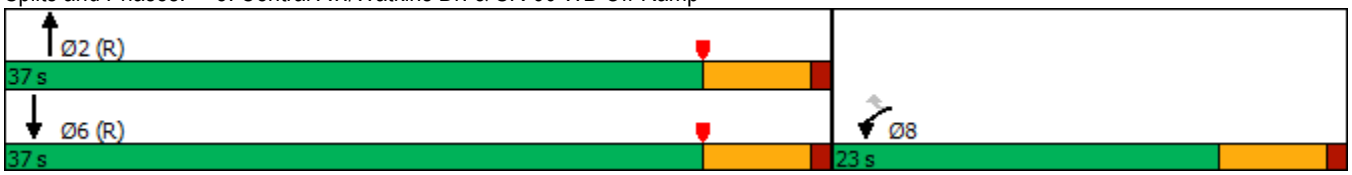
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	167	429	1903	402
Future Volume (vph)	167	429	1903	402
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.8	15.8	15.8	22.8
Total Split (s)	23.0	23.0	37.0	37.0
Total Split (%)	38.3%	38.3%	61.7%	61.7%
Yellow Time (s)	4.8	4.8	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Min	C-Min

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 21.6 (36%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 5: Central Av./Watkins Dr. & SR-60 WB Off-Ramp



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	167	429	1903	0	0	402
Future Volume (veh/h)	167	429	1903	0	0	402
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1885	1885	1856	0	0	1870
Adj Flow Rate, veh/h	178	367	2024	0	0	428
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	3	0	0	2
Cap, veh/h	909	417	1923	0	0	1939
Arrive On Green	0.26	0.26	0.37	0.00	0.00	0.55
Sat Flow, veh/h	3483	1598	3711	0	0	3741
Grp Volume(v), veh/h	178	367	2024	0	0	428
Grp Sat Flow(s),veh/h/ln	1742	1598	1763	0	0	1777
Q Serve(g_s), s	2.4	13.2	32.7	0.0	0.0	3.7
Cycle Q Clear(g_c), s	2.4	13.2	32.7	0.0	0.0	3.7
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	909	417	1923	0	0	1939
V/C Ratio(X)	0.20	0.88	1.05	0.00	0.00	0.22
Avail Cap(c_a), veh/h	998	458	1923	0	0	1939
HCM Platoon Ratio	1.00	1.00	0.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.09	0.00	0.00	1.00
Uniform Delay (d), s/veh	17.3	21.3	19.0	0.0	0.0	7.0
Incr Delay (d2), s/veh	0.1	16.6	25.1	0.0	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	6.1	19.1	0.0	0.0	1.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.4	37.9	44.2	0.0	0.0	7.3
LnGrp LOS	B	D	F	A	A	A
Approach Vol, veh/h	545		2024			428
Approach Delay, s/veh	31.2		44.2			7.3
Approach LOS	C		D			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		38.5			38.5	21.5
Change Period (Y+Rc), s		5.8			5.8	5.8
Max Green Setting (Gmax), s		31.2			31.2	17.2
Max Q Clear Time (g_c+I1), s		34.7			5.7	15.2
Green Ext Time (p_c), s		0.0			2.6	0.4

Intersection Summary	
HCM 6th Ctrl Delay	36.5
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	17.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	924	1408	402	99
Future Vol, veh/h	0	0	924	1408	402	99
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	2	0
Mvmt Flow	0	0	1015	1547	442	109

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	3301	497	551	0	-	0
Stage 1	497	-	-	-	-	-
Stage 2	2804	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	2	577	~ 999	-	-	-
Stage 1	615	-	-	-	-	-
Stage 2	21	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	0	577	~ 999	-	-	-
Mov Cap-2 Maneuver	0	-	-	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	21	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	21	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	~ 999	-	-	-	-
HCM Lane V/C Ratio	1.016	-	-	-	-
HCM Control Delay (s)	53.1	-	0	-	-
HCM Lane LOS	F	-	A	-	-
HCM 95th %tile Q(veh)	20.6	-	-	-	-

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

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	134	0	17	0	312	72	36	407	0
Future Vol, veh/h	0	0	0	134	0	17	0	312	72	36	407	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	146	0	18	0	339	78	39	442	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	677	898	378	-	0	0	417	0	0
Stage 1	378	378	-	-	-	-	-	-	-
Stage 2	299	520	-	-	-	-	-	-	-
Critical Hdwy	6.63	6.53	6.23	-	-	-	4.13	-	-
Critical Hdwy Stg 1	5.43	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.83	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	-	-	-	2.219	-	-
Pot Cap-1 Maneuver	402	278	668	0	-	-	1140	-	0
Stage 1	692	614	-	0	-	-	-	-	0
Stage 2	727	531	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	384	0	668	-	-	-	1140	-	-
Mov Cap-2 Maneuver	492	0	-	-	-	-	-	-	-
Stage 1	692	0	-	-	-	-	-	-	-
Stage 2	694	0	-	-	-	-	-	-	-

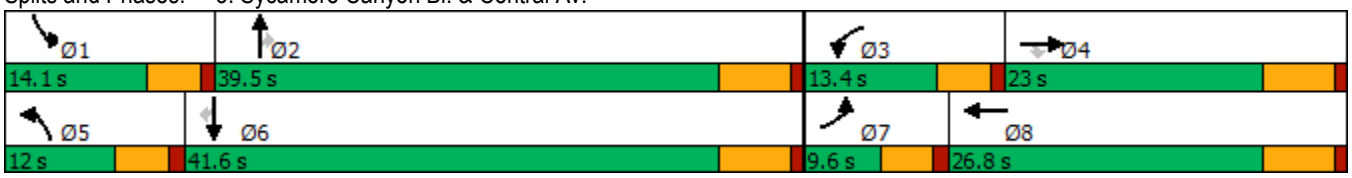
Approach	WB	NB	SB
HCM Control Delay, s	15.5	0	0.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	507	1140	-
HCM Lane V/C Ratio	-	-	0.324	0.034	-
HCM Control Delay (s)	-	-	15.5	8.3	0.2
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.4	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	51	781	645	274	558	412	209	343	156	341	43
Future Volume (vph)	51	781	645	274	558	412	209	343	156	341	43
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases			4					2			6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	15.8	15.8	9.6	26.8	9.6	15.8	15.8	9.6	40.8	40.8
Total Split (s)	9.6	23.0	23.0	13.4	26.8	12.0	39.5	39.5	14.1	41.6	41.6
Total Split (%)	10.7%	25.6%	25.6%	14.9%	29.8%	13.3%	43.9%	43.9%	15.7%	46.2%	46.2%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	3.6	4.8	4.8	3.6	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	5.8	4.6	5.8	4.6	5.8	5.8	4.6	5.8	5.8
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	5.1	17.4	17.4	8.7	25.3	7.5	16.5	16.5	9.4	18.4	18.4
Actuated g/C Ratio	0.07	0.24	0.24	0.12	0.35	0.10	0.23	0.23	0.13	0.25	0.25
v/c Ratio	0.47	0.68	0.98	0.70	0.59	2.42	0.52	0.70	0.72	0.40	0.09
Control Delay	50.7	30.2	44.2	43.3	24.7	676.7	28.7	17.4	52.1	23.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.7	30.2	44.2	43.3	24.7	676.7	28.7	17.4	52.1	23.3	0.3
LOS	D	C	D	D	C	F	C	B	D	C	A
Approach Delay		37.0			30.0		301.6			29.8	
Approach LOS		D			C		F			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 73.1	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 2.42	
Intersection Signal Delay: 99.1	Intersection LOS: F
Intersection Capacity Utilization 73.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: Sycamore Canyon Bl. & Central Av.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	781	645	274	558	123	412	209	343	156	341	43
Future Volume (veh/h)	51	781	645	274	558	123	412	209	343	156	341	43
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1885	1870	1885	1885	1885	1870	1885	1856	1900	1885	1900
Adj Flow Rate, veh/h	54	831	545	291	594	116	438	222	270	166	363	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	8	1	2	1	1	1	2	1	3	0	1	0
Cap, veh/h	80	1293	398	387	939	183	193	414	345	206	808	
Arrive On Green	0.05	0.25	0.25	0.11	0.32	0.32	0.11	0.22	0.22	0.11	0.23	0.00
Sat Flow, veh/h	1697	5147	1585	3483	2976	580	1781	1885	1572	1810	3582	1610
Grp Volume(v), veh/h	54	831	545	291	357	353	438	222	270	166	363	0
Grp Sat Flow(s),veh/h/ln	1697	1716	1585	1742	1791	1765	1781	1885	1572	1810	1791	1610
Q Serve(g_s), s	2.1	9.9	17.2	5.5	11.7	11.7	7.4	7.1	11.1	6.1	6.0	0.0
Cycle Q Clear(g_c), s	2.1	9.9	17.2	5.5	11.7	11.7	7.4	7.1	11.1	6.1	6.0	0.0
Prop In Lane	1.00		1.00	1.00		0.33	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	80	1293	398	387	565	557	193	414	345	206	808	
V/C Ratio(X)	0.68	0.64	1.37	0.75	0.63	0.63	2.27	0.54	0.78	0.80	0.45	
Avail Cap(c_a), veh/h	124	1293	398	448	565	557	193	928	774	251	1874	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.1	22.9	25.6	29.5	20.0	20.0	30.5	23.6	25.2	29.6	22.8	0.0
Incr Delay (d2), s/veh	3.7	1.1	181.0	4.8	2.3	2.4	589.6	1.1	3.9	11.9	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	3.7	25.7	2.4	4.6	4.5	34.4	3.0	4.0	3.1	2.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.8	24.0	206.6	34.3	22.3	22.4	620.1	24.7	29.0	41.5	23.2	0.0
LnGrp LOS	D	C	F	C	C	C	F	C	C	D	C	
Approach Vol, veh/h		1430			1001			930			529	A
Approach Delay, s/veh		94.0			25.8			306.4			28.9	
Approach LOS		F			C			F			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.4	20.8	12.2	23.0	12.0	21.2	7.8	27.4
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	5.8	4.6	5.8
Max Green Setting (Gmax), s	9.5	33.7	8.8	17.2	7.4	35.8	5.0	21.0
Max Q Clear Time (g_c+I1), s	8.1	13.1	7.5	19.2	9.4	8.0	4.1	13.7
Green Ext Time (p_c), s	0.0	2.0	0.1	0.0	0.0	2.2	0.0	2.4

Intersection Summary	
HCM 6th Ctrl Delay	118.4
HCM 6th LOS	F

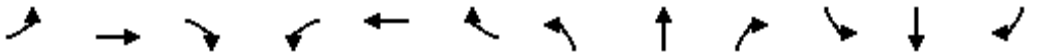
Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	19	3	90	570	710	851	864
Future Volume (vph)	19	3	90	570	710	851	864
Turn Type	Prot	NA	Perm	NA	Perm	Prot	NA
Protected Phases	7	4		2		1	6
Permitted Phases			4		2		
Detector Phase	7	4	4	2	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	15.8	15.8	15.8	9.6	22.8
Total Split (s)	15.8	15.8	15.8	24.2	24.2	20.0	44.2
Total Split (%)	26.3%	26.3%	26.3%	40.3%	40.3%	33.3%	73.7%
Yellow Time (s)	4.8	4.8	4.8	4.8	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	4.6	5.8
Lead/Lag				Lag	Lag	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	10.0	10.0	10.0	22.1	22.1	18.0	47.0
Actuated g/C Ratio	0.17	0.17	0.17	0.37	0.37	0.30	0.78
v/c Ratio	0.07	0.18	0.14	0.47	0.90	0.89	0.32
Control Delay	21.9	10.0	0.8	17.1	26.5	30.7	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	21.9	10.0	0.8	17.1	26.5	30.7	7.6
LOS	C	B	A	B	C	C	A
Approach Delay		8.2		22.3			19.1
Approach LOS		A		C			B

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 20.0	Intersection LOS: B
Intersection Capacity Utilization 90.1%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 4: Central Av. & SR-60 EB Off-Ramp/SR-60 EB On-Ramp



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	3	90	0	0	0	0	570	710	851	864	0
Future Volume (veh/h)	19	3	90	0	0	0	0	570	710	851	864	0
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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1841	1900	1811				0	1856	1841	1856	1900	0
Adj Flow Rate, veh/h	20	0	83				0	606	570	905	919	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	4	0	6				0	3	4	3	0	0
Cap, veh/h	240	0	420				0	1187	525	880	2418	0
Arrive On Green	0.14	0.00	0.14				0.00	0.34	0.34	0.51	1.00	0.00
Sat Flow, veh/h	1753	0	3070				0	3618	1560	3428	3705	0
Grp Volume(v), veh/h	20	0	83				0	606	570	905	919	0
Grp Sat Flow(s),veh/h/ln	1753	0	1535				0	1763	1560	1714	1805	0
Q Serve(g_s), s	0.6	0.0	1.4				0.0	8.3	20.2	15.4	0.0	0.0
Cycle Q Clear(g_c), s	0.6	0.0	1.4				0.0	8.3	20.2	15.4	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	240	0	420				0	1187	525	880	2418	0
V/C Ratio(X)	0.08	0.00	0.20				0.00	0.51	1.09	1.03	0.38	0.00
Avail Cap(c_a), veh/h	292	0	512				0	1187	525	880	2418	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.66	0.66	0.63	0.63	0.00
Uniform Delay (d), s/veh	22.6	0.0	23.0				0.0	15.9	19.9	14.6	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.2				0.0	1.0	57.7	31.7	0.3	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	0.2	0.0	0.5				0.0	2.9	14.4	6.9	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.8	0.0	23.2				0.0	17.0	77.6	46.3	0.3	0.0
LnGrp LOS	C	A	C				A	B	F	F	A	A
Approach Vol, veh/h		103						1176			1824	
Approach Delay, s/veh		23.1						46.3			23.1	
Approach LOS		C						D			C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	20.0	26.0		14.0		46.0
Change Period (Y+Rc), s	4.6	5.8		5.8		5.8
Max Green Setting (Gmax), s	15.4	18.4		10.0		38.4
Max Q Clear Time (g_c+I1), s	17.4	22.2		3.4		2.0
Green Ext Time (p_c), s	0.0	0.0		0.1		6.9

Intersection Summary			
HCM 6th Ctrl Delay			31.9
HCM 6th LOS			C

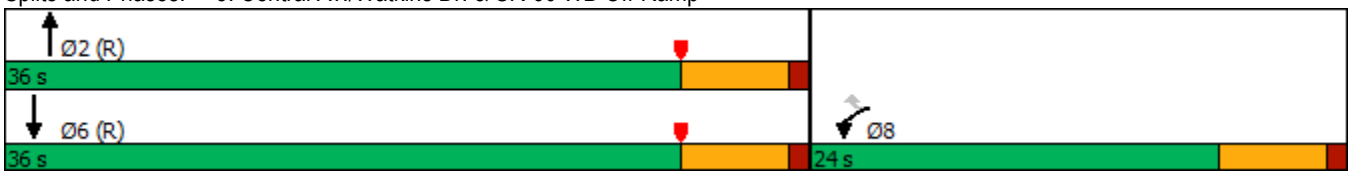
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	345	374	589	1370
Future Volume (vph)	345	374	589	1370
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.8	15.8	15.8	22.8
Total Split (s)	24.0	24.0	36.0	36.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%
Yellow Time (s)	4.8	4.8	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Min	C-Min
Act Effct Green (s)	14.9	14.9	33.5	33.5
Actuated g/C Ratio	0.25	0.25	0.56	0.56
v/c Ratio	0.46	0.79	0.34	0.78
Control Delay	20.2	22.8	4.5	15.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.2	22.8	4.5	15.3
LOS	C	C	A	B
Approach Delay	21.6		4.5	15.3
Approach LOS	C		A	B

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 21.6 (36%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 14.6	Intersection LOS: B
Intersection Capacity Utilization 90.1%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: Central Av./Watkins Dr. & SR-60 WB Off-Ramp



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	345	374	589	0	0	1370
Future Volume (veh/h)	345	374	589	0	0	1370
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1885	1870	1856	0	0	1885
Adj Flow Rate, veh/h	392	253	669	0	0	1557
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	1	2	3	0	0	1
Cap, veh/h	723	329	2112	0	0	2146
Arrive On Green	0.21	0.21	0.20	0.00	0.00	0.60
Sat Flow, veh/h	3483	1585	3711	0	0	3770
Grp Volume(v), veh/h	392	253	669	0	0	1557
Grp Sat Flow(s),veh/h/ln	1742	1585	1763	0	0	1791
Q Serve(g_s), s	6.0	9.0	9.7	0.0	0.0	18.5
Cycle Q Clear(g_c), s	6.0	9.0	9.7	0.0	0.0	18.5
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	723	329	2112	0	0	2146
V/C Ratio(X)	0.54	0.77	0.32	0.00	0.00	0.73
Avail Cap(c_a), veh/h	1057	481	2112	0	0	2146
HCM Platoon Ratio	1.00	1.00	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.89	0.00	0.00	1.00
Uniform Delay (d), s/veh	21.2	22.4	13.6	0.0	0.0	8.5
Incr Delay (d2), s/veh	0.6	4.5	0.4	0.0	0.0	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	3.3	3.5	0.0	0.0	4.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.9	26.9	13.9	0.0	0.0	10.7
LnGrp LOS	C	C	B	A	A	B
Approach Vol, veh/h	645		669			1557
Approach Delay, s/veh	23.8		13.9			10.7
Approach LOS	C		B			B

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		41.7			41.7	18.3
Change Period (Y+Rc), s		5.8			5.8	5.8
Max Green Setting (Gmax), s		30.2			30.2	18.2
Max Q Clear Time (g_c+I1), s		11.7			20.5	11.0
Green Ext Time (p_c), s		3.9			6.7	1.4

Intersection Summary		
HCM 6th Ctrl Delay		14.4
HCM 6th LOS		B

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	283	680	1370	15
Future Vol, veh/h	0	0	283	680	1370	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	1	9
Mvmt Flow	0	0	311	747	1505	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2509	1513	1521	0	-	0
Stage 1	1513	-	-	-	-	-
Stage 2	996	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	26	149	425	-	-	-
Stage 1	203	-	-	-	-	-
Stage 2	524	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	7	149	425	-	-	-
Mov Cap-2 Maneuver	7	-	-	-	-	-
Stage 1	54	-	-	-	-	-
Stage 2	524	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	425	-	-	-	-
HCM Lane V/C Ratio	0.732	-	-	-	-
HCM Control Delay (s)	33.3	-	0	-	-
HCM Lane LOS	D	-	A	-	-
HCM 95th %tile Q(veh)	5.8	-	-	-	-

APPENDIX 7.2:

HORIZON YEAR (2040) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

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Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↱	
Traffic Vol, veh/h	107	0	0	554	3	10
Future Vol, veh/h	107	0	0	554	3	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	116	0	0	602	3	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	718	116
Stage 1	-	-	-	-	116	-
Stage 2	-	-	-	-	602	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	-	0	0	-	396	936
Stage 1	-	0	0	-	909	-
Stage 2	-	0	0	-	547	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	396	936
Mov Cap-2 Maneuver	-	-	-	-	468	-
Stage 1	-	-	-	-	909	-
Stage 2	-	-	-	-	547	-

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

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	760	-	-
HCM Lane V/C Ratio	0.019	-	-
HCM Control Delay (s)	9.8	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	54	142	0	18	21	536	74	37	79	1
Future Vol, veh/h	0	0	54	142	0	18	21	536	74	37	79	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	59	154	0	20	23	583	80	40	86	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	846	876	44	792	836	623	87	0	0	663	0	0
Stage 1	167	167	-	669	669	-	-	-	-	-	-	-
Stage 2	679	709	-	123	167	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.53	6.93	7.33	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.53	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.53	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	3.519	4.019	3.319	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	269	287	1017	293	302	485	1508	-	-	924	-	-
Stage 1	819	760	-	446	455	-	-	-	-	-	-	-
Stage 2	440	436	-	869	760	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	246	270	1017	263	284	485	1508	-	-	924	-	-
Mov Cap-2 Maneuver	321	333	-	359	367	-	-	-	-	-	-	-
Stage 1	807	726	-	439	448	-	-	-	-	-	-	-
Stage 2	416	429	-	782	726	-	-	-	-	-	-	-

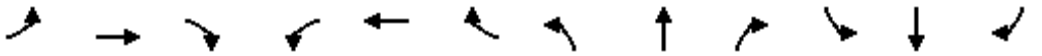
Approach	EB	WB	NB	SB
HCM Control Delay, s	8.8	23.1	0.2	2.9
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1508	-	-	1017	370	924	-	-
HCM Lane V/C Ratio	0.015	-	-	0.058	0.47	0.044	-	-
HCM Control Delay (s)	7.4	-	-	8.8	23.1	9.1	-	-
HCM Lane LOS	A	-	-	A	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	2.4	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	58	1138	200	51	325	323	456	1027	150	69	57
Future Volume (vph)	58	1138	200	51	325	323	456	1027	150	69	57
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases			4					2			6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	15.8	15.8	9.6	26.8	9.6	15.8	15.8	9.6	40.8	40.8
Total Split (s)	9.6	26.8	26.8	9.6	26.8	26.8	63.9	63.9	9.7	46.8	46.8
Total Split (%)	8.7%	24.4%	24.4%	8.7%	24.4%	24.4%	58.1%	58.1%	8.8%	42.5%	42.5%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	3.6	4.8	4.8	3.6	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	5.8	4.6	5.8	4.6	5.8	5.8	4.6	5.8	5.8
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	5.0	21.0	21.0	5.0	21.0	22.2	58.2	58.2	5.1	41.1	41.1
Actuated g/C Ratio	0.05	0.19	0.19	0.05	0.19	0.21	0.54	0.54	0.05	0.38	0.38
v/c Ratio	0.75	1.25	0.50	0.34	0.68	0.96	0.48	1.20	1.96	0.06	0.10
Control Delay	98.2	158.5	14.0	56.9	43.0	83.4	18.1	124.8	498.7	22.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	98.2	158.5	14.0	56.9	43.0	83.4	18.1	124.8	498.7	22.3	0.3
LOS	F	F	B	E	D	F	B	F	F	C	A
Approach Delay		135.3			44.5		90.4			276.9	
Approach LOS		F			D		F			F	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 108.1	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.96	
Intersection Signal Delay: 113.4	Intersection LOS: F
Intersection Capacity Utilization 107.4%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 3: Sycamore Canyon Bl. & Central Av.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	58	1138	200	51	325	116	323	456	1027	150	69	57
Future Volume (veh/h)	58	1138	200	51	325	116	323	456	1027	150	69	57
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1856	1796	1900	1870	1870	1856	1885	1841	1856	1856	1648
Adj Flow Rate, veh/h	62	1224	213	55	349	122	347	490	1009	161	74	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	3	7	0	2	2	3	1	4	3	3	17
Cap, veh/h	80	975	293	131	481	166	360	1004	831	83	1325	
Arrive On Green	0.04	0.19	0.19	0.04	0.19	0.19	0.20	0.53	0.53	0.05	0.38	0.00
Sat Flow, veh/h	1810	5066	1522	3510	2594	893	1767	1885	1560	1767	3526	1397
Grp Volume(v), veh/h	62	1224	213	55	237	234	347	490	1009	161	74	0
Grp Sat Flow(s),veh/h/ln	1810	1689	1522	1755	1777	1710	1767	1885	1560	1767	1763	1397
Q Serve(g_s), s	3.7	21.0	14.3	1.7	13.7	14.1	21.2	17.9	58.1	5.1	1.5	0.0
Cycle Q Clear(g_c), s	3.7	21.0	14.3	1.7	13.7	14.1	21.2	17.9	58.1	5.1	1.5	0.0
Prop In Lane	1.00		1.00	1.00		0.52	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	80	975	293	131	330	317	360	1004	831	83	1325	
V/C Ratio(X)	0.77	1.25	0.73	0.42	0.72	0.74	0.96	0.49	1.21	1.95	0.06	
Avail Cap(c_a), veh/h	83	975	293	161	342	329	360	1004	831	83	1325	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	51.6	44.0	41.3	51.4	41.8	41.9	43.0	16.1	25.5	52.0	21.7	0.0
Incr Delay (d2), s/veh	31.5	123.1	8.7	0.8	6.9	8.1	37.8	0.4	107.4	467.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	19.5	5.9	0.7	6.4	6.4	12.7	7.1	43.6	12.9	0.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	83.0	167.2	50.0	52.2	48.7	50.0	80.8	16.5	132.8	519.5	21.7	0.0
LnGrp LOS	F	F	D	D	D	D	F	B	F	F	C	
Approach Vol, veh/h		1499			526			1846			235	A
Approach Delay, s/veh		147.0			49.6			92.2			362.7	
Approach LOS		F			D			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.7	63.9	8.7	26.8	26.8	46.8	9.4	26.0
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	5.8	4.6	5.8
Max Green Setting (Gmax), s	5.1	58.1	5.0	21.0	22.2	41.0	5.0	21.0
Max Q Clear Time (g_c+I1), s	7.1	60.1	3.7	23.0	23.2	3.5	5.7	16.1
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.4	0.0	1.1

Intersection Summary	
HCM 6th Ctrl Delay	122.2
HCM 6th LOS	F

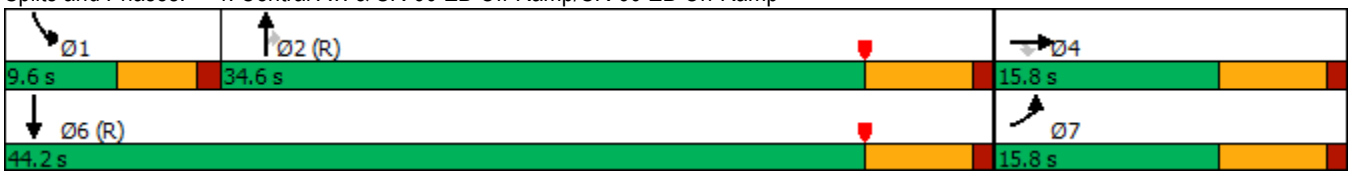
Notes

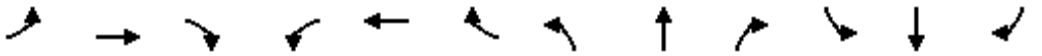
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	107	5	116	1819	496	199	378
Future Volume (vph)	107	5	116	1819	496	199	378
Turn Type	Prot	NA	Perm	NA	Perm	Prot	NA
Protected Phases	7	4		2		1	6
Permitted Phases			4		2		
Detector Phase	7	4	4	2	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	15.8	15.8	15.8	9.6	22.8
Total Split (s)	15.8	15.8	15.8	34.6	34.6	9.6	44.2
Total Split (%)	26.3%	26.3%	26.3%	57.7%	57.7%	16.0%	73.7%
Yellow Time (s)	4.8	4.8	4.8	4.8	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	4.6	5.8
Lead/Lag				Lag	Lag	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	10.0	10.0	10.0	31.7	31.7	5.2	42.7
Actuated g/C Ratio	0.17	0.17	0.17	0.53	0.53	0.09	0.71
v/c Ratio	0.40	0.22	0.19	1.07	0.50	0.73	0.16
Control Delay	27.1	9.9	1.9	61.0	2.9	44.3	3.6
Queue Delay	0.0	0.0	0.0	15.7	0.0	0.0	0.0
Total Delay	27.1	9.9	1.9	76.7	2.9	44.3	3.6
LOS	C	A	A	E	A	D	A
Approach Delay		15.9		60.9			17.6
Approach LOS		B		E			B

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.07	
Intersection Signal Delay: 49.6	Intersection LOS: D
Intersection Capacity Utilization 89.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 4: Central Av. & SR-60 EB Off-Ramp/SR-60 EB On-Ramp





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	107	5	116	0	0	0	0	1819	496	199	378	0
Future Volume (veh/h)	107	5	116	0	0	0	0	1819	496	199	378	0
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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1841	1900	1811				0	1856	1841	1856	1900	0
Adj Flow Rate, veh/h	116	0	115				0	1977	461	216	411	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	4	0	6				0	3	4	3	0	0
Cap, veh/h	286	0	501				0	1705	754	286	2323	0
Arrive On Green	0.16	0.00	0.16				0.00	0.48	0.48	0.17	1.00	0.00
Sat Flow, veh/h	1753	0	3070				0	3618	1560	3428	3705	0
Grp Volume(v), veh/h	116	0	115				0	1977	461	216	411	0
Grp Sat Flow(s),veh/h/ln	1753	0	1535				0	1763	1560	1714	1805	0
Q Serve(g_s), s	3.6	0.0	2.0				0.0	29.0	13.0	3.6	0.0	0.0
Cycle Q Clear(g_c), s	3.6	0.0	2.0				0.0	29.0	13.0	3.6	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	286	0	501				0	1705	754	286	2323	0
V/C Ratio(X)	0.41	0.00	0.23				0.00	1.16	0.61	0.76	0.18	0.00
Avail Cap(c_a), veh/h	292	0	512				0	1705	754	286	2323	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.09	0.09	0.98	0.98	0.00
Uniform Delay (d), s/veh	22.5	0.0	21.8				0.0	15.5	11.4	24.4	0.0	0.0
Incr Delay (d2), s/veh	0.9	0.0	0.2				0.0	72.5	0.3	9.7	0.2	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	1.4	0.0	0.6				0.0	25.5	3.4	1.6	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.4	0.0	22.1				0.0	88.0	11.7	34.1	0.2	0.0
LnGrp LOS	C	A	C				A	F	B	C	A	A
Approach Vol, veh/h		231						2438			627	
Approach Delay, s/veh		22.7						73.6			11.9	
Approach LOS		C						E			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	9.6	34.8		15.6		44.4
Change Period (Y+Rc), s	4.6	5.8		5.8		5.8
Max Green Setting (Gmax), s	5.0	28.8		10.0		38.4
Max Q Clear Time (g_c+I1), s	5.6	31.0		5.6		2.0
Green Ext Time (p_c), s	0.0	0.0		0.3		2.6

Intersection Summary	
HCM 6th Ctrl Delay	58.3
HCM 6th LOS	E

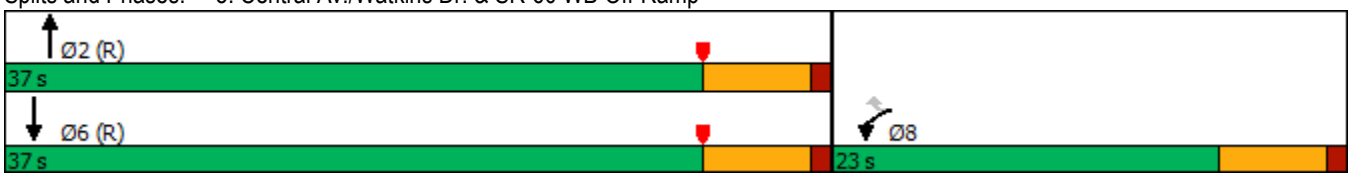
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	173	429	1927	404
Future Volume (vph)	173	429	1927	404
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.8	15.8	15.8	22.8
Total Split (s)	23.0	23.0	37.0	37.0
Total Split (%)	38.3%	38.3%	61.7%	61.7%
Yellow Time (s)	4.8	4.8	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Min	C-Min
Act Effct Green (s)	17.2	17.2	31.2	31.2
Actuated g/C Ratio	0.29	0.29	0.52	0.52
v/c Ratio	0.19	0.99	1.13	0.23
Control Delay	16.8	64.7	76.3	8.3
Queue Delay	0.0	0.0	0.9	0.0
Total Delay	16.8	64.7	77.2	8.3
LOS	B	E	E	A
Approach Delay	50.9		77.2	8.3
Approach LOS	D		E	A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 21.6 (36%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.13	
Intersection Signal Delay: 62.3	Intersection LOS: E
Intersection Capacity Utilization 89.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: Central Av./Watkins Dr. & SR-60 WB Off-Ramp



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	173	429	1927	0	0	404
Future Volume (veh/h)	173	429	1927	0	0	404
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1885	1885	1856	0	0	1870
Adj Flow Rate, veh/h	184	367	2050	0	0	430
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	3	0	0	2
Cap, veh/h	910	417	1923	0	0	1938
Arrive On Green	0.26	0.26	0.37	0.00	0.00	0.55
Sat Flow, veh/h	3483	1598	3711	0	0	3741
Grp Volume(v), veh/h	184	367	2050	0	0	430
Grp Sat Flow(s),veh/h/ln	1742	1598	1763	0	0	1777
Q Serve(g_s), s	2.5	13.2	32.7	0.0	0.0	3.8
Cycle Q Clear(g_c), s	2.5	13.2	32.7	0.0	0.0	3.8
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	910	417	1923	0	0	1938
V/C Ratio(X)	0.20	0.88	1.07	0.00	0.00	0.22
Avail Cap(c_a), veh/h	998	458	1923	0	0	1938
HCM Platoon Ratio	1.00	1.00	0.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.09	0.00	0.00	1.00
Uniform Delay (d), s/veh	17.3	21.3	19.0	0.0	0.0	7.1
Incr Delay (d2), s/veh	0.1	16.6	31.0	0.0	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	6.1	20.7	0.0	0.0	1.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.4	37.9	50.0	0.0	0.0	7.3
LnGrp LOS	B	D	F	A	A	A
Approach Vol, veh/h	551		2050			430
Approach Delay, s/veh	31.0		50.0			7.3
Approach LOS	C		D			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		38.5			38.5	21.5
Change Period (Y+Rc), s		5.8			5.8	5.8
Max Green Setting (Gmax), s		31.2			31.2	17.2
Max Q Clear Time (g_c+I1), s		34.7			5.8	15.2
Green Ext Time (p_c), s		0.0			2.6	0.5

Intersection Summary	
HCM 6th Ctrl Delay	40.5
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	19.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	941	1415	404	99
Future Vol, veh/h	0	0	941	1415	404	99
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	2	0
Mvmt Flow	0	0	1034	1555	444	109

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	3345	499	553	0	-	0
Stage 1	499	-	-	-	-	-
Stage 2	2846	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	2	576	~ 997	-	-	-
Stage 1	614	-	-	-	-	-
Stage 2	18	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	0	576	~ 997	-	-	-
Mov Cap-2 Maneuver	0	-	-	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	18	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	23.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	~ 997	-	-	-	-
HCM Lane V/C Ratio	1.037	-	-	-	-
HCM Control Delay (s)	58.9	-	0	-	-
HCM Lane LOS	F	-	A	-	-
HCM 95th %tile Q(veh)	22.1	-	-	-	-

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

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	446	0	0	329	2	6
Future Vol, veh/h	446	0	0	329	2	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	485	0	0	358	2	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	843	485
Stage 1	-	-	-	-	485	-
Stage 2	-	-	-	-	358	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	-	0	0	-	334	582
Stage 1	-	0	0	-	619	-
Stage 2	-	0	0	-	707	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	334	582
Mov Cap-2 Maneuver	-	-	-	-	452	-
Stage 1	-	-	-	-	619	-
Stage 2	-	-	-	-	707	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	543	-	-
HCM Lane V/C Ratio	0.016	-	-
HCM Control Delay (s)	11.7	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0	-	-

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↰	↱			↑↱	
Traffic Vol, veh/h	0	0	34	134	0	17	65	312	72	36	413	3
Future Vol, veh/h	0	0	34	134	0	17	65	312	72	36	413	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	37	146	0	18	71	339	78	39	449	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1058	1088	226	823	1050	378	452	0	0	417	0	0
Stage 1	529	529	-	520	520	-	-	-	-	-	-	-
Stage 2	529	559	-	303	530	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.53	6.93	7.33	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.53	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.53	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	3.519	4.019	3.319	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	190	215	778	279	226	668	1107	-	-	1140	-	-
Stage 1	502	526	-	538	531	-	-	-	-	-	-	-
Stage 2	532	510	-	682	526	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	170	192	778	244	202	668	1107	-	-	1140	-	-
Mov Cap-2 Maneuver	286	300	-	351	302	-	-	-	-	-	-	-
Stage 1	470	502	-	504	497	-	-	-	-	-	-	-
Stage 2	484	477	-	620	502	-	-	-	-	-	-	-

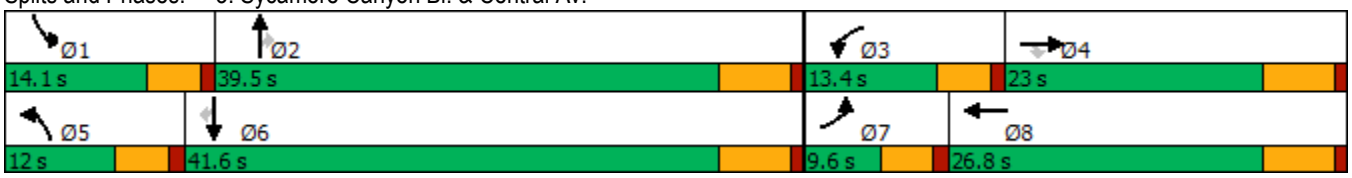
Approach	EB	WB	NB	SB
HCM Control Delay, s	9.9	22.2	1.2	0.7
HCM LOS	A	C		

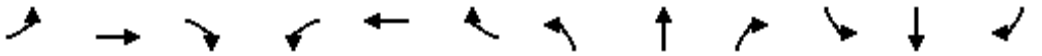
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1107	-	-	778	371	1140	-	-
HCM Lane V/C Ratio	0.064	-	-	0.048	0.442	0.034	-	-
HCM Control Delay (s)	8.5	-	-	9.9	22.2	8.3	-	-
HCM Lane LOS	A	-	-	A	C	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	2.2	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	65	781	645	274	558	412	219	343	182	347	52
Future Volume (vph)	65	781	645	274	558	412	219	343	182	347	52
Turn Type	Prot	NA	Perm	Prot	NA	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8	5	2		1	6	
Permitted Phases			4					2			6
Detector Phase	7	4	4	3	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	9.6	15.8	15.8	9.6	26.8	9.6	15.8	15.8	9.6	40.8	40.8
Total Split (s)	9.6	23.0	23.0	13.4	26.8	12.0	39.5	39.5	14.1	41.6	41.6
Total Split (%)	10.7%	25.6%	25.6%	14.9%	29.8%	13.3%	43.9%	43.9%	15.7%	46.2%	46.2%
Yellow Time (s)	3.6	4.8	4.8	3.6	4.8	3.6	4.8	4.8	3.6	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	5.8	4.6	5.8	4.6	5.8	5.8	4.6	5.8	5.8
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	5.1	17.4	17.4	8.7	23.2	7.5	16.8	16.8	9.6	18.9	18.9
Actuated g/C Ratio	0.07	0.24	0.24	0.12	0.32	0.10	0.23	0.23	0.13	0.26	0.26
v/c Ratio	0.61	0.68	0.99	0.71	0.69	2.43	0.54	0.70	0.83	0.40	0.11
Control Delay	60.2	30.5	46.3	43.8	27.5	683.9	29.2	18.4	62.6	23.2	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.2	30.5	46.3	43.8	27.5	683.9	29.2	18.4	62.6	23.2	0.4
LOS	E	C	D	D	C	F	C	B	E	C	A
Approach Delay		38.6			32.0		302.2			33.6	
Approach LOS		D			C		F			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 73.6	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 2.43	
Intersection Signal Delay: 99.8	Intersection LOS: F
Intersection Capacity Utilization 74.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: Sycamore Canyon Bl. & Central Av.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	781	645	274	558	164	412	219	343	182	347	52
Future Volume (veh/h)	65	781	645	274	558	164	412	219	343	182	347	52
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1885	1870	1885	1885	1885	1870	1885	1856	1900	1885	1900
Adj Flow Rate, veh/h	69	831	545	291	594	159	438	233	270	194	369	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	8	1	2	1	1	1	2	1	3	0	1	0
Cap, veh/h	89	1260	388	384	840	224	188	413	345	235	873	
Arrive On Green	0.05	0.24	0.24	0.11	0.30	0.30	0.11	0.22	0.22	0.13	0.24	0.00
Sat Flow, veh/h	1697	5147	1585	3483	2780	742	1781	1885	1572	1810	3582	1610
Grp Volume(v), veh/h	69	831	545	291	382	371	438	233	270	194	369	0
Grp Sat Flow(s),veh/h/ln	1697	1716	1585	1742	1791	1731	1781	1885	1572	1810	1791	1610
Q Serve(g_s), s	2.8	10.2	17.2	5.7	13.3	13.4	7.4	7.7	11.4	7.3	6.1	0.0
Cycle Q Clear(g_c), s	2.8	10.2	17.2	5.7	13.3	13.4	7.4	7.7	11.4	7.3	6.1	0.0
Prop In Lane	1.00		1.00	1.00		0.43	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	89	1260	388	384	541	523	188	413	345	235	873	
V/C Ratio(X)	0.77	0.66	1.40	0.76	0.71	0.71	2.34	0.56	0.78	0.82	0.42	
Avail Cap(c_a), veh/h	121	1260	388	436	541	523	188	904	754	245	1825	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.9	23.9	26.5	30.4	21.7	21.8	31.4	24.4	25.9	29.8	22.4	0.0
Incr Delay (d2), s/veh	12.9	1.3	197.1	5.4	4.2	4.4	617.2	1.2	3.9	18.1	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	3.8	27.0	2.5	5.5	5.4	35.1	3.2	4.2	4.1	2.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.8	25.2	223.6	35.8	25.9	26.2	648.6	25.7	29.8	47.9	22.7	0.0
LnGrp LOS	D	C	F	D	C	C	F	C	C	D	C	
Approach Vol, veh/h		1445			1044			941			563	A
Approach Delay, s/veh		101.0			28.8			316.8			31.4	
Approach LOS		F			C			F			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.7	21.2	12.3	23.0	12.0	22.9	8.3	27.0
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	5.8	4.6	5.8
Max Green Setting (Gmax), s	9.5	33.7	8.8	17.2	7.4	35.8	5.0	21.0
Max Q Clear Time (g_c+I1), s	9.3	13.4	7.7	19.2	9.4	8.1	4.8	15.4
Green Ext Time (p_c), s	0.0	2.0	0.1	0.0	0.0	2.2	0.0	2.1

Intersection Summary	
HCM 6th Ctrl Delay	123.2
HCM 6th LOS	F

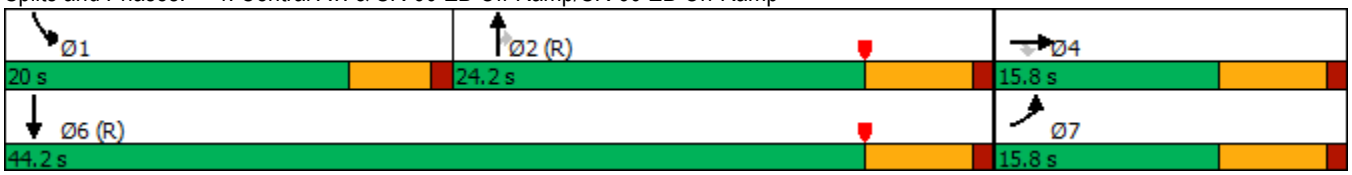
Notes

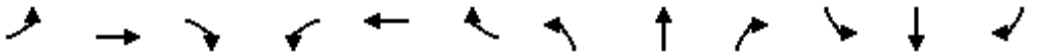
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	19	3	107	585	721	851	888
Future Volume (vph)	19	3	107	585	721	851	888
Turn Type	Prot	NA	Perm	NA	Perm	Prot	NA
Protected Phases	7	4		2		1	6
Permitted Phases			4		2		
Detector Phase	7	4	4	2	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	15.8	15.8	15.8	9.6	22.8
Total Split (s)	15.8	15.8	15.8	24.2	24.2	20.0	44.2
Total Split (%)	26.3%	26.3%	26.3%	40.3%	40.3%	33.3%	73.7%
Yellow Time (s)	4.8	4.8	4.8	4.8	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.8	4.6	5.8
Lead/Lag				Lag	Lag	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes	
Recall Mode	None	None	None	C-Min	C-Min	None	C-Min
Act Effct Green (s)	10.0	10.0	10.0	20.2	20.2	16.7	42.7
Actuated g/C Ratio	0.17	0.17	0.17	0.34	0.34	0.28	0.71
v/c Ratio	0.07	0.20	0.16	0.53	0.95	0.95	0.37
Control Delay	21.9	9.7	1.0	18.8	35.0	38.9	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	21.9	9.7	1.0	18.8	35.0	38.9	8.9
LOS	C	A	A	B	D	D	A
Approach Delay		7.8		27.8			23.6
Approach LOS		A		C			C

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow, Master Intersection	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 24.7	Intersection LOS: C
Intersection Capacity Utilization 90.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 4: Central Av. & SR-60 EB Off-Ramp/SR-60 EB On-Ramp





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	3	107	0	0	0	0	585	721	851	888	0
Future Volume (veh/h)	19	3	107	0	0	0	0	585	721	851	888	0
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
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1841	1900	1811				0	1856	1841	1856	1900	0
Adj Flow Rate, veh/h	20	0	101				0	622	582	905	945	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	4	0	6				0	3	4	3	0	0
Cap, veh/h	253	0	444				0	1159	513	880	2390	0
Arrive On Green	0.14	0.00	0.14				0.00	0.33	0.33	0.51	1.00	0.00
Sat Flow, veh/h	1753	0	3070				0	3618	1560	3428	3705	0
Grp Volume(v), veh/h	20	0	101				0	622	582	905	945	0
Grp Sat Flow(s),veh/h/ln	1753	0	1535				0	1763	1560	1714	1805	0
Q Serve(g_s), s	0.6	0.0	1.7				0.0	8.6	19.7	15.4	0.0	0.0
Cycle Q Clear(g_c), s	0.6	0.0	1.7				0.0	8.6	19.7	15.4	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	253	0	444				0	1159	513	880	2390	0
V/C Ratio(X)	0.08	0.00	0.23				0.00	0.54	1.13	1.03	0.40	0.00
Avail Cap(c_a), veh/h	292	0	512				0	1159	513	880	2390	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.64	0.64	0.62	0.62	0.00
Uniform Delay (d), s/veh	22.2	0.0	22.7				0.0	16.4	20.1	14.6	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.3				0.0	1.1	75.7	31.5	0.3	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	0.2	0.0	0.6				0.0	3.1	16.6	6.9	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.3	0.0	23.0				0.0	17.6	95.8	46.1	0.3	0.0
LnGrp LOS	C	A	C				A	B	F	F	A	A
Approach Vol, veh/h		121						1204			1850	
Approach Delay, s/veh		22.9						55.4			22.7	
Approach LOS		C						E			C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	20.0	25.5		14.5		45.5
Change Period (Y+Rc), s	4.6	5.8		5.8		5.8
Max Green Setting (Gmax), s	15.4	18.4		10.0		38.4
Max Q Clear Time (g_c+I1), s	17.4	21.7		3.7		2.0
Green Ext Time (p_c), s	0.0	0.0		0.2		7.1

Intersection Summary		
HCM 6th Ctrl Delay		35.1
HCM 6th LOS		D

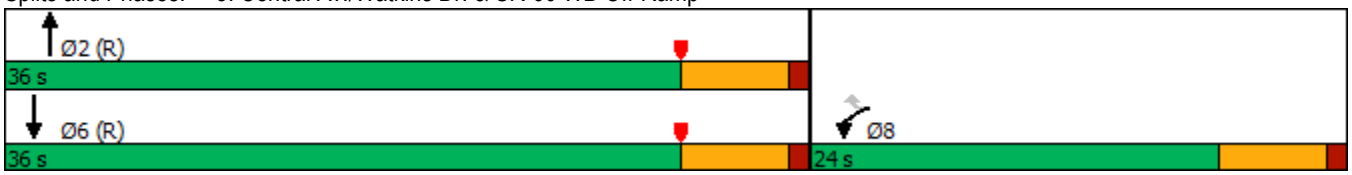
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	362	374	604	1377
Future Volume (vph)	362	374	604	1377
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	15.8	15.8	15.8	22.8
Total Split (s)	24.0	24.0	36.0	36.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%
Yellow Time (s)	4.8	4.8	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.8	5.8
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	C-Min	C-Min
Act Effct Green (s)	15.0	15.0	33.4	33.4
Actuated g/C Ratio	0.25	0.25	0.56	0.56
v/c Ratio	0.47	0.80	0.35	0.79
Control Delay	20.4	23.6	3.8	15.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.4	23.6	3.8	15.6
LOS	C	C	A	B
Approach Delay	22.0		3.8	15.6
Approach LOS	C		A	B

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 21.6 (36%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 14.7	Intersection LOS: B
Intersection Capacity Utilization 90.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: Central Av./Watkins Dr. & SR-60 WB Off-Ramp



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	362	374	604	0	0	1377
Future Volume (veh/h)	362	374	604	0	0	1377
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1885	1870	1856	0	0	1885
Adj Flow Rate, veh/h	411	253	686	0	0	1565
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	1	2	3	0	0	1
Cap, veh/h	725	330	2110	0	0	2143
Arrive On Green	0.21	0.21	0.20	0.00	0.00	0.60
Sat Flow, veh/h	3483	1585	3711	0	0	3770
Grp Volume(v), veh/h	411	253	686	0	0	1565
Grp Sat Flow(s),veh/h/ln	1742	1585	1763	0	0	1791
Q Serve(g_s), s	6.4	9.0	10.0	0.0	0.0	18.7
Cycle Q Clear(g_c), s	6.4	9.0	10.0	0.0	0.0	18.7
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	725	330	2110	0	0	2143
V/C Ratio(X)	0.57	0.77	0.33	0.00	0.00	0.73
Avail Cap(c_a), veh/h	1057	481	2110	0	0	2143
HCM Platoon Ratio	1.00	1.00	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.85	0.00	0.00	1.00
Uniform Delay (d), s/veh	21.3	22.4	13.7	0.0	0.0	8.6
Incr Delay (d2), s/veh	0.7	4.4	0.3	0.0	0.0	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	3.3	3.6	0.0	0.0	5.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.0	26.8	14.0	0.0	0.0	10.8
LnGrp LOS	C	C	B	A	A	B
Approach Vol, veh/h	664		686			1565
Approach Delay, s/veh	23.8		14.0			10.8
Approach LOS	C		B			B

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		41.7			41.7	18.3
Change Period (Y+Rc), s		5.8			5.8	5.8
Max Green Setting (Gmax), s		30.2			30.2	18.2
Max Q Clear Time (g_c+I1), s		12.0			20.7	11.0
Green Ext Time (p_c), s		4.0			6.6	1.5

Intersection Summary		
HCM 6th Ctrl Delay		14.5
HCM 6th LOS		B

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	294	684	1377	15
Future Vol, veh/h	0	0	294	684	1377	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	1	9
Mvmt Flow	0	0	323	752	1513	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2543	1521	1529	0	-	0
Stage 1	1521	-	-	-	-	-
Stage 2	1022	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	25	147	422	-	-	-
Stage 1	201	-	-	-	-	-
Stage 2	504	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	6	147	422	-	-	-
Mov Cap-2 Maneuver	6	-	-	-	-	-
Stage 1	47	-	-	-	-	-
Stage 2	504	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	10.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	422	-	-	-	-
HCM Lane V/C Ratio	0.766	-	-	-	-
HCM Control Delay (s)	36.4	-	0	-	-
HCM Lane LOS	E	-	A	-	-
HCM 95th %tile Q(veh)	6.4	-	-	-	-

APPENDIX 7.3:

HORIZON YEAR (2040) WITH PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

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Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS	2040 WP
				CALC LC	DATE 06/24/19
Jurisdiction: City of Riverside				CHK CH	DATE 06/24/19
Major Street: Sycamore Canyon Boulevard				Critical Approach Speed (Major)	45 mph
Minor Street: Driveway 1				Critical Approach Speed (Minor)	25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes **1** lane

Major Street Future ADT = **10,682** vpd Minor Street Future ADT = **70** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. √

or

In built up area of isolated community of < 10,000 population ……..

RURAL (R)

(Based on Estimated Average Daily Traffic - See Note)

URBAN / RURAL	Minimum Requirements EADT: Vehicles Per Day on Major Street (Total of Both Approaches) Urban	Major Street Rural	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) Urban	Minor Street Rural
CONDITION A - Minimum Vehicular Volume — Satisfied / Not Satisfied XX — RURAL XX				
Number of lanes for moving traffic on each approach: Major Street / Minor Street				
1 **10,682** / *1* **70**	8,000	5,600 *	2,400	1,680
2 + / *1*	9,600	6,720	2,400	1,680
2 + / *2* +	9,600	6,720	3,200	2,240
1 / *2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic — Satisfied / Not Satisfied XX				
Number of lanes for moving traffic on each approach: Major Street / Minor Street				
1 **10,682** / *1* **70**	12,000	8,400 *	1,200	850
2 + / *1*	14,400	10,080	1,200	850
2 + / *2* +	14,400	10,080	1,600	1,120
1 / *2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B — Satisfied / Not Satisfied XX				
No one condition satisfied, but following conditions fulfilled 80% of more ….. A 4% B 8%	2 CONDITIONS 80%		2 CONDITIONS 80%	

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

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APPENDIX 7.4:

HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS

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Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	142	0	18	0	536	74	37	69	0
Future Vol, veh/h	0	0	0	142	0	18	0	536	74	37	69	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	154	0	20	0	583	80	40	75	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	741	778	623	-	0	0	663	0	0
Stage 1	623	623	-	-	-	-	-	-	-
Stage 2	118	155	-	-	-	-	-	-	-
Critical Hdwy	6.63	6.53	6.23	-	-	-	4.13	-	-
Critical Hdwy Stg 1	5.43	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.83	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	-	-	-	2.219	-	-
Pot Cap-1 Maneuver	367	327	485	0	-	-	924	-	0
Stage 1	534	477	-	0	-	-	-	-	0
Stage 2	895	769	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	350	0	485	-	-	-	924	-	-
Mov Cap-2 Maneuver	443	0	-	-	-	-	-	-	-
Stage 1	534	0	-	-	-	-	-	-	-
Stage 2	855	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.1	0	3.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	447	924	-
HCM Lane V/C Ratio	-	-	0.389	0.044	-
HCM Control Delay (s)	-	-	18.1	9.1	0.1
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.8	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	58	1224	215	55	460	347	487	1104	117	63	46
v/c Ratio	0.70	1.25	0.50	0.34	0.67	0.96	0.48	1.20	1.43	0.05	0.07
Control Delay	91.5	158.5	14.0	56.9	43.0	83.4	18.0	123.7	284.4	22.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	91.5	158.5	14.0	56.9	43.0	83.4	18.0	123.7	284.4	22.2	0.2
Queue Length 50th (ft)	41	~401	24	19	148	246	210	~899	~113	14	0
Queue Length 95th (ft)	#112	#494	95	41	205	#432	299	#1156	#230	29	0
Internal Link Dist (ft)		1568			344		831			521	
Turn Bay Length (ft)	570		200	100		250		115	250		
Base Capacity (vph)	83	979	434	162	689	360	1012	919	82	1331	626
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	1.25	0.50	0.34	0.67	0.96	0.48	1.20	1.43	0.05	0.07

Intersection Summary

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

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

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	116	63	62	1951	521	216	402
v/c Ratio	0.40	0.21	0.17	1.07	0.49	0.68	0.16
Control Delay	26.9	9.9	1.4	61.8	2.9	40.3	3.6
Queue Delay	0.0	0.0	0.0	15.3	0.0	0.0	0.0
Total Delay	26.9	9.9	1.4	77.0	2.9	40.3	3.6
Queue Length 50th (ft)	38	2	0	~462	0	42	17
Queue Length 95th (ft)	80	30	3	#589	44	#87	40
Internal Link Dist (ft)		1038		344			253
Turn Bay Length (ft)	400		115			150	
Base Capacity (vph)	295	298	358	1828	1059	316	2565
Starvation Cap Reductn	0	0	0	35	0	0	0
Spillback Cap Reductn	2	0	0	675	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.21	0.17	1.69	0.49	0.68	0.16

Intersection Summary

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

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

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	178	456	2024	428
v/c Ratio	0.18	0.99	1.11	0.23
Control Delay	16.7	64.7	69.6	8.3
Queue Delay	0.0	0.0	0.9	0.0
Total Delay	16.7	64.7	70.5	8.3
Queue Length 50th (ft)	24	161	~487	40
Queue Length 95th (ft)	45	#334	m#440	63
Internal Link Dist (ft)	1138		253	437
Turn Bay Length (ft)		300		
Base Capacity (vph)	993	461	1822	1840
Starvation Cap Reductn	0	0	427	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.18	0.99	1.45	0.23

Intersection Summary

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

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

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

Intersection	
Int Delay, s/veh	17.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	924	1408	402	99
Future Vol, veh/h	0	0	924	1408	402	99
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	2	0
Mvmt Flow	0	0	1015	1547	442	109

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	3301	497	551	0	-	0
Stage 1	497	-	-	-	-	-
Stage 2	2804	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	2	577	~ 999	-	-	-
Stage 1	615	-	-	-	-	-
Stage 2	21	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	0	577	~ 999	-	-	-
Mov Cap-2 Maneuver	0	-	-	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	21	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	21	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	~ 999	-	-	-	-
HCM Lane V/C Ratio	1.016	-	-	-	-
HCM Control Delay (s)	53.1	-	0	-	-
HCM Lane LOS	F	-	A	-	-
HCM 95th %tile Q(veh)	20.6	-	-	-	-

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

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	134	0	17	0	312	72	36	407	0
Future Vol, veh/h	0	0	0	134	0	17	0	312	72	36	407	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	146	0	18	0	339	78	39	442	0

Major/Minor	Minor1			Major1			Major2		
Conflicting Flow All	677	898	378	-	0	0	417	0	0
Stage 1	378	378	-	-	-	-	-	-	-
Stage 2	299	520	-	-	-	-	-	-	-
Critical Hdwy	6.63	6.53	6.23	-	-	-	4.13	-	-
Critical Hdwy Stg 1	5.43	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.83	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	-	-	-	2.219	-	-
Pot Cap-1 Maneuver	402	278	668	0	-	-	1140	-	0
Stage 1	692	614	-	0	-	-	-	-	0
Stage 2	727	531	-	0	-	-	-	-	0
Platoon blocked, %					-	-		-	
Mov Cap-1 Maneuver	384	0	668	-	-	-	1140	-	-
Mov Cap-2 Maneuver	492	0	-	-	-	-	-	-	-
Stage 1	692	0	-	-	-	-	-	-	-
Stage 2	694	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.5	0	0.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	507	1140	-
HCM Lane V/C Ratio	-	-	0.324	0.034	-
HCM Control Delay (s)	-	-	15.5	8.3	0.2
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1.4	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	54	831	686	291	725	438	222	365	166	363	46
v/c Ratio	0.47	0.68	0.98	0.70	0.59	2.42	0.52	0.70	0.72	0.40	0.09
Control Delay	50.7	30.2	44.2	43.3	24.7	676.7	28.7	17.4	52.1	23.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.7	30.2	44.2	43.3	24.7	676.7	28.7	17.4	52.1	23.3	0.3
Queue Length 50th (ft)	23	119	123	63	140	~320	88	56	70	71	0
Queue Length 95th (ft)	#84	#227	#437	#153	#297	#613	145	136	#207	103	0
Internal Link Dist (ft)		1568			344		831			521	
Turn Bay Length (ft)	570		200	100		250		115	250		
Base Capacity (vph)	115	1223	697	422	1220	181	877	849	237	1771	863
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.68	0.98	0.69	0.59	2.42	0.25	0.43	0.70	0.20	0.05

Intersection Summary

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

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

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	20	50	49	606	755	905	919
v/c Ratio	0.07	0.18	0.14	0.47	0.90	0.89	0.32
Control Delay	21.9	10.0	0.8	17.1	26.5	30.7	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Delay	21.9	10.0	0.8	17.1	26.5	30.7	7.6
Queue Length 50th (ft)	6	1	0	95	125	~174	121
Queue Length 95th (ft)	22	27	0	141	#358	#291	181
Internal Link Dist (ft)		1038		344			253
Turn Bay Length (ft)	400		115			150	
Base Capacity (vph)	289	283	353	1290	840	1021	2830
Starvation Cap Reductn	0	0	0	0	0	0	809
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.18	0.14	0.47	0.90	0.89	0.45

Intersection Summary

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

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

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	392	425	669	1557
v/c Ratio	0.46	0.79	0.34	0.78
Control Delay	20.2	22.8	4.5	15.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.2	22.8	4.5	15.3
Queue Length 50th (ft)	59	73	3	218
Queue Length 95th (ft)	87	154	5	#326
Internal Link Dist (ft)	1138		253	437
Turn Bay Length (ft)		300		
Base Capacity (vph)	1051	613	1958	1996
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.37	0.69	0.34	0.78

Intersection Summary

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

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	283	680	1370	15
Future Vol, veh/h	0	0	283	680	1370	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	1	9
Mvmt Flow	0	0	311	747	1505	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2509	1513	1521	0	-	0
Stage 1	1513	-	-	-	-	-
Stage 2	996	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	26	149	425	-	-	-
Stage 1	203	-	-	-	-	-
Stage 2	524	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	7	149	425	-	-	-
Mov Cap-2 Maneuver	7	-	-	-	-	-
Stage 1	54	-	-	-	-	-
Stage 2	524	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	425	-	-	-	-
HCM Lane V/C Ratio	0.732	-	-	-	-
HCM Control Delay (s)	33.3	-	0	-	-
HCM Lane LOS	D	-	A	-	-
HCM 95th %tile Q(veh)	5.8	-	-	-	-

APPENDIX 7.5:

HORIZON YEAR (2040) WITH PROJECT CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS

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Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	107	0	0	554	3	10
Future Vol, veh/h	107	0	0	554	3	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	116	0	0	602	3	11

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	718	116
Stage 1	-	-	-	-	116	-
Stage 2	-	-	-	-	602	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	-	0	0	-	396	936
Stage 1	-	0	0	-	909	-
Stage 2	-	0	0	-	547	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	396	936
Mov Cap-2 Maneuver	-	-	-	-	468	-
Stage 1	-	-	-	-	909	-
Stage 2	-	-	-	-	547	-

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

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	760	-	-
HCM Lane V/C Ratio	0.019	-	-
HCM Control Delay (s)	9.8	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	54	142	0	18	21	536	74	37	79	1
Future Vol, veh/h	0	0	54	142	0	18	21	536	74	37	79	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	59	154	0	20	23	583	80	40	86	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	846	876	44	792	836	623	87	0	0	663	0	0
Stage 1	167	167	-	669	669	-	-	-	-	-	-	-
Stage 2	679	709	-	123	167	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.53	6.93	7.33	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.53	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.53	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	3.519	4.019	3.319	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	269	287	1017	293	302	485	1508	-	-	924	-	-
Stage 1	819	760	-	446	455	-	-	-	-	-	-	-
Stage 2	440	436	-	869	760	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	246	270	1017	263	284	485	1508	-	-	924	-	-
Mov Cap-2 Maneuver	321	333	-	359	367	-	-	-	-	-	-	-
Stage 1	807	726	-	439	448	-	-	-	-	-	-	-
Stage 2	416	429	-	782	726	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.8	23.1	0.2	2.9
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1508	-	-	1017	370	924	-	-
HCM Lane V/C Ratio	0.015	-	-	0.058	0.47	0.044	-	-
HCM Control Delay (s)	7.4	-	-	8.8	23.1	9.1	-	-
HCM Lane LOS	A	-	-	A	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	2.4	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	62	1224	215	55	474	347	490	1104	161	74	61
v/c Ratio	0.75	1.25	0.50	0.34	0.68	0.96	0.48	1.20	1.96	0.06	0.10
Control Delay	98.2	158.5	14.0	56.9	43.0	83.4	18.1	124.8	498.7	22.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	98.2	158.5	14.0	56.9	43.0	83.4	18.1	124.8	498.7	22.3	0.3
Queue Length 50th (ft)	44	~401	24	19	151	246	211	~902	~177	17	0
Queue Length 95th (ft)	#119	#494	95	41	210	#432	301	#1159	#311	33	0
Internal Link Dist (ft)		1568			344		831			521	
Turn Bay Length (ft)	570		200	100		250		115	250		
Base Capacity (vph)	83	979	434	162	692	360	1012	917	82	1331	626
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	1.25	0.50	0.34	0.68	0.96	0.48	1.20	1.96	0.06	0.10

Intersection Summary

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

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

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	116	65	66	1977	539	216	411
v/c Ratio	0.40	0.22	0.19	1.07	0.50	0.73	0.16
Control Delay	27.1	9.9	1.9	61.0	2.9	44.3	3.6
Queue Delay	0.0	0.0	0.0	15.7	0.0	0.0	0.0
Total Delay	27.1	9.9	1.9	76.7	2.9	44.3	3.6
Queue Length 50th (ft)	38	2	0	~465	0	42	18
Queue Length 95th (ft)	80	31	6	#593	43	#92	40
Internal Link Dist (ft)		1038		344			253
Turn Bay Length (ft)	400		115			150	
Base Capacity (vph)	289	295	353	1854	1075	295	2570
Starvation Cap Reductn	0	0	0	48	0	0	0
Spillback Cap Reductn	2	0	0	704	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.22	0.19	1.72	0.50	0.73	0.16

Intersection Summary

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

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

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	184	456	2050	430
v/c Ratio	0.19	0.99	1.13	0.23
Control Delay	16.8	64.7	76.3	8.3
Queue Delay	0.0	0.0	0.9	0.0
Total Delay	16.8	64.7	77.2	8.3
Queue Length 50th (ft)	25	161	~498	41
Queue Length 95th (ft)	46	#334	m#452	63
Internal Link Dist (ft)	1138		253	437
Turn Bay Length (ft)		300		
Base Capacity (vph)	993	461	1822	1840
Starvation Cap Reductn	0	0	427	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.19	0.99	1.47	0.23

Intersection Summary

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

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

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

Intersection	
Int Delay, s/veh	19.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	941	1415	404	99
Future Vol, veh/h	0	0	941	1415	404	99
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	2	0
Mvmt Flow	0	0	1034	1555	444	109

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	3345	499	553	0	-	0
Stage 1	499	-	-	-	-	-
Stage 2	2846	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	2	576	~ 997	-	-	-
Stage 1	614	-	-	-	-	-
Stage 2	18	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	0	576	~ 997	-	-	-
Mov Cap-2 Maneuver	0	-	-	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	18	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	23.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	~ 997	-	-	-	-
HCM Lane V/C Ratio	1.037	-	-	-	-
HCM Control Delay (s)	58.9	-	0	-	-
HCM Lane LOS	F	-	A	-	-
HCM 95th %tile Q(veh)	22.1	-	-	-	-

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

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	446	0	0	329	2	6
Future Vol, veh/h	446	0	0	329	2	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	485	0	0	358	2	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	843	485
Stage 1	-	-	-	-	485	-
Stage 2	-	-	-	-	358	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	-	0	0	-	334	582
Stage 1	-	0	0	-	619	-
Stage 2	-	0	0	-	707	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	334	582
Mov Cap-2 Maneuver	-	-	-	-	452	-
Stage 1	-	-	-	-	619	-
Stage 2	-	-	-	-	707	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	543	-	-
HCM Lane V/C Ratio	0.016	-	-
HCM Control Delay (s)	11.7	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0	-	-

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↰	↱			↑↱	
Traffic Vol, veh/h	0	0	34	134	0	17	65	312	72	36	413	3
Future Vol, veh/h	0	0	34	134	0	17	65	312	72	36	413	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	37	146	0	18	71	339	78	39	449	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1058	1088	226	823	1050	378	452	0	0	417	0	0
Stage 1	529	529	-	520	520	-	-	-	-	-	-	-
Stage 2	529	559	-	303	530	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.53	6.93	7.33	6.53	6.23	4.13	-	-	4.13	-	-
Critical Hdwy Stg 1	6.53	5.53	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.53	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.519	4.019	3.319	3.519	4.019	3.319	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	190	215	778	279	226	668	1107	-	-	1140	-	-
Stage 1	502	526	-	538	531	-	-	-	-	-	-	-
Stage 2	532	510	-	682	526	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	170	192	778	244	202	668	1107	-	-	1140	-	-
Mov Cap-2 Maneuver	286	300	-	351	302	-	-	-	-	-	-	-
Stage 1	470	502	-	504	497	-	-	-	-	-	-	-
Stage 2	484	477	-	620	502	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.9	22.2	1.2	0.7
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1107	-	-	778	371	1140	-	-
HCM Lane V/C Ratio	0.064	-	-	0.048	0.442	0.034	-	-
HCM Control Delay (s)	8.5	-	-	9.9	22.2	8.3	-	-
HCM Lane LOS	A	-	-	A	C	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	2.2	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	69	831	686	291	768	438	233	365	194	369	55
v/c Ratio	0.61	0.68	0.99	0.71	0.69	2.43	0.54	0.70	0.83	0.40	0.11
Control Delay	60.2	30.5	46.3	43.8	27.5	683.9	29.2	18.4	62.6	23.2	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.2	30.5	46.3	43.8	27.5	683.9	29.2	18.4	62.6	23.2	0.4
Queue Length 50th (ft)	30	120	128	63	150	~323	93	61	84	72	0
Queue Length 95th (ft)	#110	#227	#441	#153	#323	#613	152	142	#249	105	0
Internal Link Dist (ft)		1568			344		831			521	
Turn Bay Length (ft)	570		200	100		250		115	250		
Base Capacity (vph)	114	1214	692	419	1113	180	871	838	235	1759	858
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.68	0.99	0.69	0.69	2.43	0.27	0.44	0.83	0.21	0.06

Intersection Summary

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

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

Lane Group	EBL	EBT	EBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	20	59	58	622	767	905	945
v/c Ratio	0.07	0.20	0.16	0.53	0.95	0.95	0.37
Control Delay	21.9	9.7	1.0	18.8	35.0	38.9	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	21.9	9.7	1.0	18.8	35.0	38.9	8.9
Queue Length 50th (ft)	6	1	0	98	133	~175	127
Queue Length 95th (ft)	22	29	2	145	#368	m#288	m183
Internal Link Dist (ft)		1038		344			253
Turn Bay Length (ft)	400		115			150	
Base Capacity (vph)	289	290	353	1180	804	948	2570
Starvation Cap Reductn	0	0	0	0	0	0	800
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.20	0.16	0.53	0.95	0.95	0.53

Intersection Summary

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

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

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

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	411	425	686	1565
v/c Ratio	0.47	0.80	0.35	0.79
Control Delay	20.4	23.6	3.8	15.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.4	23.6	3.8	15.6
Queue Length 50th (ft)	62	76	3	225
Queue Length 95th (ft)	90	158	5	#331
Internal Link Dist (ft)	1138		253	437
Turn Bay Length (ft)		300		
Base Capacity (vph)	1051	607	1950	1988
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.39	0.70	0.35	0.79

Intersection Summary

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

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	294	684	1377	15
Future Vol, veh/h	0	0	294	684	1377	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	275	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	5	1	1	9
Mvmt Flow	0	0	323	752	1513	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2543	1521	1529	0	-	0
Stage 1	1521	-	-	-	-	-
Stage 2	1022	-	-	-	-	-
Critical Hdwy	6.6	6.2	4.175	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2475	-	-	-
Pot Cap-1 Maneuver	25	147	422	-	-	-
Stage 1	201	-	-	-	-	-
Stage 2	504	-	-	-	-	-
Platoon blocked, %	1			-	-	-
Mov Cap-1 Maneuver	6	147	422	-	-	-
Mov Cap-2 Maneuver	6	-	-	-	-	-
Stage 1	47	-	-	-	-	-
Stage 2	504	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	10.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	422	-	-	-	-
HCM Lane V/C Ratio	0.766	-	-	-	-
HCM Control Delay (s)	36.4	-	0	-	-
HCM Lane LOS	E	-	A	-	-
HCM 95th %tile Q(veh)	6.4	-	-	-	-

APPENDIX 7.6:

HORIZON YEAR (2040) WITH PROJECT CONDITIONS
INTERSECTION OPERATIONS ANALYSIS WORKSHEETS WITH IMPROVEMENTS

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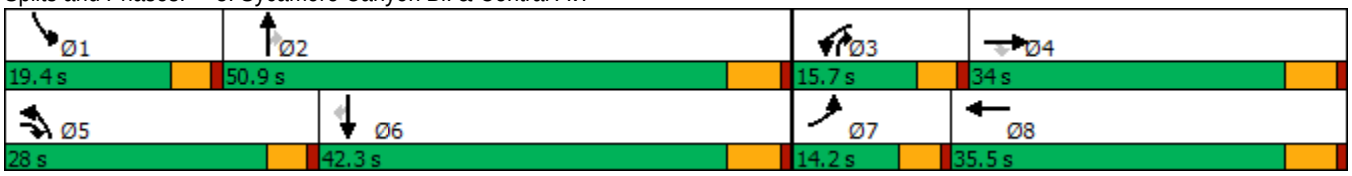
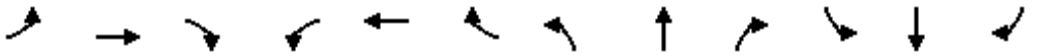
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	58	1138	200	51	325	323	456	1027	150	69	57
Future Volume (vph)	58	1138	200	51	325	323	456	1027	150	69	57
Turn Type	Prot	NA	pm+ov	Prot	NA	Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	7	4	5	3	8	5	2	3	1	6	
Permitted Phases			4					2			6
Detector Phase	7	4	5	3	8	5	2	3	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	5.0	10.0	5.0	5.0	10.0	10.0
Minimum Split (s)	9.6	15.8	9.6	9.6	26.8	9.6	15.8	9.6	9.6	40.8	40.8
Total Split (s)	14.2	34.0	28.0	15.7	35.5	28.0	50.9	15.7	19.4	42.3	42.3
Total Split (%)	11.8%	28.3%	23.3%	13.1%	29.6%	23.3%	42.4%	13.1%	16.2%	35.3%	35.3%
Yellow Time (s)	3.6	4.8	3.6	3.6	4.8	3.6	4.8	3.6	3.6	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	4.6	5.8	4.6	5.8	4.6	4.6	5.8	5.8
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	None	Min	Min

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 105.1
Natural Cycle: 120
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Sycamore Canyon Bl. & Central Av.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	58	1138	200	51	325	116	323	456	1027	150	69	57
Future Volume (veh/h)	58	1138	200	51	325	116	323	456	1027	150	69	57
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1856	1796	1900	1870	1870	1856	1885	1841	1856	1856	1648
Adj Flow Rate, veh/h	62	1224	213	55	349	122	347	490	1009	161	74	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	3	7	0	2	2	3	1	4	3	3	17
Cap, veh/h	80	1337	725	133	668	230	375	741	1183	191	1018	
Arrive On Green	0.04	0.26	0.26	0.04	0.26	0.26	0.21	0.39	0.39	0.11	0.29	0.00
Sat Flow, veh/h	1810	5066	1522	3510	2594	893	1767	1885	2745	1767	3526	1397
Grp Volume(v), veh/h	62	1224	213	55	237	234	347	490	1009	161	74	0
Grp Sat Flow(s),veh/h/ln	1810	1689	1522	1755	1777	1710	1767	1885	1373	1767	1763	1397
Q Serve(g_s), s	3.6	24.7	9.0	1.6	12.1	12.4	20.3	22.5	34.9	9.4	1.6	0.0
Cycle Q Clear(g_c), s	3.6	24.7	9.0	1.6	12.1	12.4	20.3	22.5	34.9	9.4	1.6	0.0
Prop In Lane	1.00		1.00	1.00		0.52	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	80	1337	725	133	458	440	375	741	1183	191	1018	
V/C Ratio(X)	0.77	0.92	0.29	0.41	0.52	0.53	0.93	0.66	0.85	0.84	0.07	
Avail Cap(c_a), veh/h	165	1355	730	370	500	482	392	806	1278	248	1220	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	49.9	37.7	16.8	49.6	33.5	33.7	40.7	26.3	27.0	46.2	27.2	0.0
Incr Delay (d2), s/veh	5.8	9.8	0.2	0.8	0.9	1.0	26.3	1.8	5.5	14.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	10.9	3.0	0.7	5.1	5.0	11.2	9.8	11.4	4.8	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.6	47.5	17.0	50.3	34.5	34.7	67.0	28.1	32.5	61.0	27.3	0.0
LnGrp LOS	E	D	B	D	C	C	E	C	C	E	C	
Approach Vol, veh/h		1499			526			1846			235	A
Approach Delay, s/veh		43.5			36.2			37.8			50.4	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	47.2	8.6	33.6	27.0	36.2	9.3	33.0
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	4.6	5.8	4.6	5.8
Max Green Setting (Gmax), s	14.8	45.1	11.1	28.2	23.4	36.5	9.6	29.7
Max Q Clear Time (g_c+I1), s	11.4	36.9	3.6	26.7	22.3	3.6	5.6	14.4
Green Ext Time (p_c), s	0.1	4.5	0.0	1.1	0.1	0.4	0.0	2.2

Intersection Summary	
HCM 6th Ctrl Delay	40.4
HCM 6th LOS	D

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	62	1224	215	55	474	347	490	1104	161	74	61
v/c Ratio	0.47	0.90	0.23	0.17	0.44	0.88	0.83	0.83	0.75	0.10	0.15
Control Delay	61.8	48.1	2.9	48.3	30.6	65.7	46.5	28.1	68.2	32.1	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.8	48.1	2.9	48.3	30.6	65.7	46.5	28.1	68.2	32.1	0.8
Queue Length 50th (ft)	42	300	0	18	128	234	316	333	107	21	0
Queue Length 95th (ft)	93	#468	41	41	210	#473	443	430	#226	40	0
Internal Link Dist (ft)		1568			344		831			521	
Turn Bay Length (ft)	570		200	100		250		115	250		
Base Capacity (vph)	166	1366	929	374	1082	394	815	1367	249	1230	582
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.90	0.23	0.15	0.44	0.88	0.60	0.81	0.65	0.06	0.10

Intersection Summary

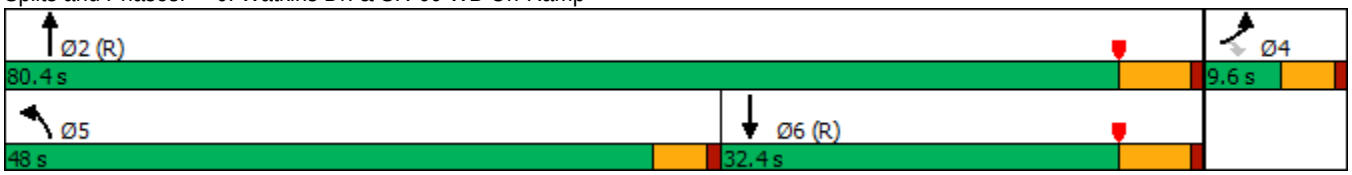
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

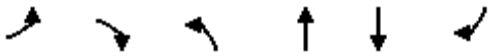
Lane Group	NBL	NBT	SBT	Ø4
Lane Configurations				
Traffic Volume (vph)	941	1415	404	
Future Volume (vph)	941	1415	404	
Turn Type	Prot	NA	NA	
Protected Phases	5	2	6	4
Permitted Phases				
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	5.0	10.0	10.0	5.0
Minimum Split (s)	9.6	15.8	27.8	9.6
Total Split (s)	48.0	80.4	32.4	9.6
Total Split (%)	53.3%	89.3%	36.0%	11%
Yellow Time (s)	3.6	4.8	4.8	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	4.6	5.8	5.8	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 6: Watkins Dr. & SR-60 WB On-Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	941	1415	404	99
Future Volume (veh/h)	0	0	941	1415	404	99
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1826	1885	1870	1870
Adj Flow Rate, veh/h	0	0	1034	1555	444	109
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	0	0	5	1	2	2
Cap, veh/h	2	2	1092	3351	1588	387
Arrive On Green	0.00	0.00	0.65	1.00	0.56	0.56
Sat Flow, veh/h	1810	1610	3374	3676	2926	690
Grp Volume(v), veh/h	0	0	1034	1555	277	276
Grp Sat Flow(s),veh/h/ln	1810	1610	1687	1791	1777	1746
Q Serve(g_s), s	0.0	0.0	25.1	0.0	7.3	7.4
Cycle Q Clear(g_c), s	0.0	0.0	25.1	0.0	7.3	7.4
Prop In Lane	1.00	1.00	1.00			0.40
Lane Grp Cap(c), veh/h	2	2	1092	3351	996	979
V/C Ratio(X)	0.00	0.00	0.95	0.46	0.28	0.28
Avail Cap(c_a), veh/h	101	89	1627	3351	996	979
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	0.12	0.12	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	15.2	0.0	10.3	10.3
Incr Delay (d2), s/veh	0.0	0.0	1.1	0.1	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	4.4	0.0	2.6	2.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	0.0	16.3	0.1	11.0	11.0
LnGrp LOS	A	A	B	A	B	B
Approach Vol, veh/h	0			2589	553	
Approach Delay, s/veh	0.0			6.5	11.0	
Approach LOS				A	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		90.0		0.0	33.7	56.3
Change Period (Y+Rc), s		5.8		4.6	4.6	5.8
Max Green Setting (Gmax), s		74.6		5.0	43.4	26.6
Max Q Clear Time (g_c+I1), s		2.0		0.0	27.1	9.4
Green Ext Time (p_c), s		17.7		0.0	2.0	2.8

Intersection Summary	
HCM 6th Ctrl Delay	7.3
HCM 6th LOS	A

Lane Group	NBL	NBT	SBT
Lane Group Flow (vph)	1034	1555	553
v/c Ratio	0.82	0.44	0.31
Control Delay	29.2	0.1	13.7
Queue Delay	0.1	0.0	0.0
Total Delay	29.2	0.1	13.7
Queue Length 50th (ft)	300	0	86
Queue Length 95th (ft)	m292	m0	142
Internal Link Dist (ft)		437	1295
Turn Bay Length (ft)	275		
Base Capacity (vph)	1608	3574	1762
Starvation Cap Reductn	50	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.66	0.44	0.31

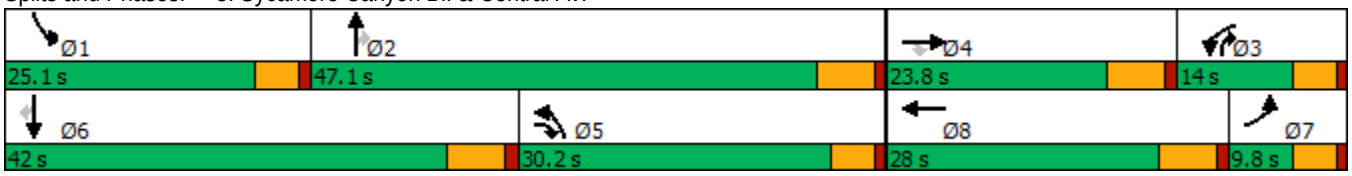
Intersection Summary

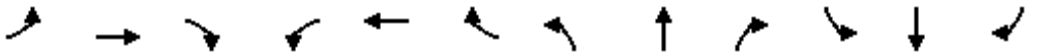
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	65	781	645	274	558	412	219	343	182	347	52
Future Volume (vph)	65	781	645	274	558	412	219	343	182	347	52
Turn Type	Prot	NA	pm+ov	Prot	NA	Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	7	4	5	3	8	5	2	3	1	6	
Permitted Phases			4					2			6
Detector Phase	7	4	5	3	8	5	2	3	1	6	6
Switch Phase											
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	5.0	10.0	5.0	5.0	10.0	10.0
Minimum Split (s)	9.6	15.8	9.6	9.6	26.8	9.6	15.8	9.6	9.6	40.8	40.8
Total Split (s)	9.8	23.8	30.2	14.0	28.0	30.2	47.1	14.0	25.1	42.0	42.0
Total Split (%)	8.9%	21.6%	27.5%	12.7%	25.5%	27.5%	42.8%	12.7%	22.8%	38.2%	38.2%
Yellow Time (s)	3.6	4.8	3.6	3.6	4.8	3.6	4.8	3.6	3.6	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.6	5.8	4.6	4.6	5.8	4.6	5.8	4.6	4.6	5.8	5.8
Lead/Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	None	Min	Min

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 91.5
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Sycamore Canyon Bl. & Central Av.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	781	645	274	558	164	412	219	343	182	347	52
Future Volume (veh/h)	65	781	645	274	558	164	412	219	343	182	347	52
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1885	1870	1885	1885	1885	1870	1885	1856	1900	1885	1900
Adj Flow Rate, veh/h	69	831	545	291	594	159	438	233	270	194	369	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	8	1	2	1	1	1	2	1	3	0	1	0
Cap, veh/h	110	1060	750	371	688	184	476	569	1130	235	535	
Arrive On Green	0.06	0.21	0.21	0.11	0.25	0.25	0.27	0.30	0.30	0.13	0.15	0.00
Sat Flow, veh/h	1697	5147	1585	3483	2780	742	1781	1885	2768	1810	3582	1610
Grp Volume(v), veh/h	69	831	545	291	382	371	438	233	270	194	369	0
Grp Sat Flow(s),veh/h/ln	1697	1716	1585	1742	1791	1731	1781	1885	1384	1810	1791	1610
Q Serve(g_s), s	3.2	12.4	0.7	6.6	16.6	16.7	19.4	8.0	1.6	8.5	7.9	0.0
Cycle Q Clear(g_c), s	3.2	12.4	0.7	6.6	16.6	16.7	19.4	8.0	1.6	8.5	7.9	0.0
Prop In Lane	1.00		1.00	1.00		0.43	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	110	1060	750	371	444	429	476	569	1130	235	535	
V/C Ratio(X)	0.63	0.78	0.73	0.78	0.86	0.87	0.92	0.41	0.24	0.83	0.69	
Avail Cap(c_a), veh/h	110	1141	775	403	490	473	561	959	1702	457	1596	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	37.0	30.5	17.2	35.4	29.2	29.3	28.9	22.6	5.0	34.5	32.8	0.0
Incr Delay (d2), s/veh	8.3	3.4	3.3	7.9	13.6	14.4	17.4	0.5	0.1	2.8	1.6	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	5.1	7.6	3.0	8.2	8.0	9.8	3.3	0.5	3.7	3.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.3	34.0	20.5	43.3	42.8	43.6	46.3	23.1	5.1	37.3	34.4	0.0
LnGrp LOS	D	C	C	D	D	D	D	C	A	D	C	
Approach Vol, veh/h		1445			1044			941			563	A
Approach Delay, s/veh		29.4			43.3			28.7			35.4	
Approach LOS		C			D			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.1	30.3	13.3	22.5	27.5	17.9	9.9	25.9
Change Period (Y+Rc), s	4.6	5.8	4.6	5.8	5.8	* 5.8	4.6	5.8
Max Green Setting (Gmax), s	20.5	41.3	9.4	18.0	25.6	* 36	5.2	22.2
Max Q Clear Time (g_c+I1), s	10.5	10.0	8.6	14.4	21.4	9.9	5.2	18.7
Green Ext Time (p_c), s	0.2	2.3	0.1	2.3	0.3	2.2	0.0	1.5

Intersection Summary	
HCM 6th Ctrl Delay	33.7
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	69	831	686	291	768	438	233	365	194	369	55
v/c Ratio	0.73	0.82	0.71	0.81	0.89	0.88	0.39	0.27	0.72	0.55	0.14
Control Delay	84.8	43.7	16.7	60.0	46.7	53.0	26.9	3.0	52.9	36.3	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	84.8	43.7	16.7	60.0	46.7	53.0	26.9	3.0	52.9	36.3	0.7
Queue Length 50th (ft)	38	161	171	82	206	228	103	9	103	102	0
Queue Length 95th (ft)	#136	#303	#478	#193	#424	#530	180	23	200	142	0
Internal Link Dist (ft)		1568			344		831			521	
Turn Bay Length (ft)	570		200	100		250		115	250		
Base Capacity (vph)	95	1019	961	359	865	499	856	1351	407	1426	714
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.82	0.71	0.81	0.89	0.88	0.27	0.27	0.48	0.26	0.08

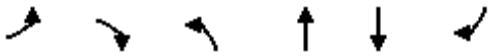
Intersection Summary

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

Lane Group	NBL	NBT	SBT	Ø4
Lane Configurations				
Traffic Volume (vph)	294	684	1377	
Future Volume (vph)	294	684	1377	
Turn Type	Prot	NA	NA	
Protected Phases	5	2	6	4
Permitted Phases				
Detector Phase	5	2	6	
Switch Phase				
Minimum Initial (s)	5.0	10.0	10.0	5.0
Minimum Split (s)	9.6	15.8	27.8	21.6
Total Split (s)	17.0	68.4	51.4	21.6
Total Split (%)	18.9%	76.0%	57.1%	24%
Yellow Time (s)	3.6	4.8	4.8	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	4.6	5.8	5.8	
Lead/Lag	Lead		Lag	
Lead-Lag Optimize?	Yes		Yes	
Recall Mode	None	C-Min	C-Min	None

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated

Splits and Phases: 6: Watkins Dr. & SR-60 WB On-Ramp



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	294	684	1377	15
Future Volume (veh/h)	0	0	294	684	1377	15
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1826	1885	1885	1885
Adj Flow Rate, veh/h	0	0	323	752	1513	16
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	0	0	5	1	1	1
Cap, veh/h	2	2	388	3351	2793	30
Arrive On Green	0.00	0.00	0.23	1.00	0.77	0.77
Sat Flow, veh/h	1810	1610	3374	3676	3724	38
Grp Volume(v), veh/h	0	0	323	752	746	783
Grp Sat Flow(s),veh/h/ln	1810	1610	1687	1791	1791	1877
Q Serve(g_s), s	0.0	0.0	8.2	0.0	14.8	14.9
Cycle Q Clear(g_c), s	0.0	0.0	8.2	0.0	14.8	14.9
Prop In Lane	1.00	1.00	1.00			0.02
Lane Grp Cap(c), veh/h	2	2	388	3351	1378	1444
V/C Ratio(X)	0.00	0.00	0.83	0.22	0.54	0.54
Avail Cap(c_a), veh/h	342	304	465	3351	1378	1444
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	0.86	0.86	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	33.8	0.0	4.1	4.1
Incr Delay (d2), s/veh	0.0	0.0	7.9	0.1	1.5	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	3.3	0.1	3.4	3.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	0.0	41.7	0.1	5.6	5.6
LnGrp LOS	A	A	D	A	A	A
Approach Vol, veh/h	0			1075	1529	
Approach Delay, s/veh	0.0			12.6	5.6	
Approach LOS				B	A	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		90.0		0.0	15.0	75.0
Change Period (Y+Rc), s		5.8		4.6	4.6	5.8
Max Green Setting (Gmax), s		62.6		17.0	12.4	45.6
Max Q Clear Time (g_c+I1), s		2.0		0.0	10.2	16.9
Green Ext Time (p_c), s		5.5		0.0	0.2	12.1

Intersection Summary	
HCM 6th Ctrl Delay	8.5
HCM 6th LOS	A

Lane Group	NBL	NBT	SBT
Lane Group Flow (vph)	323	752	1529
v/c Ratio	0.72	0.22	0.61
Control Delay	43.5	1.1	10.5
Queue Delay	0.0	0.0	0.0
Total Delay	43.5	1.1	10.5
Queue Length 50th (ft)	94	0	170
Queue Length 95th (ft)	139	68	478
Internal Link Dist (ft)		437	1295
Turn Bay Length (ft)	275		
Base Capacity (vph)	480	3356	2500
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.67	0.22	0.61

Intersection Summary

September 16, 2020

Ms. Sonya Hooker
Ruth Villalobos & Associates, Inc.
3602 Inland Empire Blvd., Suite C310
Ontario, CA 91764

SUBJECT: CRESTVIEW APARTMENTS VEHICLE MILES TRAVELLED (VMT) ANALYSIS REVISED

Dear Ms. Sonya Hooker:

The following Vehicle Miles Travelled (VMT) Analysis has been prepared for the proposed Crestview Apartments (**Project**), which is located at the northwest corner of Sycamore Canyon Boulevard and Central Avenue in the City of Riverside.

PROJECT OVERVIEW

The Project as addressed in this analysis consists of up to 237 2-4-story multifamily residential dwelling units. Trips generated by the Project's proposed land uses have been estimated based on trip generation rates collected by the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition, 2017. (1) The proposed Project is anticipated to generate a total of 1,431 vehicle trip-ends per day.

BACKGROUND

Changes to California Environmental Quality Act (CEQA) Guidelines were adopted in December 2018, which requires all lead agencies to adopt VMT as a replacement for automobile delay-based level of service (LOS) as the new measure for identifying transportation impacts for land use projects. This statewide mandate takes effect July 1, 2020. To aid in this transition, the Governor's Office of Planning and Research (OPR) released a Technical Advisory on Evaluating Transportation Impacts in CEQA (December of 2018) (**Technical Advisory**). (2) Based on OPR's Technical Advisory, the Western Riverside Council of Governments (WRCOG) prepared a WRCOG SB 743 Implementation Pathway Document Package (March 2019) to assist its member agencies with implementation tools necessary to adopt analysis methodology, impact thresholds and mitigation approaches for VMT. To add to the previous work effort, WRCOG in February 2020 released its Recommended Traffic Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service Assessment (**WRCOG Guidelines**), which provides each of its member agencies with specific procedures for complying with the new CEQA requirements for VMT analysis. (3)

VMT ANALYSIS METHODOLOGY

The City of Riverside recently adopted updated Traffic Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service Assessment (**City Guidelines**). (4) The City Guidelines include VMT thresholds that were recently reviewed and adopted by City Council on June 16, 2020. Based on the adopted VMT thresholds, a significant impact would occur if the following condition is met:

- For new residential projects, utilizing a threshold consistent with 15% below the City's current baseline VMT Per Capita.

PROJECT SCREENING

The City Guidelines provides details on appropriate "screening thresholds" that can be used to identify when a proposed land use project is anticipated to result in a less-than-significant impact without conducting a more detailed VMT analysis. Screening thresholds are broken into three types:

- Project Type Screening
- Map Based Screening based on Low VMT Area
- Transit Priority Area (TPA) Screening

A land use project need only to meet one of the above screening thresholds to result in a less-than-significant impact.

For the purposes of this analysis, the initial VMT screening process has been conducted with using the WRCOG VMT Screening Tool (**Screening Tool**), which uses screening criteria consistent with the screening thresholds recommended in the Technical Advisory and City Guidelines.

PROJECT TYPE SCREENING

The City Guidelines identifies projects that are consistent with the current Sustainable Communities Strategy (SCS) or general plan, and that generate fewer than 110 daily vehicle trips be presumed to have a less-than-significant impact on VMT. The Project is forecast to generate more than 110 daily vehicle trips; therefore, the Project would not be eligible to screen out based on project type screening.

The Project Type screening threshold is not met.

LOW VMT AREA SCREENING

The Technical Advisory also states that, "residential and office projects that locate in areas with low VMT and that incorporate similar features (density, mix of uses, and transit accessibility) will tend to exhibit similarly low VMT." The Screening Tool uses the sub-regional Riverside County Transportation Analysis Model (RIVTAM) to measure VMT performance within individual traffic analysis zones (TAZ's) within the WRCOG region. The Project's physical location based on parcel number (APN 256050012) was selected

within the Screening Tool to determine the relevant TAZ's VMT as compared to the jurisdictional average (see Attachment A). The Project boundary is located in TAZ 3581 and would not appear to be within a low VMT generating TAZ based on Residential Home-Based VMT.

The Low VMT Area screening threshold is not met.

TPA SCREENING

Consistent with guidance identified in the Technical Advisory, projects located within a Transit Priority Area (TPA) (i.e., within ½ mile of an existing "major transit stop"[1] or an existing stop along a "high-quality transit corridor"[2]) may be presumed to have a less than significant impact absent substantial evidence to the contrary.

However, the presumption may not be appropriate if a project:

- Has a Floor Area Ratio (FAR) of less than 0.75;
- Includes more parking for use by residents, customers, or employees of the project than required by the jurisdiction (if the jurisdiction requires the project to supply parking);
- Is inconsistent with the applicable Sustainable Communities Strategy (as determined by the lead agency, with input from the Metropolitan Planning Organization); or
- Replaces affordable residential units with a smaller number of moderate- or high-income residential units.

Based on the Screening Tool results presented in Attachment A, the Project site is not located within ½ mile of an existing major transit stop, or along a high-quality transit corridor.

The TPA screening threshold is not met.

Since none of the project level screening criteria were met, a project level VMT analysis should be prepared.

PROJECT VMT

The Riverside Transportation Analysis Model (RIVTAM) is a useful tool to estimate VMT as it considers interaction between different land uses based on socio-economic data such as population, households and employment. The City Guidelines identifies RIVTAM as the appropriate tool for conducting VMT analysis for land use projects in Riverside County.

[1] Pub. Resources Code, § 21064.3 ("'Major transit stop' means a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.").
[2] Pub. Resources Code, § 21155 ("For purposes of this section, a high-quality transit corridor means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.").

Project VMT has been calculated using the most current version of RIVTAM. Adjustments in socio-economic data (SED) (i.e., population) have been made to the appropriate traffic analysis zone (TAZ) within the RIVTAM model to reflect the Project's proposed land use (i.e., residential use). Table 1 summarizes the population factors for the Project.

TABLE 1: POPULATION DENSITY FACTORS

	Project
Dwelling Units	237
Population Density Factor[3]	3.18 persons/1 household
Population	754

Adjustments to SED to represent the Project were made for a separate TAZ in both the base year model and cumulative year model. A separate TAZ was utilized to isolate Project generated VMT. Project-generated Home-Based (HB) VMT was then calculated for both the base year (2012) model and cumulative year (2040) model and linear interpolation was used to determine the Project's baseline HB VMT. Project HB VMT is then normalized by dividing the population value. As shown in Table 2, the Project baseline (2019) HB VMT per capita is 9.59 and the Project cumulative (2040) HB VMT per capita is 7.66.

TABLE 2: PROJECT HB VMT PER CAPITA

	Baseline 2019	Cumulative 2040
Population	754	754
HB VMT	7,234	5,777
HB VMT / Capita	9.59	7.66

CITY OF RIVERSIDE VMT

WRCOG provides VMT calculations for base model year (2012) and cumulative model year (2040) for each of its member agencies. Urban Crossroads has obtained this data from WRCOG and has used linear interpolation to calculate the City of Riverside's HB VMT per capita for baseline (2019) conditions, which is 10.61. The City of Riverside's HB VMT per capita for cumulative year (2040) is 10.11.

PROJECT LEVEL VMT ASSESSMENT

Table 3 illustrates the comparison between the Project generated HB VMT per capita to the City of Riverside's baseline and cumulative HB VMT per capita. The Project's baseline HB VMT per capita is 9.61% below the City's current baseline HB VMT per capita while the Project's cumulative HB VMT per

[3] Population Density Factor was obtained from the City of Riverside General Plan Housing Element (June 2018).

capita is 24.23% below the City's current baseline HB VMT per capita.

TABLE 3: HB VMT PER CAPITA COMPARISON

	Baseline HB VMT/Capita	Cumulative HB VMT/Capita
City of Riverside	10.61	10.11
Project	9.59	7.66
Difference	-1.02	-2.45
Percent Change	-9.61%	-24.23%
Potentially Significant?	Yes	No

PROJECT'S EFFECT ON VMT

Consistent with City Guidelines, projects that are found to have a potential impact using efficiency-based metrics (such as VMT per capita) should also provide an additional assessment to evaluate a project's effect on VMT. This analysis is performed using the boundary method, which includes all vehicle trips with one or both trip-ends within a specific geographic area of interest (i.e., the City of Riverside). Once the areawide VMT value is calculated, it is then normalized by dividing by that City's service population (i.e., population and employment). As shown on Table 4, the Project is anticipated to result in a baseline (2019) net decrease of 0.01 VMT/SP and a cumulative (2040) net decrease of 0.03 VMT/SP within the City, which would indicate that the Project would increase the efficiency of travel in the City.

TABLE 4: CUMULATIVE CITY OF RIVERSIDE VMT PER SERVICE POPULATION

	2019 Without Project	2019 With Project	2040 Without Project	2040 With Project
Population	321,235	321,989	367,784	368,538
Employment	146,813	146,813	228,619	228,619
VMT	6,478,628	6,482,369	8,723,440	8,719,316
VMT/SP	13.84	13.83	14.63	14.60
Change in VMT	-0.01		-0.03	
Potentially Significant?	No		No	

POTENTIAL VMT REDUCTION STRATEGIES

Transportation demand management (TDM) strategies have been evaluated for the purpose of reducing VMT impacts determined to be potentially significant. The effectiveness of TDM strategies to reduce VMT has been determined based on the SB 743 Implementation TDM Strategy Assessment (February 26, 2019, Fehr & Peers) (**WRCOG Report**) prepared for WRCOG and the Quantifying Greenhouse Gas Mitigation Measures (CAPCOA, 2010). The WRCOG Report indicates that of the 50 transportation measures presented by CAPCOA, only 41 are applicable at a building and site level. The remaining 9

measures are functions of, or depend on, site location and/or actions by local and regional agencies or funders.

Based on a review of the 41 transportation measures identified by CAPCOA, the WRCOG Report identifies that only 7 of those measures may be effective at the project level. Land use context is a major factor relevant to the potential application and effectiveness of TDM measures. More specifically, the land use context of the Project is characteristically suburban center[4]. Based on a review of the potentially relevant TDM measures presented in the CAPCOA and WRGOG Report, the following TDM measures have the potential to further reduce project generated VMT:

- *Measure 1: Increase Diversity of Land Uses (LUT-3).* Having different types of land uses near one another can decrease VMT since trips between land use types are shorter and may be accommodated by non-auto modes of transportation. For example, when residential areas are in the same neighborhood as retail and office buildings, a resident does not need to travel outside of the neighborhood to meet his/her trip needs.

  Remarks: The Project proposes the construction of 237 multi-family dwelling units. In order for the above measure to apply, at least 3 of the following land uses should be located on-site or if not on-site then off-site within ¼ mile of the Project: residential development, retail development, office development, park, or open space. As the proposed Project does not include a mix of land uses on-site, but is instead located within a sphere of influence to a mix residential and retail uses (i.e., ¼ mile radius), this particular TDM measure would provide a nominal reduction and is therefore not evaluated further as a means of providing a reduction in Project VMT.

- *Measure 2: Provide Pedestrian Network Improvements (SDT-1).* Providing on-site pedestrian access network to link areas of the Project site to the off-site pedestrian network encourages people to walk instead of drive. This mode shift results in people driving less for short/nearby trips (typically less than ¼ mile and no greater than ½ mile) and thus a reduction in VMT.

  Remarks: The Project would provide for on-site pedestrian connections linking the site to existing pedestrian network along Central Avenue that would provide pedestrian connectivity to existing and planned commercial and residential uses in the area. In a suburban center context, a maximum 2.0% reduction in Project VMT may be achieved, as noted by CAPCOA (Quantifying Greenhouse Gas Mitigation Measures, p. 186).

- *Measure 3: Provide Traffic Calming Measure (SDT-2).* Providing traffic calming measures encourages people to walk or bike instead of using a passenger car. This mode shift would result in a decrease in VMT. Traffic calming features may include: marked crosswalks, count-down signal timers, curb extensions, speed tables, raised crosswalks, raised intersections, median islands, tight corner radii, roundabouts or mini-circles, on-street parking, planter strips with street trees, chicanes/chokers, and others.

  Remarks: The Central Avenue corridor provides for sidewalk and bike lane enhancements. There is limited opportunity for the Project to implement meaningful enhanced traffic calming measures in the area. A high

[4] ***Suburban Center:*** A project typically involving a cluster of multi-use development within dispersed, low-density, automobile dependent land use patterns (a suburb). The center may be an historic downtown of a smaller community that has become surrounded by its region's suburban growth pattern in the latter half of the 20th Century. The suburban center serves the population of the suburb with office, retail and housing which is denser than the surrounding suburb (*Quantifying Greenhouse Gas Mitigation Measures,* p. 60).

visibility crosswalk feature with an accessible pedestrian signal has been mentioned at the project site by City staff as a potential pedestrian enhancement along Central Avenue. This measure on its own would provide a nominal 0.25% reduction in VMT, as described by CAPCOA (Quantifying Greenhouse Gas Mitigation Measures, p. 190).

- *Measure 4: Implement Car-Sharing Program (TRT-9).* Implementing a car-sharing program would allow individuals to have on-demand access to a shared fleet of vehicles on an as-needed basis. User costs are typically determined through mileage or hourly rates, with deposits and/or annual membership fees.

  Remarks: This measure would likely require the Project to pay fees toward its inclusion in an existing car sharing program – which may not be feasible for a project of this size. The potential reduction in VMT is also extremely limited with a maximum reduction in VMT between 0.4% and .07% as noted by CAPCOA (Quantifying Greenhouse Gas Mitigation Measures, p. 245), therefore, this measure is not evaluated further as means of providing a reduction in Project VMT.

- *Measure 5: Increase Transit Service Frequency and Speed (TST-4).* This measure serves to reduce transit-passenger travel time through more reduced headways and increased speed and reliability. This makes transit service more attractive and may result in a mode shift from auto to transit which reduces VMT.

  Remarks: The project area is currently served by Riverside Transit Agency (RTA), a public transit agency serving various jurisdictions within Riverside County. RTA Route 16 currently provides along Central Avenue. Transit service is reviewed and updated by RTA periodically to address ridership, budget and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate. An ADA compliant bus turnout is being required along the Project's frontage in response to a comment from RTA. Providing a bus stop in walking distance (less than ¼ mile) of the Project site would help to encourage transit use and reduce VMT. The potential reduction in VMT related to providing enhanced service near the Project site is estimated to be at the low end of the estimated range 0.1% and 10.5% as noted by WRCOG Report (TDM Strategy Evaluation, p. 96). Given the suburban center context of the area it is conservatively estimated that a maximum of a 4.0% reduction in Project VMT may be achieved.

- *Measure 6: Encourage Telecommuting and Alternative Work Schedule (TRT-6).* Encouraging telecommuting and alternative work schedules reduces the number of commute trips and therefore VMT traveled by employees. Alternative work schedules could take the form of staggered starting times, flexible schedules, or compressed work weeks.

  Remarks: This measure is not applicable for a residential project and is therefore not evaluated further as means of providing a reduction in Project VMT.

- *Measure 7: Provide Ride-Sharing Programs (TRT-3).* This strategy focuses on encouraging carpooling and vanpooling but its ultimate implementation is limited as Measure 6 above.

  Remarks: This measure is therefore not evaluated further as means of providing a reduction in Project VMT.

CONCLUSION

In summary, the Project's baseline HB VMT per capita exceeds the City threshold of 15% below the current baseline City HB VMT per capita, while the Project's cumulative HB VMT per capita does NOT exceed the City's threshold. Furthermore, the Project's effect on VMT was calculated and found to also

not exceed the City's threshold of no net increase in VMT for either baseline or cumulative traffic conditions.

With implementation of the limited feasible TDM measures discussed above (i.e., Measures 2, 3 and 5), a potential reduction in Project VMT of 6.25% would achieve the City's target threshold of 15% below current baseline HB VMT per capita that would result in a less than significant VMT impact based on the City's impact thresholds as described in the City Guidelines.

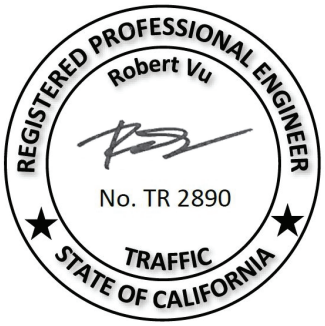
If you have any questions, please contact me directly at (949) 480-7788.

Respectfully submitted,

URBAN CROSSROADS, INC.

Aric Evatt, PTP
President

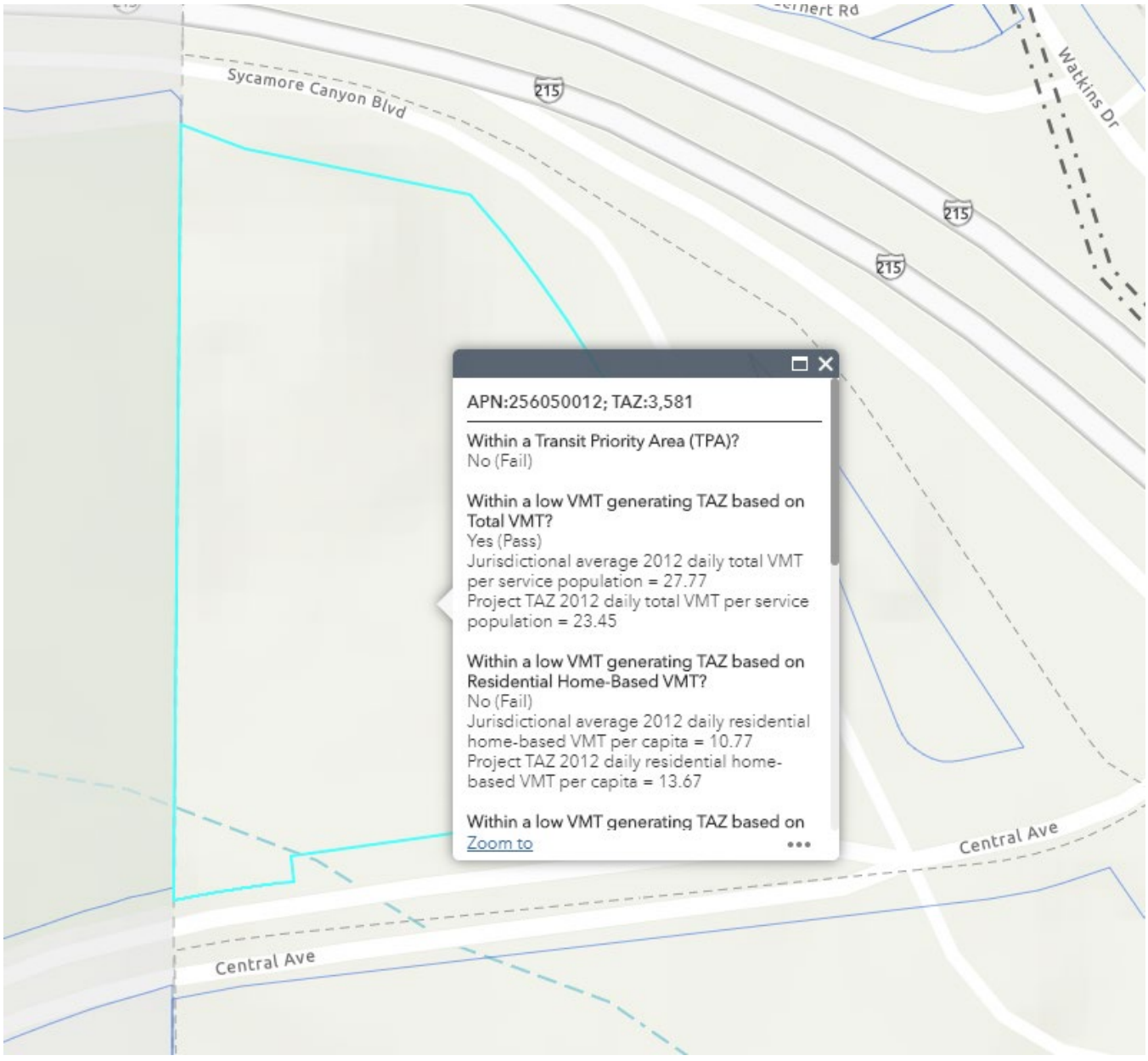
Robert Vu, PE
Transportation Engineer



REFERENCES

1. **Institute of Transportation Engineers.** *Trip Generation Manual.* 10th Edition. 2017.
2. **Office of Planning and Research.** *Technical Advisory on Evaluating Transportation Impacts in CEQA.* State of California : s.n., December 2018.
3. **Western Riverside Council of Governments (WRCOG).** *Recommended Traffic Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service Assessment.* February 13, 2020.
4. **City of Riverside Public Works Department.** *Traffic Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service Assessment.* City of Riverside : s.n., May 2020.

ATTACHMENT A:
WRCOG SCREENING ASSESSMENT


Sycamore Canyon Blvd
215
215
215
Watkins Dr
Central Ave
Central Ave
APN:256050012; TAZ:3,581
Within a Transit Priority Area (TPA)?
No (Fail)
Within a low VMT generating TAZ based on Total VMT?
Yes (Pass)
Jurisdictional average 2012 daily total VMT per service population = 27.77
Project TAZ 2012 daily total VMT per service population = 23.45
Within a low VMT generating TAZ based on Residential Home-Based VMT?
No (Fail)
Jurisdictional average 2012 daily residential home-based VMT per capita = 10.77
Project TAZ 2012 daily residential home-based VMT per capita = 13.67
Within a low VMT generating TAZ based on
Zoom to